Correspondence for

June 19th, 2019 Napa County Planning Commission

Agenda item Draft Napa County

Climate Action Plan- public comment

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June 15, 2019

David Morrison, Director
& Napa County Planning Commission
1195 Third Street, Suite 210
Napa, CA 94559

Re: draft Napa County Climate Action Plan
Second Revised Draft CAP

Dear Director Morrison and Napa County Planning Commissioners,

Table 2-1 chart of the Greenhouse Gas Emissions lists **Building Energy Use** at 31% of total estimated county emissions. Building efficiency and reducing this quantitative and qualitative share are primary goals. Improving this single sector can provide a greater reduction in greenhouse gas (GHG) emissions than any other sector.

As an Architect in both California and Michigan, and practicing here in the County, my team was able to provide design for a small community of (10) Net Zero Energy Homes for Habitat for Humanity of Grand Traverse, Michigan. These homes are now built and functioning **100% electric**, solar power generating and (5) are LEED platinum certified. In 2016, we won a Department of Energy Award from the office of Energy Efficiency & Renewable Energy. Design for Habitat was instructive for best use of **'off the shelf'** systems at reasonable cost.

Practicing here in California, we are proud of the Golden State's forward thinking and efforts toward energy efficiency. Residential building codes are geared toward Zero Net Energy (ZNE) requirements in the 2019 California Building Code to be implemented in 2020.

At this point, it is important to draw a distinction between energy efficiency and carbon reduction. Energy efficiency is not necessarily carbon reduction. The California Energy Commission will certify compliance software for the calculation of building energy efficiency and this includes an arcane calculation of Time Dependent Values (TDV). TDV includes a spectrum of energy sources and cost factors which does include carbon fuels in Zero Net Energy compliance. We can recognize that the California Energy Commission represents varied interests in many energy sources such as: Renewables (Solar, Wind, Geothermal), Hydroelectric, Nuclear, and Oil & Gas.

In fact, the 2019 Title 24/Part 2 & 2.5 California Building Codes, the energy calculation in 2019 Title 24/Part 6 Building Energy Code, the mandatory measures of 2019 Title 24, part 11

CALGreen Tier 1 Green Building Standards and HERS ratings all allow for **Gas water heaters** and **Gas furnaces for Home Heating**. Propane and Natural Gas are, of course, Carbon Fuels (GHG). As many of us are aware, efforts to rebrand Natural Gas as a clean burning fuel neglect both extraction collateral losses and unavoidable combustion Carbon Monoxide/Carbon Dioxide/Methane release providing point sources of greenhouse gas (GHG) emissions.

It is encouraging to see in the Primary Measures of Table 3-3 (Building Energy Measures of the draft Napa Climate Action Plan), the **BE-4** provision to "Require new or replacement water heating systems to be electrically powered or alternatively fueled (e.g., solar water heating) for all residential land uses. Please believe from an architect, the California codes do not currently make it easy to include heat pump water heating in energy code compliance, in spite of the fact that the heat pump water heaters offer efficiencies up to 3.5 times a typical default water heater. [1]

For assured additional significant GHG reduction in the Building Energy Use sector, including **electrical home heating and cooling** in provision **BE-4** would move heating and cooling toward eliminating GHG combustion emissions entirely. Electric Heat Pump technology now offers high efficiencies for both heating and cooling well suited for the full range of climate conditions we experience here in Napa. While the units do use refrigerants such as HFC r-410a, which is a greenhouse gas, it is sealed in the system and recyclable and does not approach the emissions from a continuously fired combustion gas furnace. The heat pump appliance industry is also continuing research into refrigerant alternatives. In any case, it should be noted that any home that includes an Air Conditioning unit also uses the same refrigerants, so a furnace/AC combination always exceeds the GHG of an electric heat pump.

Including incentives for all electric heating and cooling is synergistic with measure BE-3, MCE's Deep Green (100 percent renewable) incentive.

Retrofitting existing homes and developments with all electric, off the shelf heat pump heating and cooling is a viable synergy to the BE-10 provision as well.

While it may be difficult to rapidly eliminate carbon fueled furnaces entirely from existing buildings, it is certainly within codes to require high efficiencies for both heating and cooling in new buildings and remodels. Electric Heat Pumps typically beat gas furnaces in moderate heating climates (such as Napa), with heat pump seasonal efficiencies of 200% and better compared to gas furnace overall seasonal efficiencies around 80% at the high end. It is hopeful to also incentivize all electric heating and cooling through language designating home heating efficiency minimums in **BE-4**: Furnace efficiency, Annual Fuel Utilization Efficiency (AFUE) min 95%
Heat Pump efficiency, Heating Season Performance Factor (HSPF) min 8.2

Sincerely,

David T. Hanawalt AIA
Architect CA#35039
Lail Design Group

[1] See attached correspondence with State of California regulators Re: Heat Pump Water Heaters

Gmail

David Hanawalt <hanawaltarchitect@gmail.com>

Planning Commission Mtg.

JUN 19 2019

Agenda Item # 7A

Heat pump water heaters

1 message

Ross, Dee Anne@Energy <deeanne.ross@energy.ca.gov> Fri, Mar 24, 2017 at 10:20 AM
To: "hanawaltarchitect@gmail.com" <hanawaltarchitect@gmail.com>
Cc: Energy - Title24 <Title24@energy.ca.gov>, "cbecc.res@gmail.com" <cbecc.res@gmail.com>

David,

You're not the only one who is noticing this. The change to instantaneous gas as the standard design is a big part of it, but also the ACM Reference Manual spells out the standard design is gas instantaneous even when the proposed is electric or heat pump:

> For systems serving individual dwelling units the standard design is a single gas or propane small instantaneous water heater for each dwelling unit. The standard design is natural gas except if the proposed water heater is propane; then the standard is modeled as propane.

In the 2013 ACM, it was, in part, this language:

> If natural gas is not available, the fuel type is the same as the proposed fuel type, meeting the minimum federal Energy Factor standard for propane (0.575 in 2014, 0.60 in 2015) or electric (0.904 in 2014, 0.945 in 2015). When the proposed fuel type is electric resistance, a solar water heating system with a minimum solar savings fraction of 0.50 is included.

But I would offer two comments. (1) Make sure, if natural gas is not available, you uncheck that box because propane TDV #s are **a lot different**. Analysis Tab:

(2) If you can use a NEEA rated heat pump water heater, they perform a lot better than when not NEEA rated.

Hope that helps.

Dee Anne Ross

Building Standards Office

California Energy Commission

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Sacramento, CA 95814

(916) 654-6560

From: Energy - Title24 [mailto:Title24@energy.ca.gov]
Sent: Friday, March 24, 2017 9:35 AM
To: cbecc.res@gmail.com
Subject: FW: attn: RAY

Hello,

David needs help understanding why his model run might prefer a Hot Water On Demand system over a Heat Pump system. It was always my understanding that heat pumps would perform better. Below is his original email.

Best Regards,

Raymundo Gregorio-Flores

Energy Standards Hotline Staff

California Energy Commission

1516 Ninth Street

Sacramento, CA 95814

(800) 772-3300

Title24@energy.ca.gov

From: David Hanawalt [mailto:hanawaltarchitect@gmail.com]
Sent: Friday, March 03, 2017 10:58 AM
To: Energy - Title24
Subject: attn: RAY

Hello Ray,

Thanks for helping this morning!

Appreciate you help comparing Title24 part 6 energy analysis of:

Heat Pump Water Heater

50 gallon, electric, Rheem unit, 3.5 EF

vs.

Hot Water on Demand

199,000 btu/hr, NG unit, .9 EF

For one project, our energy analyst ran the project with either of these two and it failed for the HPWH and passed with the HWOD. I want to better understand this, as my preference toward net zero and carbon reduction in many ways is the HPWH.

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