| DOCKETED | |
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| **Docket Number:** | 19-BSTD-06 |
| **Project Title:** | Local Ordinances Exceeding the 2019 Energy Code |
| **TN #:** | 235508-2 |
| **Document Title:** | Staff Report to the City Council 12-4-19 |
| **Description:** | Plain text of the staff report to the Los Altos Hills City Council 12-4-19 |
| **Filer:** | Danuta Drozdowicz |
| **Organization:** | Town of Los Altos Hills |
| **Submitter Role:** | Public Agency |
| **Submission Date:** | 11/4/2020 3:24:19 PM |
| **Docketed Date:** | 11/4/2020 |

TOWN OF LOS ALTOS HILLS December 4, 2019
Staff Report to the City Council

SUBJECT: CONSIDER ADOPTING LOCAL MODIFICATIONS AND AMENDMENTS TO THE CALIFORNIA ENERGY CODE TO ENCOURAGE ELECTRIFICATION OF NEW STRUCTURES; FILE #MCA19-0005

FROM: Zachary Dahl, AICP, Planning Director

APPROVED: Carl Cahill, City Manager

RECOMMENDATION: That the City Council:

Review the information in the staff report and attachments, take public comment, and provide direction to staff for preparation of an ordinance to implement reach codes for all new single-family residences and detached habitable structures based on one of the following options:

1. Require pre-wiring for heat-pump space heating systems, heat-pump water heating, appliances, battery back-up systems and Level 2 car charging;
2. Require heat-pump space heating, heat-pump water heating and electric clothes dryers, but allow for cooking appliances and fireplaces to be gas fueled. In addition, require pre-wiring for all appliances, battery back-up systems and Level 2 car charging;
3. Require all-electric buildings by banning all new gas infrastructure for new development.

## BACKGROUND

Every three years, the California Building Standards Commission, along with other state agencies, reviews the California Building Standards Code (CBC) and adopts updates to the codes as part of Title 24 of the California Code of Regulations. Local jurisdictions have the option of adopting more stringent amendments to the code (also known as reach codes), however, the California Energy Commission (CEC) requires that a cost-effectiveness study be conducted and filed in the case of local amendments to the Energy Code (Title 24, Part 6). It is required that a local jurisdiction demonstrate to the CEC, using a cost-effectiveness study, that the amendments to the code are financially responsible and do not represent an unreasonable burden to property owners and applicants.

There are multiple reasons why cities consider adopting energy related reach codes. These include improving indoor air quality, reducing fire risk, and seeking an overall reduction in greenhouse gas (GHG) emissions to meet their adopted Climate Action Plans. In the past six months, there has been considerable interest among cities in the Bay Area to adopt reach codes, including mandating all-electric new construction, or "building electrification," which means that the buildings would not have any fossil fuel services. Over 13 jurisdictions have now adopted ordinances which ban, to varying degrees, natural gas connections and appliances in new buildings. Attachment 1 includes a memo entitled "Building Decarbonization: Legal Opportunities and Hurdles for Local Governments" from the law offices of Shute, Mihaly and Weinberger LLP, which outlines the legal framework from which local governments can decarbonize new and existing residential and

commercial buildings. In summary, local jurisdictions can adopt an ordinance that includes reach codes as long as the requisite findings are made.

## DISCUSSION

At the September 19, 2019 City Council meeting, a representative of Silicon Valley Clean Energy gave a presentation on energy reach codes. These codes are only intended for new construction and not for additions or remodels to buildings that are already connected to natural gas or propane.

Based on the City Council's response to the reach codes presentation, staff has developed three options for consideration:

**Option 1** – Require electric prewiring for heat-pump space heating systems, heat-pump water heating, appliances, battery back-up systems and Level 2 car charging. This option requires the installation of 220 volt wiring to a junction box or outlet in locations throughout the home to service heat-pump systems and appliances. This option does require that the home have a minimum 200 amp service to accommodate the additional 220-volt outlets. This would not pose a substantial burden on property owners as most, if not all, new homes currently being built in Los Altos Hills are equipped with a minimum 200 amp service. This option could also be applied to major additions and whole house remodels if desired by the Council.

**Option 2** – Require heat-pump space heating, heat-pump water heating and clothes dryers to be electric, but allows for cooking appliances and fireplaces to be gas fueled. In addition, it requires pre-wiring for all appliances, battery back-up systems and Level 2 car charging. This option would target reducing fossil fuel consumption by focusing on space and water heating, which are typically responsible for 80% or more of a home's natural gas usage.

**Option 3** – Require all-electric buildings by banning all new indoor gas infrastructure. This option has the greatest impact on indoor air quality, safety and GHG emissions.

Both options 2 and 3 would add cost and preference burdens on property owners (discussed further below). However, it should be noted that reach codes only address natural gas use inside of a residential structure, and the outdoor use of natural gas for pool and spa heating, barbeques and outdoor fireplaces would continue to be allowed under any of these options.

### Reach Code Cost Effectiveness Analysis

Due to the existing land use pattern in Los Altos Hills, staff has focused primarily on cost effectiveness of reach codes on single-family residences. The Cities of Palo Alto and San Jose completed cost effectiveness analyses that outline the costs associated with an all-electric home versus a mixed-fuel home. The Draft City of Palo Alto "2019 Title 24 Energy Reach Code Cost Effectiveness Analysis" is included in Attachment 2. This report documents cost-effective combinations of measures that exceed the minimum state requirements for new single-family and low-rise multi-family residential construction. It should be noted that most of the measures researched in the Palo Alto study were intended to support building electrification and that the

modeled homes were 2,700 square feet in size, which is substantially smaller than the typical new single-family residence in Los Altos Hills.

There are several assumptions made in the studies, which include the following:

- Appliances: The typical first installed cost for electric appliances is very similar to that for natural gas appliances. This was based on information provided by contractors, plumbers and builders as well as a review of other studies. The cost difference between gas and electric resistance options for clothes dryers and stoves is negligible and the lifetimes of the two technologies are also similar.

- Heating, Ventilation, Air Conditioning (HVAC): Typical HVAC incremental costs assume approximately $200 in cost savings for the heat pump relative to the gas furnace and air conditioner combination (based on 2018 data). The assumption also includes the present value of the incremental replacement costs for the heat pump based on a 15-year lifetime while a gas furnace in the mixed-fuel home was based on a 20-year lifetime.

- Domestic Hot Water (DHW): Typical costs for the a water heating system were based on equivalent installed first costs for the heat-pump water heater (HPWH) and tankless gas water heater. This accounts for slightly higher equipment cost but lower installation labor due to the elimination of the gas flue. Incremental replacement costs for the HPWH are based on a 15-year lifetime and a 20-year lifetime for the tankless water heater.

- Electric service upgrade: The study assumed an incremental cost to run 220V service to each appliance of $200 per appliance for single-family homes and $150 per appliance per multi-family apartment based on cost estimates from builders and contractors. The authors of the studies consulted with contractors to estimate which electricity and/or natural gas services are usually provided to the dryer and oven. It was also assumed that no upgrades to the electrical panel are required and that a 200 amp panel is typically installed for both mixed fuel and all-electric new construction homes.

- In-house gas infrastructure (from meter to appliances): Installation cost to run a gas line from the meter to the appliance location is $200 per appliance for single-family and $150 per appliance per multi-family apartment based on cost estimates from builders and contractors. The cost estimate includes providing gas to the water heater, furnace, dryer and cooktop.

- Site gas infrastructure: The cost-effective analysis components with the highest degree of variability are the costs for on-site gas infrastructure. These costs can be project dependent and may be significantly impacted by such factors as utility territory, site characteristics, distance to the nearest gas main and main location, etc. The typical infrastructure costs for single-family homes presented in the report are based on cost data provided by PG&E. Total typical costs assume $10,000 for extension of a gas main, $1,686 for a service lateral, and $150 for the meter.

Study Conclusions Related to Single-Family Homes

Cost-effectiveness was evaluated according to two metrics: On-Bill customer lifecycle benefit-to-cost and Time Dependent Valuation (TDV) lifecycle benefit-to-cost. It is up to each jurisdiction to determine what metric is most appropriate for their application. Specific design packages for new residences were developed by both Palo Alto and San Jose. While the package scenarios presented are cost-effective under at least one of these metrics, they are not all cost-effective under both metrics. Based on typical cost assumptions arrived at for this analysis, the lifetime equipment costs (30-year period) for the single-family code compliant all-electric option are approximately $5,350 to $7,700 less than the mixed-fuel code compliant option. Cost savings are entirely due to the elimination of gas infrastructure and those costs include the extension of gas mains to serve the new development. In a case of a redeveloped property, where a gas line lateral is simply extended to the home from a main, the cost savings drop substantially and in some cases are break-even. This is mainly due to the need to provide a larger PV array on an all-electric home to offset the greater use of electricity. The following table from the Palo Alto study outlines the results of the study based on a 2,700 square foot single-family residence with new construction and with redevelopment.

| Single-Family New Construction | kWh savings | therms savings | Life Cycle Costs | $TDV savings | $Bill savings | Net TDV Savings | Net Bill Savings |
|---|---|---|---|---|---|---|---|
| 200A Electrical Panel | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| HPWH-ready outlet (240V, 25A) | 0 | 0 | $181 | $0 | $0 | -$181 | -$181 |
| Induction cooktop | -272 | 15 | $1,838 | -$922 | -$67 | -$2,760 | -$1,905 |
| Heat pump clothes dryer | -468 | 30 | $817 | -$1,131 | $109 | -$1,947 | -$708 |
| Heat pump space heater | -1849 | 166 | $601 | $0 | -$856 | -$601 | -$1,456 |
| Heat pump water heater | -987 | 108 | -$356 | $0 | $1,787 | $356 | $2,142 |
| No natural gas piping (NC or RD-Iron) | 0 | 0 | -$8,772 | $0 | $0 | $8,772 | $8,772 |
| No natural gas piping (RD-PolyE) | 0 | 0 | -$4,851 | $0 | $0 | $4,851 | $4,851 |
| **Package A (NC or RD-Iron)** | **-3637** | **322** | **-$5,691** | **-$2,052** | **$2,003** | **$3,639** | **$7,694** |
| **Package B (RD-PolyE)** | **-3637** | **322** | **-$1,770** | **-$2,052** | **$2,003** | **-$282** | **$3,773** |

Note: **Package A** assumes the building is either completely new construction or is a redevelopment where the existing natural gas main is iron piping. In both scenarios, a new connection to the main would be required by the City of Palo Alto Utilities. **Package B** assumes the building is a redevelopment where the existing natural gas main is made of polyethylene piping. In this scenario, a branch upgrade would only be required from the sidewalk to the building.

Should the City Council choose to go with an all-electric option (Option 3), staff recommends that an independent cost effectiveness analysis be done based on the typical larger home sizes in Los Altos Hills to fully understand the ramifications of this requirement on new home construction.

Environmental Initiatives Committee

On October 3, 2019, the Environmental Initiatives Committee (EIC) reviewed the proposed reach codes and recommended that the City Council adopt electrification reach codes, as written by Silicon Valley Clean Energy (SVCE), to help reduce GHG emissions associated with new construction, reduce costs in new construction, improve indoor air quality and safety of our building stock, and increase adoption of electric vehicles. These measures require the installation of electric heat-pumps for space heating and water heating in all new residences. The EIC further stated that the Town of Los Altos Hills has demonstrated leadership in sustainability over the past 14 years through the following means:

- In 2005, solar panels were installed on the new Town Hall and encouraged residents to install PV systems by incentivizing them with additional development area;

- In 2007, the Town published its first Climate Action Plan and annual Greenhouse Gas inventories;

- In 2010 the Town completed the retrofit of Westwind Barn, the first LEED-certified working barn;

- In 2014, solid waste diversion rates of 90% were achieved through our partner Green Waste Recovery, Inc.;

- In 2015, the Town updated its Climate Action Plan;

- In 2017, the City Council voted unanimously to joined SVCE and started receiving 100% clean electricity; and

- In 2019, the Town deployed its first electric riding mower to maintain the fields at Purissima Park and recently purchased an electric fleet vehicle for Town Hall staff.

NEXT STEPS

Three reach code options have been developed for City Council consideration, and draft language for an ordinance has not yet been completed because the code language varies accordingly based on the level of decarbonization sought by the Council. Once a decision is made on whether or not to adopt the reach codes (along with the agreed upon option), staff will prepare an ordinance to amend the Town's Municipal Code. Specific findings along with a cost-effectiveness study (if necessary, to satisfy CEC requirements) will be prepared and reviewed by the City Attorney. The draft ordinance will then be brought back to Council for introduction at the next available meeting.

## PUBLIC COMMENT

A public notice was placed in the Town Crier, posted in three public locations throughout the Town, and placed in a Town-wide mailer sent to all property owners for the special City Council meeting. Several e-mails from residents have been received and are included in Attachment 3.

## FISCAL IMPACT

Although there is no fiscal impact to the Town associated with adoption of a reach code, the cost of construction would increase with the implementation of these more restrictive energy codes.

## CEQA STATUS

The proposed ordinance amendments are exempt from California Environmental Quality Act (CEQA) pursuant to "general exemptions" described in Section 15061(b)(3) of the CEQA Guidelines, since the ordinance amendments would not have any significant effects on the environment.

## ATTACHMENTS

1. Memo titled “Building Decarbonization: Legal Opportunities and Hurdles for Local Governments”
2. Draft City of Palo Alto “2019 Title 24 Energy Reach Code Cost Effectiveness Analysis
3. Public Comments

Staff report prepared by Steve Padovan, Principal Planner