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On Framework for Doubling Energy Efficiency Savings

Additional submitted attachment is included below.



UTILITIES DEPARTMENT

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**City of Palo Alto Comments on Framework for Doubling Energy Efficiency Savings
Docket 17-IEPR-06**

September 21, 2017

On September 7, 2017, the California Energy Commission (CEC) held a workshop to discuss the draft Commission Report titled “Senate Bill 350: Doubling Energy Efficiency Savings by 2030.” The report segments the projected 2030 energy efficiency (EE) savings into utility program based savings and non-utility program savings. Palo Alto is pleased to see that CEC has recognized that fuel substitution, or appliance electrification, reduces both energy consumption and GHG emissions. Specifically, high performance heat pump water heating (HPWH) and heat pump space heating (HPSH) systems are considered eligible fuel substitution technologies. However, the draft Commission Report attributes fuel substitution energy savings exclusively to future local building code mandates, and fails to recognize the *significant* potential for energy reduction and GHG emissions through voluntary fuel substitution in new and existing buildings.

Fuel substitution programs have the potential to reduce energy consumption and GHG emissions beyond the new construction market which is regulated through the state’s Title 24 building energy standards and municipal building codes. Palo Alto respectfully submits the following recommendations related to fuel substitution programs.

Recommendation #1: CEC should include energy savings attributed to utility-funded voluntary fuel substitution programs toward the SB 350 EE targets.

Prior to establishing local building code mandates on fuel substitution measures, customer outreach and incentives are necessary to lower/remove prevailing market barriers that include high upfront prices and market awareness. For decades, California utilities have played a critical role in facilitating market transformation of energy efficient technologies that range from lighting to windows to home appliances through rebates and education programs. As the customer uptake of the energy efficient alternatives increases, prices of the energy efficient products decline, and eventually the efficient products become the norm and in some cases are incorporated into the state’s appliance or building standard.

Currently, HPWH sales account for less than 2% of the water heater market in United States. Most consumers, and even contractors, remain unaware of heat pump water heating or heat pump space heating products. The cost of heat pump water heaters and space heaters are high compare to their natural-gas counterparts. As a result of these higher equipment cost, many contractors and retailers do not stock these products.

In early 2017, the City of Palo Alto explored mandating electric heat pump water heating/space heating as part of the City’s green building code. The study found that in new construction of an all-electric single family home, a low-rise multifamily building, or a small office building without natural gas connections, electric heat pump water heating/space heating is cost-effective under the current Title 24 Building Energy Code¹. Installation of heat pump space heaters is also found to be cost effective in single family and low-rise multifamily new construction projects. Despite these findings, Palo Alto’s Utilities Advisory Commission concurred with staff recommendation that until

¹ See staff report to Palo Alto Utilities Advisory Commission dated March 1, 2017
<http://www.cityofpaloalto.org/civicax/filebank/documents/56134>

existing market hurdles to the adoption of heat pump appliances are overcome, a building mandate should not be implemented. Instead, Palo Alto decided to rely on education and incentive programs to increase customer awareness and adoption of HPWH and HPSH products. This effort included engaging with equipment makers and installers to lower supply market barriers. The City of Palo Alto has been implementing a HPWH pilot that offers a rebate of up to \$1,500 to residents for replacing gas water heater with a HPWH for over a year. Customer and contractor outreach has been a key component of this pilot program.

Palo Alto is however a municipal utility that serves only around 25,000 residential customers and 4,000 non-residential customers. An effective market transformation in California will need programmatic support from investor-owned utilities, municipal utilities and community choice aggregators across the state. These entities are well connected with local communities and are best positioned to influence the energy efficiency choices of residents and businesses. In the case of Pacific Northwest region, the Northwest Energy Efficiency Alliance has been working closely with its member utilities across Oregon, Washington, Idaho and Montana to advocate the Heat Pump Water Heater Initiative to replace electric resistance water heaters in single family homes since mid-2013. A recent market evaluation report on the NEEA's HPWH Initiative noted that utility incentives play a key role to transform the electric water heating market in the Northwest.²

By including energy savings attributed to utility-funded fuel substitution programs toward the SB 350 EE targets, the CEC will provide the necessary policy direction to guide the subsequent development of fuel substitution programs.

Recommendation #2: The CEC's estimation of natural gas savings from voluntary fuel substitution should include retrofits to existing buildings in addition to savings from new all electric buildings.

In the CEC staff paper, the 2030 EE projection does not include natural gas savings from fuel substitution in retrofits to existing buildings. This is because fuel substitution measures in existing buildings are currently deemed non-cost effective and therefore the CEC chose to exclude them in the 2030 EE savings targets. Projecting EE savings through 2030 is a non-trivial exercise; it is difficult to predict the development of new EE technologies over the next decade and the changing cost effectiveness of such technologies. There are existing HPWH and HPSH products that are more energy efficient than gas-fired alternatives, and there are trends that will likely improve the cost-effectiveness of these technologies before 2030. Therefore these technologies should be included in the 2030 portfolio of energy efficiency programs.

Over time, as policies, utility rates, equipment prices and contractors' attitude towards heat pump water heating and space heating technologies evolve, fuel substitution will become more cost-effective in retrofit scenarios. Furthermore, as more existing buildings upgrade the main electric circuit panel to accommodate the addition of electric vehicle supply equipment and rooftop PV system, it becomes easier and cheaper to replace the gas water heating and space heating systems with electric heat pump alternatives.

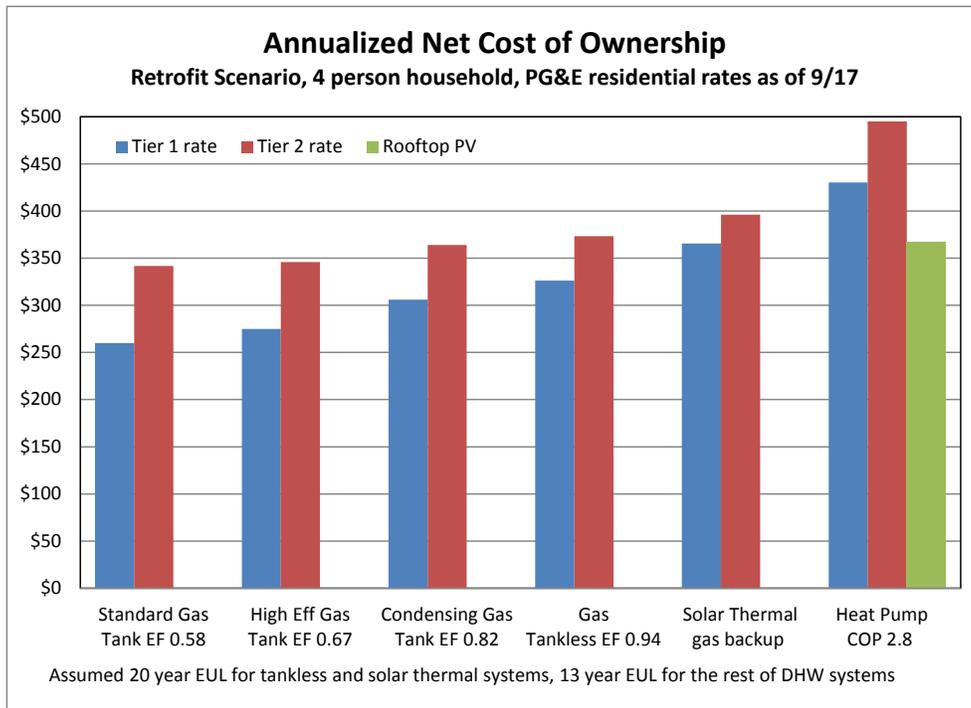
While HPWH may not be cost-effective as a standalone retrofit measure, it can be cost effective when bundled with lower cost electricity from rooftop PV system in existing single family buildings. In addition to energy savings and GHG emission reductions, HPWH can also provide value to the grid as a thermal storage unit. NRDC is currently leading a study to assess the potential for demand flexibility by HPWHs in California.

In the past, cost-effectiveness has not necessarily been a deterrent to inclusion of EE measures in CEC projections. For example, California legislation has supported non-cost effective EE measures such as solar thermal systems. The Solar Water Heating and Efficiency Act of 2007 (AB 1470) requires gas utilities implement a customer rebate

² Northwest Heat Pump Water Heater Initiative Market Progress Evaluation Report #2, August 23, 2016, prepared by Evergreen Economics, pp. 34-35 (<http://neea.org/docs/default-source/reports/northwest-heat-pump-water-heater-initiative-market-progress-evaluation-report-2.pdf?sfvrsn=6>)

program for solar water heating system funded by the natural gas surcharge for EE and low income programs. Under AB 1470, solar thermal system only needs to be cost effective from a customer perspective. Without the federal tax credit and utility rebates, solar water heating systems are not cost effective for most residential applications. Figure 1 below shows the relative annualized net cost of ownership for various residential domestic hot water heating systems based on current PG&E residential rates. The annualized net costs exclude utility rebates, but include the 30% federal tax credit for solar thermal system cost. Without utility rebates, solar thermal system with gas back-up remains more expensive than other gas tank and tankless water heating systems.

Figure 1: Annualized Net Cost of Ownership for Residential Domestic Water Heater Systems under PG&E rates



Lastly, the question of whether the gas or electric utility should obtain credit toward meeting the SB 350 target should not be a deterrent in the current long term EE goal setting process. The effects of climate change will impact everyone, regardless of which utility gets the credit.

City of Palo Alto looks forward to continuing its participation in future working groups to facilitate fuel substitution as a key strategy to meeting SB 350’s EE targets.

Respectfully,

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