Air-Conditioning to Heat Pump

Background, Policy Description, Resources, Discussion

Purpose

Understand the steps and decisions you need to make to develop an AC to Heat Pump ordinance

Ordinance Objectives

When **replacing or adding space cooling** require energy upgrades by either installing:

- A **heat pump** space conditioner (cooling + heating) and comply with State Code;

  OR

- An **air-conditioner** (cooling only) alongside a ducted gas furnace and make other energy improvements above the State Code

Policy Context

2025 CALGreen (Part 11) Tier 1

- Offers AC-to-HP as voluntary model for local adoption
- Energy Commission, utility consultants, and volunteers have coordinated enhancements to the language, and an Energy Code version (Part 6) soon
- Requires cost-effectiveness determination

2025 Energy Code (Part 6) Nonresidential

- Prescriptively requires AC-to-HP for units up to 65 kBtu/h (5 tons)

Air Quality Regulations

- Bay Area and Los Angeles are in “non-attainment” for ozone and particulate matter (PM)
- Gas appliances generate NOx emissions, which create ozone and PM2.5
- Beginning in 2029 furnace sales will be restricted by California Air Resources Board, Bay Area Air District, and (possibly) South Coast Air Quality Management District

Policy Requirements

Code language structure

Trigger: Altered space-conditioning system serving existing single-family dwelling

1. Furnace-only replacement → no reach requirement
2. All CA Climate Zones except 15 (Palm Springs, Coachella)
3. Installing **new or replacement** air-conditioner
    a. Install a heat pump. Supplemental heating from gas or electric resistance allowed. OR;
    b. Install an AC
        - Reuse **existing ductwork** + efficiency measures
        - Replace or install new **ductwork and furnace** + efficiency measures

Energy equivalency test for **unducted** systems (e.g. wall furnaces) not yet performed.

New Heat Pump Only

- Duct Insulation: No Requirement
- Duct Sealing: 10% or RA Path
- Airflow: 300 CFM/ton or RA Path
- Fan Efficacy: No requirement
- Ref Charge

New AC Only

- Duct Insulation: No Requirement
- Duct Sealing: 10% or RA Path
- Airflow: 300 CFM/ton or RA Path
- **Fan Efficacy: 0.45 W/CFM or RA Path**
- **Ref Charge**
- **Attic Insulation: R-49 Exception: Exist R-38**
- **Air Sealing: Ceiling Exception: Exist R-38**

Solid blue: Reach over state code

Gradient: Reach in some CZ

No fill: Same as state code

RA: Reference Appendix

New Heat Pump and New Ducts

- Duct Insulation: R-6 in CZ 3, 5-7 R-8 in CZ 1, 2, 4, 8-16
- Duct Sealing: 5%
- Airflow: 350 CFM/ton
- Fan Efficacy: 0.58 W/CFM
- Ref Charge
- Attic Insulation: R-49 CZ 1-4, 6, 8-16 Only. Exc. R-19 in CZ 1, 3, 6
- Air Sealing: Ceiling CZ 2, 4, 8-16 Only. Exception - Exist R-19

New AC/Furnace and New Ducts

- **Duct Insulation: R-8**
- Duct Sealing: 5%
- Airflow: 350 CFM/ton
- **Fan Efficacy: 0.35 W/CFM**
- **Ref Charge**
- Attic Insulation: R-49 CZ 1-4, 6, 8-16 Only. Exc. R-19 in CZ 1, 3, 6
- Air Sealing: Ceiling CZ 2, 4, 8-16 Only. Exception - Exist R-19

AC to HP exceptions allow for the following

Lower efficiency levels

- Existing levels of ceiling insulation
- Small attics
- Inaccessible ducts for sealing
- Furnace fans manufactured before July 2019

Avoiding hazardous conditions

- Asbestos disturbances
- Atmospherically vented combustion appliances

Avoiding large electrical upgrades

- Knob and tube wiring disturbances
- Electrical service upgrades

Avoiding high costs

- Where the heating load is 12 kBtuh greater than the cooling load

Relevant Resources

Cost Estimates

Equipment, over 30-years, accounting for Zero-NOx regulations

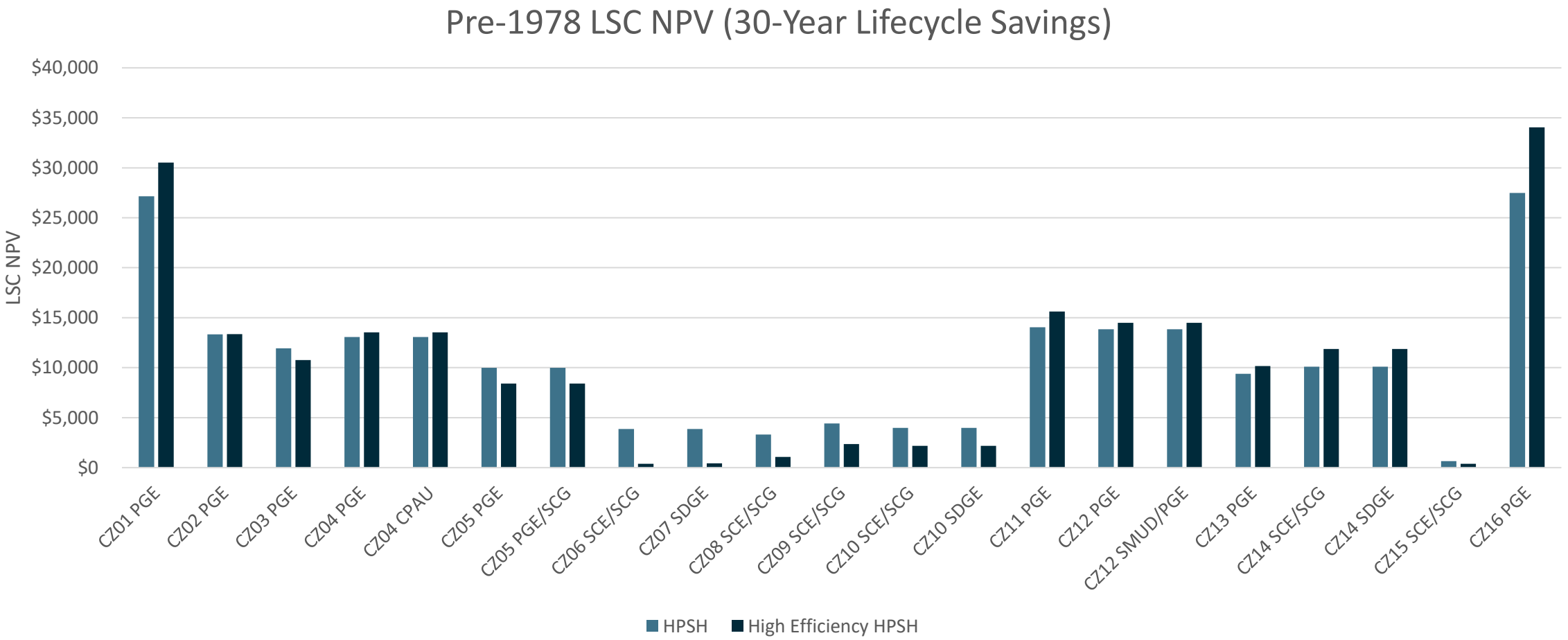
- AC + furnace: $23,100
- Heat pump: $23,200

Efficiency measures, upfront, over the state energy code

- **AC only:** $3,800 - $7,500 depending on existing attic insulation
  - Refrigerant charge, R-49 attic insulation, air sealing
- **AC, furnace and ductwork,** all vintages:
  - Assuming homeowner is already planning to replace their old ducts
  - CZs 3, 5, 6, 7: $2,100 including R-6 to R-8 duct insulation
  - Other CZs: $600 for fan efficacy, refrigerant charge verification

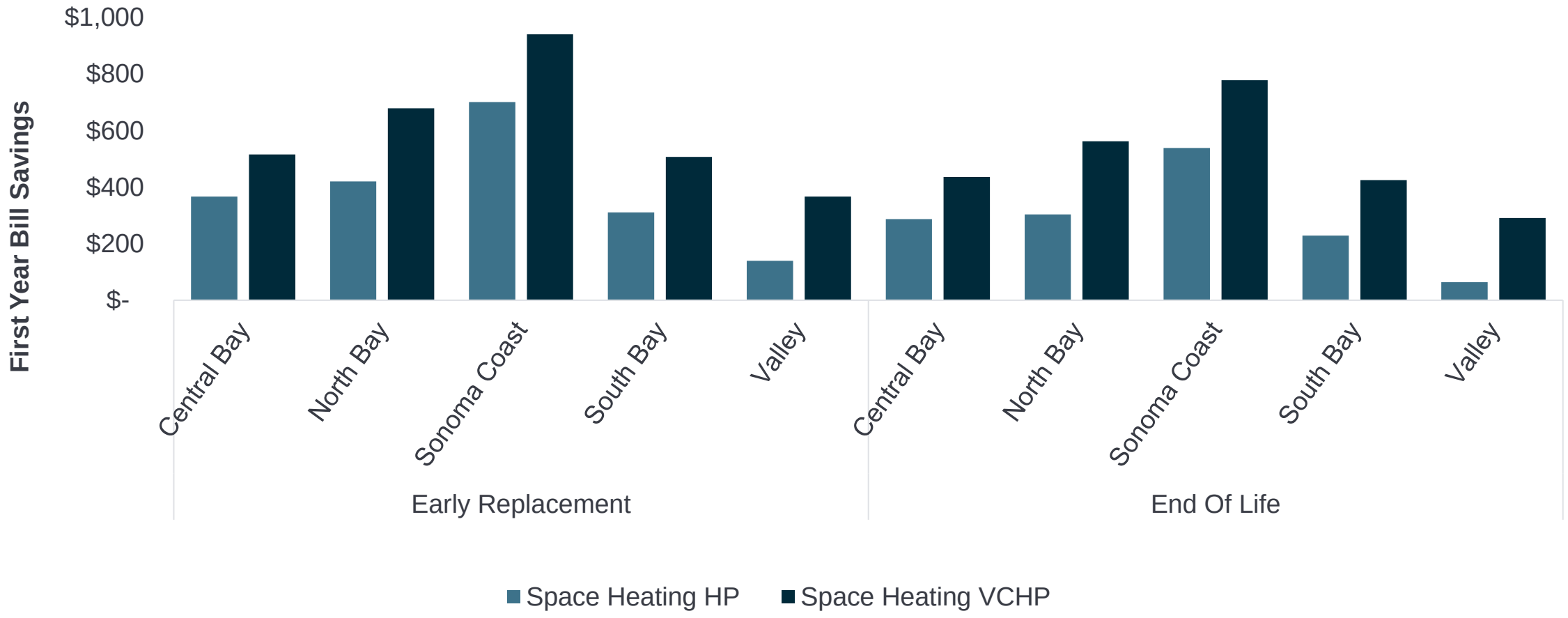
Source: Statewide IOUs C&S: Single Family Air Conditioner Replacements (AC to HP), Cost Effectiveness Study

AC-HP is widely cost-effective



Source: Statewide IOUs C&S: Single Family Air Conditioner Replacements (AC to HP), May 28, 2025

AC-HP saves $ today



Source: Peninsula Clean Energy / Silicon Valley Clean Energy On-Bill Analysis for CZs 1, 2, 3, 4, 12

Resources

Ready Today

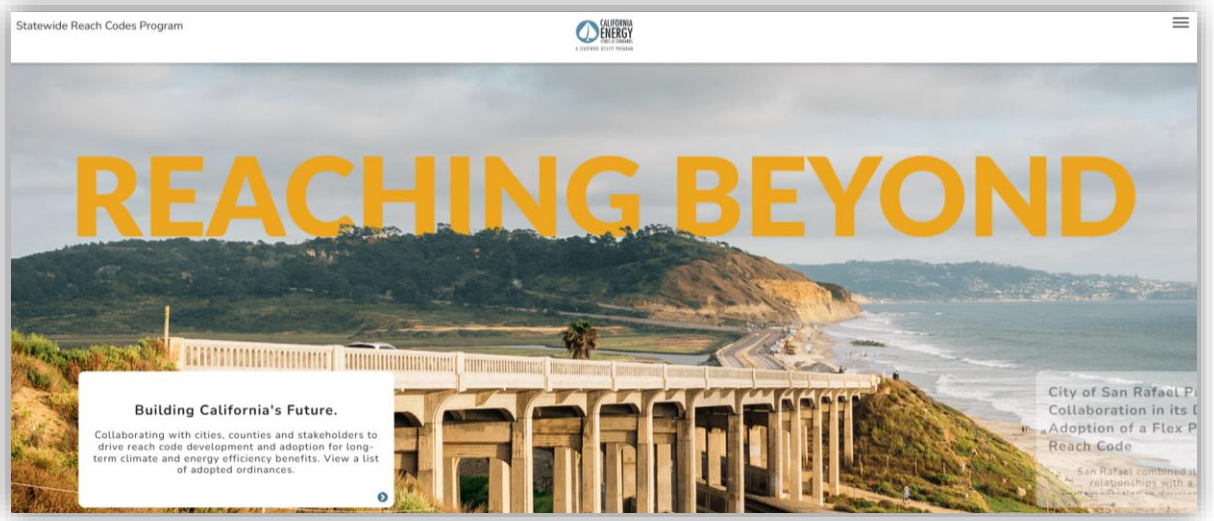
- Part 11 version
- Cost effectiveness study

Coming Soon

- Ordinance Part 6 version
- Cost effectiveness study full data
- Model staff report
- Slides

Cross-posted and customized

- BayAreaReachCodes.org
- CentralCoastReachCodes.org
- CPAReachCodes.org



Jurisdiction Next Steps

Suggested next steps

- Circulate the policy concept with key decision makers
- Analyze property database and last few years of permits to estimate:
  - # of existing single family homes, duplexes and townhomes
  - # with central air conditioning and gas heating
  - # of annual permits for air conditioner installations or replacements
  - % of projects affected annually by proposed requirements