Single-Family AC to Heat Pump Staff Report Version Tracking

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| --- | --- | --- |
| **Date** | **Version #** | **Description of Changes** |
| 6/21/25 | 1.0 | Followed modified version of the FlexPath draft |
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*This is a customizable template for completing an electric-readiness staff report. Blue in-line text needs customization- things like dates, local legislation, staff, and ordinance-specific references for your customized reach code. Complete these sections to customize this staff report to reflect your local context and reach code.*

[DATE]

**DEPARTMENT:** [Department Head Name, Title]

 [Other Contributor(s), Title]

**RECOMMENDATION**

Adopt an ordinance amending [jurisdiction] Municipal/County Code Section [xxx] to require that projects in single-family homes, duplexes and townhomes involving replacement or alteration of an existing air conditioning system or installation of new air conditioning systems must either include a heat pump space conditioner as the primary heating system or install specific energy efficiency measures.

BACKGROUND

Include local policy that is relevant in this section. Some common examples are Climate Action Plans, legislation, Council climate action goals, commission findings, mayoral direction, local referenda, or any other reason a reach code was pursued by this jurisdiction.

A suite of adopted City Council policies support the staff recommendation to adopt the proposed policy. A select summary of this policy context is below:

• XXXXXXX

• XXXXXXX

• XXXXXXX

**DISCUSSION**

**Proposed Policy**

The proposed ordinance would require that projects in single-family homes, duplexes, and townhomes involving replacement or alteration of an existing air conditioning system or installation of a new air conditioning system must either include a heat pump space conditioner as the primary heating system or install specific energy efficiency measures. Heat pumps are far more efficient than gas furnaces and result in fewer greenhouse gas emissions. The policy will also prepare homes for compliance Bay Area Air District’s Rules 9-4 and 9-6, which limit the sale of natural gas-fueled building appliances.

The proposed ordinance would amend the 2025 California Energy Code, Title 24, Part 6, as adopted, amended and codified under *[cite local code sections]* to include, as mandatory, an amended version of the voluntary requirements of the 2025 Title 24, Part 11 California Green Building Standards Code (CALGreen), Section A4.204.1.1 for heat pump space conditioning alterations in single family homes. CALGreen includes both mandatory and voluntary measures. Jurisdictions may adopt the voluntary measures as mandatory requirements. If the requirements affect the California Energy Code, as the proposed policy does, they must be found to be cost effective and must require that buildings be designed to use less energy than the standard California Energy Code. The attached study commissioned by the California Codes and Standards Program (see Attachment B) has found that the proposed requirements are cost effective and will result in a reduction in Long-Term System Cost (LSC) energy relative to the existing building.

Staff has proposed a modified version of the CALGreen policy that would encourage the installation of a heat pump space conditioning system at the time an air conditioner was replaced or added to an existing home. The proposed policy is based on the CALGreen code but has been modified to facilitate implementation and has been vetted by California Energy Commission staff. As proposed, a project may comply with the ordinance by either installing a heat pump space conditioner and no other measures other than those that are required under the California Energy Code, or maintain a gas furnace as the primary heating source and install additional energy efficiency measures above what is required under the California Energy Code.

There are several different ways a project could comply. The simplest way would be to install a heat pump (an air conditioner that is also configured to function as a space heater). This could be done either by replacing the furnace with heat pump system or leaving the furnace in place to serve as the air handler for the heat pump, and as a back-up heating system. California Energy Code requirements would apply; these vary depending upon whether the duct system is replaced at the same time.

Alternatively, a project could comply by installing an air conditioner but relying on a gas furnace for space heating. Again, certain California Energy Code requirements would apply when replacing an air conditioner. In addition, this alternative would require other energy efficiency measures.

Table 1 presents compliance requirements for heat pump systems under two scenarios, one using the existing ducts, the other with new ducts. Table 2 presents compliance requirements for systems that still use furnaces as the primary heating source, under the same duct scenarios.

**Table 1. Summary of Requirements if Using a Heat Pump**

|  |  |  |
| --- | --- | --- |
| **Ducts** | **State Code Requirements** | **Additional Local Code Requirements** |
| Existing | * Duct sealing (10% leakage)
* Airflow efficiency (300 CFM/ton)
* Refrigerant charge verification
 | * None
 |
| New | * Duct sealing (5% leakage)
* Airflow efficiency (350 CFM/ton)
* Fan efficacy (0.58 W/CFM)
* Refrigerant charge verification
* Attic insulation (R-49) [CZs 1-4, 6, 8-16]
* Air sealing [CZs 2-4, 8-16]
* R-6 Duct insulation [CZ 3, 5-7]
* R-8 Duct insulation [CZs 1-2, 4, 8-16]
 | * None
 |

**Table 2. Summary of Requirements if Using a Furnace**

|  |  |  |
| --- | --- | --- |
| **Ducts** | **State Code Requirements** | **Additional Local Code Requirements** |
| Existing | * Duct sealing (10% leakage)
* Airflow efficiency (300 CFM/ton)
* Refrigerant charge verification [CZs 2, 8-15]
 | * Refrigerant charge verification [CZs 1, 3-7, 16]
* Fan efficacy (0.45 watts/CFM)
* Attic insulation (R-49)
* Air sealing
 |
| New | * Duct sealing (5% leakage)
* Airflow efficiency (350 CFM/ton)
* Fan efficacy (0.45 W/CFM)
* Refrigerant charge verification [CZs 2, 8-15]
* Attic Insulation (R-49) [CZs 1-4, 6, 8-16]
* Air sealing [CZs 2-4, 8-16]
* R-6 Duct insulation [CZ 3, 5-7]
* R-8 Duct insulation [CZs 1-2, 4, 8-16]
 | * Refrigerant charge verification [CZs 1, 3-7, 16]
* Fan efficacy (0.35 watts/CFM)
* R-8 Duct insulation [CZs 3, 5-7]
 |

**Impacts**

There are some incremental costs associated with converting to a heat pump, but these costs are [“partially”, depending on CZ, consult Tables 12 & 13 of the cost effectiveness report] offset by utility bill savings over the lifetime of the equipment. From a societal perspective, the incremental costs are more than offset by the savings that accrue to all utility billpayers (e.g., reductions in utility infrastructure costs) [except in CZ 15]. The incremental cost, that is the amount over what would otherwise be needed to just replace the air conditioner and comply with the 2025 California Energy Code, depends on whether the furnace is replaced at the same time as the air conditioner. The lifetime of a furnace and air conditioner are about the same, 10-15 years, so it often makes economic sense to replace both if the furnace is near the end of its life. In this scenario, the cost of the furnace replacement is assumed as part of the base project cost. Alternatively, a heat pump could be configured to operate as the primary heating source using the air handler in the existing furnace and using the furnace for supplemental heating on very cold days. Table 3 below compares the incremental cost and lifecycle savings (net present value of utility bill savings less incremental cost) for each approach.

**Table 3. Economic Costs and Savings**

|  |  |  |
| --- | --- | --- |
| **Approach** | **Incremental Cost** | **Lifecycle Savings** |
| Heat pump & new air handler (no furnace) |  |  |
| Heat pump with existing furnace as backup |  |  |

[Populate using data from Tables 12 & 13 of the cost effectiveness report]

The costs may be offset by federal tax credits in the amount of 30% off total project cost up to $2,000. [Add any additional incentives that are available locally or regionally]

In terms of greenhouse gas emissions, heat pumps can provide significant reductions. This is because heat pumps are far more efficient than gas furnaces (and electric resistance heat) and electricity in California is derived from low-carbon energy sources. Table 4 shows greenhouse gas reductions for both approaches. The table shows greenhouse gas reductions in metric tons (for the first year) and as a percentage of total emissions for homes of different ages (vintages), the oldest, pre-1978, pre-dates the California Energy Code. The values were generated for typical homes using the California Building Energy Code Compliance software (CBECC).

**Table 3. Greenhouse Gas Reductions by Vintage of Home**

|  |  |  |
| --- | --- | --- |
|  | **Metric Tons** | **Percentage** |
| **Approach** | **1978-1991** | **1992-2010** | **Pre-****1978** | **1978-1991** | **1992-2010** | **Pre-****1978** |
| Heat pump & new air handler (no furnace) |  |  |  | % | % | % |
| Heat pump with existing furnace as backup  |  |  |  | % | % | % |

[Populate table with data from Appendix 1]

**Exceptions**

The proposed policy offers two general exceptions. The first is for situations where the electrical panel capacity is insufficient to meet the load of a heat pump. The second is where the heat pump would need to be sized more than 12,000 Btu/hr (1 ton) over the air conditioner that would be installed in order to meet the heating load. There are also exceptions to the duct sealing and airflow requirements that specify alternative methods of compliance. All applicable exceptions in the California Energy Code apply.

Public Engagement

[Summarize public outreach and engagement activities.]

Policy Implementation Considerations

The policy would be implemented via an additional/modified intake form required at time of building permit submittal. Building staff would review the application for consistency with the policy and field verification would happen as part of the typical inspection process.

ScHedule and Next Steps

Should Council approve staff’s recommendations, work would proceed on the timeline provided in Table 4 below.

**Table 4. Schedule and Next Steps**

|  |  |
| --- | --- |
| **Task** | **Timeframe** |
| Second reading of the draft Ordinance (Attachment A) and submittal to the California Energy Commission and California Building Standards Commission |  |
|  |  |
| Develop implementation forms, training, and help desk services |  |
| Receive approval from the California Energy Commission and California Building Standards Commission approves for filing |  |
| Policy goes into effect | No sooner than 1/1/26 |

ENVIRONMENTAL REVIEW

[This text should be prepared by qualified staff and should read the same as the ordinance. Two samples are provided below. Edit as needed]

Staff recommendations are found to be exempt from CEQA under the general rule, 15061(b)(3), because it can be seen with certainty that the provisions contained herein would not have the potential for causing a significant effect on the environment. Further, this ordinance is also exempt from CEQA under the categorical exemptions in Section 15308 of the CEQA Guidelines in that the proposed ordinance would institute regulatory requirements intended to protect the environment and natural resources.

This ordinance is exempt from CEQA under 15061(b)(3) on the grounds that these standards are more stringent than the State energy standards, there are no reasonably foreseeable adverse impacts and there is no possibility that the activity in question may have a significant effect on the environment.

ALTERNATIVES

1. XXXXXX
2. XXXXXX
3. XXXXXX

ATTACHMENTS

1. Ordinance Adopting the [Policy name]
2. [2025 Single Family AC to Heat Pump Cost-Effectiveness Study](https://localenergycodes.com/download/2034/file_path/fieldList/2025%20Single%20Family%20AC%20to%20HP%20Cost-eff%20Study.pdf)
3. Version of the Ordinance Showing Markup of State Energy Code

Appendix 1: Emissions Data by Climate Zone

Use this table to populate Table 3 in the report.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Metric Tons | Percentage |
| Climate Zone | Approach | 1978-1991 | 1992-2010 | Pre1978 | 1978-1991 | 1992-2010 | Pre1978 |
| 1 | Heat pump with existing furnace as backup | 2.27 | 1.26 | 2.84 | 46% | 36% | 49% |
| 1 | Heat pump & new air handler (no furnace) | 2.40 | 1.35 | 2.99 | 49% | 39% | 53% |
| 2 | Heat pump with existing furnace as backup | 0.92 | 0.82 | 1.21 | 29% | 27% | 33% |
| 2 | Heat pump & new air handler (no furnace) | 1.08 | 0.94 | 1.41 | 34% | 32% | 38% |
| 3 | Heat pump with existing furnace as backup | 0.81 | 0.72 | 1.10 | 29% | 27% | 35% |
| 3 | Heat pump & new air handler (no furnace) | 0.80 | 0.71 | 1.09 | 29% | 27% | 35% |
| 4 | Heat pump with existing furnace as backup | 0.69 | 0.63 | 0.94 | 22% | 22% | 26% |
| 4 | Heat pump & new air handler (no furnace) | 0.97 | 0.84 | 1.30 | 32% | 30% | 37% |
| 5 | Heat pump with existing furnace as backup | 0.67 | 0.61 | 0.93 | 25% | 24% | 30% |
| 5 | Heat pump & new air handler (no furnace) | 0.71 | 0.65 | 0.98 | 27% | 25% | 32% |
| 6 | Heat pump with existing furnace as backup | 0.15 | 0.13 | 0.25 | 8% | 7% | 13% |
| 6 | Heat pump & new air handler (no furnace) | 0.14 | 0.12 | 0.25 | 8% | 7% | 13% |
| 7 | Heat pump with existing furnace as backup | 0.12 | 0.11 | 0.21 | 7% | 6% | 11% |
| 7 | Heat pump & new air handler (no furnace) | 0.12 | 0.10 | 0.21 | 7% | 6% | 11% |
| 8 | Heat pump with existing furnace as backup | 0.18 | 0.15 | 0.29 | 10% | 9% | 14% |
| 8 | Heat pump & new air handler (no furnace) | 0.18 | 0.15 | 0.29 | 10% | 8% | 14% |
| 9 | Heat pump with existing furnace as backup | 0.27 | 0.23 | 0.40 | 14% | 12% | 18% |
| 9 | Heat pump & new air handler (no furnace) | 0.27 | 0.23 | 0.40 | 13% | 12% | 18% |
| 10 | Heat pump with existing furnace as backup | 0.25 | 0.21 | 0.38 | 13% | 11% | 17% |
| 10 | Heat pump & new air handler (no furnace) | 0.26 | 0.22 | 0.39 | 13% | 11% | 18% |
| 11 | Heat pump with existing furnace as backup | 0.91 | 0.76 | 1.23 | 29% | 26% | 33% |
| 11 | Heat pump & new air handler (no furnace) | 1.02 | 0.84 | 1.37 | 32% | 29% | 37% |
| 12 | Heat pump with existing furnace as backup | 0.95 | 0.81 | 1.25 | 30% | 28% | 34% |
| 12 | Heat pump & new air handler (no furnace) | 1.03 | 0.87 | 1.35 | 33% | 30% | 37% |
| 13 | Heat pump with existing furnace as backup | 0.66 | 0.55 | 0.88 | 24% | 22% | 28% |
| 13 | Heat pump & new air handler (no furnace) | 0.71 | 0.59 | 0.95 | 26% | 24% | 31% |
| 14 | Heat pump with existing furnace as backup | 0.51 | 0.47 | 0.73 | 16% | 17% | 20% |
| 14 | Heat pump & new air handler (no furnace) | 0.91 | 0.78 | 1.24 | 30% | 28% | 34% |
| 15 | Heat pump with existing furnace as backup | 0.07 | 0.05 | 0.13 | 4% | 3% | 7% |
| 15 | Heat pump & new air handler (no furnace) | 0.06 | 0.04 | 0.12 | 4% | 3% | 6% |
| 16 | Heat pump with existing furnace as backup | 1.36 | 0.82 | 1.65 | 24% | 20% | 26% |
| 16 | Heat pump & new air handler (no furnace) | 2.74 | 1.72 | 3.38 | 50% | 42% | 53% |