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Brendan Creedon comments (customer perspective)

Additional submitted attachment is included below.

22-DECARB-02: Building Decarbonization and Electric Vehicle Charging Equipment Web Guide

Dear Commissioner McAllister and CEC Staff:

Thank you for soliciting input from the general public for the proposed CEC website. My comments are from the point of view of a homeowner-customer, based on my own experiences trying to navigate the decarbonization and electrification process, and I hope my perspective will be helpful.

The current situation can be very confusing, with unfamiliar concepts and terms and a steep learning curve. A central website with online tools has a lot of potential to educate, guide and help consumers (and contractors) understand the tradeoffs and timescales involved.

Suggestions:

- Existing websites such Switch Is On (www.switchison.org) and Bayren (www.bayren.org) are very good examples of portals that could be enhanced by tools similar to HEA's Home Intel tool (<https://corp.hea.com/>) or Lumina Decision Systems Analytica Cloud Platform, as described in 22-DECARB-01 TN242835. Being able to try out different decarbonization options and timelines online with immediate feedback can be very informative. The online experience can then be supplemented with a network of unbiased human experts, expanding from what is currently available from Bayren and Switch Is On.
- It can be difficult for consumers to see the big picture and how heat pumps, solar panels, electric or thermal storage, induction stoves, electric clothes drying, and vehicle charging all interact. It can also be very difficult to figure out where to start, and how to prioritize these different possibilities. It is also difficult to understand where a strategic multiyear plan might be appropriate, given future regulatory directions, versus what can be done immediately. Laying out different pathways can help consumers visualize an approach that works for them, both short-term and long-term.
- Some decarbonization options can have non-obvious interactions, for example the need for electrical panel upgrades or changes. Planning can save consumers money and annoyance if they are aware that future loads such as for heat pumps (water and/or space heating/cooling), battery storage, EV charging and other 220V appliances will all require space and capacity in their electrical panel. Redwood Energy's Watt Diet approach, or a critical loads subpanel for a future battery storage installation, can help reduce the aggregate cost of electrical panel upgrades.
- Heat pumps are a preferred solution but sizing them is heavily influenced by the building envelope – much more so than with gas or electric resistance heating where the incremental cost of a larger or oversized system was minimal. Building envelope improvements can also be very expensive and can become major projects in their own rights. However, it is better for these issues to be visible, otherwise there is a danger that some of these decarbonization efforts will develop a poor reputation and could end up being adversely politicized in the media. With better information, consumers can make tradeoffs that better fit their specific circumstances and needs.
- In the 22-DECARB-01 Heat Pump workshop, several presenters suggested that CEC provide recommended or preferred heat pump configurations. This would be very helpful for manufacturers, installers, and consumers by identifying frameworks that are likely to stand the

test of time and would also allow CEC to lay out pathways for meeting its goals. It seems that an ideal cost-effective solution would be a combination heat pump that provides space heating/cooling and domestic hot water, preferably with heat recovery for summer water heating. This is described in CEC 20-EPIC-01 TN 240609 “Final Commission Report – The Electric Program Investment Charge Proposed 2021-2025 Investment Plan”, Topic 27. Combination Heat Pump for Domestic Hot Water and Space Conditioning.

- A single combination heat pump could be hydronics based, with an external heat pump. Such a configuration decouples the heat pump and questions about its refrigerant from the rest of the heating/cooling system. The heat pump is the most complex part of the system and is likely to be replaced sooner than other components. It is almost certain there will be a drive to lower GWP refrigerants in the coming decades that are incompatible with what is currently approved. Being able to upgrade the heat pump only without touching the rest of the system is advantageous, something a hydronics based system would allow.
- An unbiased consumer protection guide like CPUC’s Solar Consumer Protection Guide would be a very helpful supplement to the website.

Thank you for your consideration.

Yours,

Brendan Creedon