



SUSTAINABILITY & CLIMATE ACTION PLAN

September 9, 2021

Sustainability and Climate Action Plan Ad Hoc Committee Meeting Focus: Residential Building Electrification

Questions and Answers

1. How many homes need to be electrified per year to get to 71% reductions by 2030?
 - A. We will need close to 100% of single-family homes to be electrified, in addition to meeting other outcomes, to get to 71% reduction in greenhouse gas emissions by 2030. The number of homes electrified will be slow in the initial 3-4 years, as these will be driven by early adopters. The City is considering policy options that take effect beginning 2026 to increase the rate of home electrification; examples of policy options include end-of-life mandates, time-of-sale mandate, and disconnecting gas service to selected blocks and neighborhoods. Please note that these policy options are under consideration only and require more discussion – they are not adopted and there are no mandates in place.
2. Can you say what the targets are for key electrification segments, mainly water and space heating for 2021, 2022, 2023, 2024 that would drive the policy and program implementation priorities?
 - A. The target is 5% heat pump water heater and 6% heat pump space heating penetration in single family homes by 2023. There are approximately 15,000 single family homes in Palo Alto.
3. You have set a very aggressive target and timeline. Do you have any examples of other cities that have successfully mandated or incentivized such extensive retrofit programs by homeowners and landlords using their own funds?
 - A. No, currently there aren't any examples of U.S. cities that have successfully mandated or incentivized extensive retrofit programs. However, electrification incentives are available in multiple jurisdictions to encourage voluntary electrification. Palo Alto is currently collaborating with other cities, including Menlo Park and Berkeley, to look at policy options such as end-of-life mandates to increase the rate of electrification retrofits in existing buildings.
4. Is there a problem or bottleneck with the manufacturing of enough home electric heating?
 - A. Not that we know of. There are many manufacturers that make different types of heat pump space heating systems; these systems are common in other parts of the United States

as well as other countries. We do not expect a bottleneck in the near-term production of residential heat pump systems.

5. Does the Home Efficiency Genie program review contractor quotes for appliances and retrofits? Where can we find the participating contractors list?
- A. Yes, our City program provides independent, third party advice on any home efficiency and electrification project, helping residents make educated and informed decisions on upgrades, equipment and appliances. The Home Efficiency Genie provides free over the phone energy and water efficiency advice for all Palo Alto residents. To learn more about the services the Genie provides, please visit efficiencygenie.com or call 650-713-3411. Additionally, the most up-to-date list of [qualified Genie contractors](#) can be found on the website.

6. If I need a circuit panel upgrade for electrification can I get city financing?
- A. The City does not currently offer financing for upgrading your electrical panel, but we have resources to help you determine whether or not you need an upgrade. The [Electric Panel Upgrade page](#) provides information to help you understand how to determine whether or not your project will require an electric panel upgrade and the best way to proceed. We invite you to connect with the Home Efficiency Genie at efficiencygenie.com or call 650-713-3411.

Redwood Energy has a resource that may help residents with a “Watt Diet” to possibly avoid an electric panel upgrade. That Watt Diet section starts on page 19 of this Pocket Guide: <http://redwoodenergy.net/wp-content/uploads/2021/02/Pocket-Guide-to-All-Electric-Retrofits-of-Single-Family-Homes.pdf#page=20>.

7. There is great complexity and cost with older homes. Adding solar panels, plug-ins for electric vehicles, radiant heat...all require updating the electric panel and contractors have different competencies. If I do a solar panel installation and circuit panel upgrade at the same time, do I qualify for city financial assistance?
- A. Palo Alto is currently participating in the SunShares solar group buy program, for old homes and newer ones. The program provides discounts of about 15% for solar. Electric panel upgrades can often be included as part of a solar install project and that allows them to benefit from a 26% federal tax credit, good for systems installed through Dec 31, 2022. After that the federal tax credit drops for 2023 to 22% and expires for systems installed after 2023.
8. Through required permitting, you know when people last installed their water heater. Why not send people a letter when their water is end-of-life offering incentives? When it is an emergency, people will replace with a gas water heater because it is faster.
- A. Yes, this is a good idea. In the summer of 2019, we launched a direct mail campaign to customers with water heater permits that were at the 10+ year mark. However, not all water heater replacements are permitted so the City’s record of water heater installation dates is spotty. We are currently inventorying permit data, as well as location and age of

existing equipment through our Home Efficiency Genie program and are looking at ways to expand this inventory through programs with schools, Green Teams, contests, and others to collect this information. The Home Efficiency Genie can help you determine how old your water heater is so that you can replace it with a heat pump before it leaks. We invite you to connect with the Home Efficiency Genie at efficiencygenie.com or call 650-713-3411.

9. Could someone clarify whether permits are required for water heater replacement? My general understanding is that in the case of “like for like” repairs, permits are not necessary.
 - A. Permits are required for like-for-like gas water heater replacements, as well as gas-to-electric water heater changeouts.

10. Thus far, the 15 amp Heat Pump Water Heater (HPWH) units are only available with long lead times
 - A. 15 amp HPWHs are new to market; the manufacturers will ramp the production of these units when the market demand for these units picks up.

11. Having City of Palo Alto Utilities do a group buy on 15 amp HPWH could help on both cost and availability.
 - A. This is an idea that we would like to explore. We might even consider offering the 120 volt units as those start becoming available, but there are logistical and resource issues to work out.

12. When will monetary incentives be available for HVAC electrification (similar to the HPWH rebate)?
 - A. The City is working to make those available as quickly as we can. Work is progressing right now on identifying funding sources.

13. Is there any consideration for replacement of gas fireplaces? Should we be building awareness that (1) this is a gas "appliance" that homeowners should look to replace, as well as (2) providing guidance on options, contractors, etc.
 - A. Yes, there are many electric options available for replacing gas fireplaces. Electric inserts can be fitted into just about any existing fireplace. The dimensions of the insert must fit within the fireplace cavity. In order to replace a gas fireplace with an electric insert you will need to remove the existing unit, seal the gas line, and pop in the electric unit. Electric inserts are 100% energy efficient, and installation costs are minimal in comparison to gas fireplaces. They offer different features such as the flame effect, a safety shut off switch, and remote-control access. The Home Efficiency Genie has resources for electric fireplaces and installers. We invite you to connect with the Home Efficiency Genie at efficiencygenie.com or call 650-713-3411. Redwood Energy’s Pocket Guide to All-Electric Retrofits of Single-Family Homes also has a section on electric fireplace resources (p.80) that may help residents with a “Watt Diet” to possibly avoid an electric panel upgrade. That Watt Diet section starts on page 19 of this Pocket Guide: <https://redwoodenergy.net/wp-content/uploads/2021/02/Pocket-Guide-to-All-Electric-Retrofits-of-Single-Family-Homes.pdf#page=81>.

14. Your consultant is recommending induction stovetops. 1.5 million US residents (and the number is growing) have pacemakers and cannot get near one.

- A. Thank you, this is a really important and helpful comment. Pacemakers are small electrical devices that regulate electrical activity in the heart; anything that produces a strong electromagnetic field can interfere with a pacemaker (such as microwave ovens, metal detectors, handheld hair dryers, shavers with an electrical cord, large stereo speakers, and electric toothbrushes). As such, we understand that induction cooktops are not recommended for those with certain types of pacemakers that are implanted on the left side, and we suggest electric ranges for individuals with unipolar pacemakers.
15. You offer incentives for gas heating (a larger first bracket allowance in the winter), but do not offer a similar allowance for electricity. When will the City change the electric rate structure to incentivize electrification? Currently the rate structure is a disincentive. Is anyone on City of Palo Alto Utilities staff looking into changing rate structures for those who are electrifying?
- A. Yes, our Rates team is starting an electric cost of service study, which is the first step to getting the rate structures re-examined. We aim to have this barrier addressed by September 2022.
16. Is there a way to internalize the currently externalized costs of gas to make it more expensive than electricity for home use? I am aware that you can't subsidize electric rates with gas ones, so I suggest that the true costs of gas be reflected in its cost to the consumer.
- A. This is partially already happening due to some environmental adders currently in place on the gas rates, including the State's Cap and Trade Program. Costs associated with that program are rising and the City buys offsets for our Carbon Neutral Gas program, which raises the cost of gas. We will be looking at carbon pricing in studies in the next 1-2 years while considering the impact on low-income customer winter heating.
17. How will the distribution/transmission capacity from PG&E lines be increased to accommodate the increased demand in electricity due to converting from gas? The Peninsula is already somewhat limited by electrical capacity.
- A. The need for PG&E upgrades will depend on what happens both in Palo Alto and beyond Palo Alto. We can't speak to the need for transmission upgrades on PG&E's system. We can say that Palo Alto's transmission connection to PG&E has adequate capacity to handle the increased load, as do our substations. But there will likely need to be upgrades to the Palo Alto distribution system. You can get our early assessment of this issue in this staff report: <https://www.cityofpaloalto.org/files/assets/public/agendas-minutes-reports/agendas-minutes/utilities-advisory-commission/archived-agenda-and-minutes/agendas-and-minutes-2020/11-04-2020-special/id-11639-item-no-3.pdf>.
18. Are we still reliant on only one PG&E line into Palo Alto for electricity? Why not use the dormant line over 101 by the south end of town?
- A. We are currently still reliant on one line but are working actively and collaboratively with PG&E and the California Independent System Operator (CAISO) on a design for a second one.

19. One of the main fears I've encountered is resiliency. What about rolling blackouts when everyone has switched to electricity? Won't people resort to gas run generators as back-up? Can we have microgrids?

A. Resiliency is certainly an important consideration. The City of Palo Alto Utilities Department strives to provide safe and reliable services. Our electric system is highly reliable as compared to others and ensuring maintenance and investment in the system will be critical as more homes electrify. The state is working to eliminate the possibility of future rolling outages, which will help our own efforts, and we are actively working on adding a second transmission line in Palo Alto.

Most gas appliances need electricity to operate, like fans and ignition and venting, so gas appliances do not always have advantages. We don't encourage gas generators except in certain instances. For customers who are worried about shutoffs, and not having power to use their appliances, there are alternatives – such as battery backup systems. One of the things we're focusing on right now is supporting people who are interested in installing their own storage and their own back-up generation. The City offers resources to customers who want to invest in home storage solutions, and we are also partnering with commercial customers interested in microgrids as a resiliency solution. The City is not pursuing local utility scale storage solutions at this time due to the high cost to our customers, but will continue to monitor various technologies and cost trends.

20. The city should be working on reducing the number of power outages within the city. So far, with the current outages, people are not willing to go all electric until this is fixed. This does not depend on a second line which would go down in the event of an earthquake.

A. We agree that day to day reliability is critical as is emergency resiliency and recovery. It's worth noting that despite recent high-profile outages, Palo Alto still is in the top quartile nationwide on key reliability measures. But we need to preserve and improve that reliability and help people feel confident that electric service will be reliable if they electrify their homes. We have studies and programs included in the S/CAP work plan addressing these issues.

21. What parallel effort is City of Palo Alto Utilities making to make sure that the winter and overnight electricity supply is really coming from carbon free generation instead of relying on renewable energy credits (REC) to achieve symbolic carbon neutrality?

A. We spent a little bit over a year working with our Utilities Advisory Commission to evaluate whether our Carbon Neutral Electric portfolio truly resulted in net zero emissions each year. We made some adjustments to our calculation methodology, incorporating the hourly emissions associated with grid power. These were adopted by the City Council last spring. After that thorough review we feel confident that Palo Alto's electric portfolio is net zero each year. We will continue to rebalance the electric portfolio based on the composition of the statewide electric system. As more solar is installed on the state grid, it will naturally force us to rebalance the portfolio to incorporate more winter and overnight renewable sources to maintain our carbon neutrality goal. One note: a REC is just a certificate that attests that one megawatt-hour of renewable energy was generated. RECs are generated

only when we purchase actual renewable energy. They represent real power generated and supplied.

22. I don't see a lot of information coming out from the Utilities Department about home electrification and the fact that our residences will be completely electrified by 2030. Most residents have no idea that this is coming. We need a massive communications campaign from the city.
- A. There are currently no mandates to electrify. No one is required to electrify their homes by 2030, or any year. At this time, we are only suggesting electrification, highlighting the benefits, and taking early actions that set the stage for widespread conversion; the Sustainability and Climate Action Plan and the Three-Year Work Plan have not yet been approved or adopted by Council. Until that happens, the residential building electrification strategy is still up for discussion – it has not been finalized yet. Regarding our communication efforts, a significant communications and outreach plan about the benefits of home electrification is in the works now.
23. Recent conversations on NextDoor show a very different mix of opinions than I am hearing today. Is anyone from this group monitoring those threads?
- A. Yes, we are following the conversations on NextDoor, which make it clear that we need to improve awareness and community involvement to gain community wide support. We are working to do so now and appreciate the community's help in spreading the word about our efforts.
24. When will all of the residents be surveyed regarding the proposed regulations? Perhaps that should be done before they come before the Council.
- A. We agree that any proposed regulations need extensive public engagement. The focus in the near-term is on establishing voluntary programs while studying possible regulations in parallel.
25. We all know that short-term incentives often outweigh long-term benefits. Most of us know that eating less and exercising more are great for our health, but few of us do so. To the concerns about cost, could City of Palo Alto Utilities issue "green bonds" funded by future utility savings to raise immediate subsidization funds in addition to bulk purchasing of hardware and installation?
- A. There is no doubt that financing will be critical. We will be looking at bonds as one potential option when we study financing of mass electrification.
26. Is Palo Alto City Hall all-electric? If not, what are the plans?
- A. City Hall is not currently all-electric. The Public Works Department is currently undertaking an Electrification and Planning Assessment of City facilities, with the goal of reducing natural gas usage at City facilities by 80% by 2030.
27. Why is this [the September Ad Hoc] meeting only focused on electrification of appliances, and doesn't even mention solar panels plus battery storage?
- A. Solar and storage are important; we have a wide variety of topics to focus on and address each month. Appliance electrification is just one topic for one meeting. More information

about solar and battery storage, as well as available rebates, can be found at <https://www.cityofpaloalto.org/Departments/Utilities/Sustainability/Solar-in-Palo-Alto>.

28. With regards to the “permitting” topic for next month’s meeting, will that address electrification permitting for residences?

A. Yes, the October S/CAP Ad Hoc Meeting will address permitting as it relates to building electrification.

29. How does the public access the AECOM impact memo?

A. The AEOMC Impact Analysis memo can be found at https://www.cityofpaloalto.org/files/assets/public/sustainability/aecom-palo-alto-action-impact-memo_final_rev-210607.pdf.

30. Has anyone calculated the greenhouse gas (GHG) emissions from additional concrete used in basement construction in high groundwater areas compared to residential emissions from burning natural gas? And, in comparison to GHG emissions from water heating?

A. We are currently studying the best practices for reducing GHG emissions from concrete. We plan to complete that study by the end of 2022.

31. I would love it if the City can promote a program to convert gardens to be mower and blower free. Lawns need to be deprecated to address long term drought, and mulch is far healthier for soil than blowing it away. Currently the gas blower ban is not being enforced, and gas blowers are still allowed on multifamily and commercial properties. It is time to retire these appliances completely.

A. Yes, the City has a Landscape Rebate Program to replace high water use landscape (i.e. irrigated turf or functional swimming pool) with a qualifying low water use landscape. https://www.cityofpaloalto.org/files/assets/public/utilities/bill-inserts/landscape_ad_v01.pdf. As you noted, Palo Alto currently has an [ordinance](#) in place that bans the use of gas-powered leaf blowers in residential neighborhoods. Although Palo Alto’s ordinance remains in effect, there have been staffing reductions in the Planning and Police Departments over the last several years that impact our ability to enforce the ordinance. Our Planning Code Enforcement staffing was previously budgeted at three officers, which enabled Planning Officers to assist the Police Department in educating people to not use gas leaf blowers. We currently have only one Planning Enforcement Officer. Given the reduced staffing, Planning Enforcement staff are prioritizing enforcement of unpermitted construction. However, we do still want to know about any residential gas leaf blower use. To report use in a residential neighborhood, you may call the non-emergency 23-hour dispatch center at 650-329-2413. You may also choose to submit a complaint via Palo Alto’s issue-reporting webpage: <https://www.cityofpaloalto.org/Residents/Services/Report-an-Issue>.

At the state level, in October 2021, Governor Newsom signed into law [Assembly Bill 1346](#), which directs the California Air Resources Board (CARB) to phase out the sale of small internal combustion engines predominately used in lawn and garden equipment, starting as soon as 2024, and support the transition to zero-emission small off-road equipment

operations. The new law, authored by Assemblyman Marc Berman from Menlo Park, will offer rebates for consumers to purchase electric replacements, and it builds on previous rulemaking already underway. The phaseout will begin as soon as is feasible or by January 1, 2024, whichever comes later. The law also requires CARB to adopt cost-effective and technologically feasible regulations to prohibit engine exhaust and evaporative emissions from new small off-road engines by July 1, 2022, and directs the state board to implement strategies to achieve 100 percent zero emissions from off-road equipment in California by 2035, where feasible and cost-effective.