



## Building Planning Capacity for Building Decarbonization

Building Decarbonization is an umbrella term for reducing greenhouse gas (GHG) emissions in the building sector through the [following actions](#):

- Increasing energy efficiency and insulation
- Increasing reliance on renewable electricity (utility and distributed generation)
- Electrification of end uses (for example, water heating or air conditioning)
- Implementing distributed energy resources like rooftop solar and batteries
- Switching to climate-friendly refrigerants and improving refrigerant management

### State Supports

The State of California aims to achieve an 80% reduction in CO<sub>2</sub> emissions relative to 2005 levels by 2050 and has created the following supports and funding for local governments:

- [Senate Bill 100](#) (De León, 2018) requires that renewable and zero-carbon energy resources supply 100% of the electricity for retail sales to customers by 2045.
- Over 70 jurisdictions have adopted all electric requirements for new construction. Find model building codes in the [California's Green Building Standards \(CALGreen\) Code](#) and at the [Statewide Reach Codes Program](#).
- [Zero-Emission Appliance Standards](#) – includes support for zero-emission GHG standards for new space and water heaters sold in California as part of the 2022 State Strategy for the State Implementation Plan. It would require new sales of space and water heaters for residential and commercial buildings to be zero-emission starting in 2030.

### Regional Challenges

**Feasibility:** In California, the energy use from buildings is responsible for about [one-quarter of statewide greenhouse gas emissions](#), making it the second largest contributor to emissions after transportation. At the same time, the energy and the built environment sectors are also most responsive to reduction measures for reducing GHG ([Brinkley, 2014](#)). Using existing technologies for private, community, and rooftop solar and wind generation, [models](#) show that renewable energy can feasibly and cost-effectively provide approximately 72% of electricity generation by 2050 ([Langevin et. al, 2019](#)). Local jurisdictions can help by enabling, fast-tracking permitting, and siting more renewable and net-zero energy infrastructure.

**Equity:** Low-income communities and communities of color are disproportionately exposed to local pollution while living in lower quality housing and bearing a higher proportion of energy costs as a percentage of total household budget. These communities are also highly vulnerable to extreme weather from climate change, and they lack access to cooling and resilient infrastructure (Tan and Jung, 2021). Renters usually pay the utility bills but face the split-incentive of not being able to make energy efficiency upgrades to insulation, boilers, or renewable energy. Low-cost



energy improvements could save low-income households about \$1,500 annually ([Kontokosta et al, 2020](#)). Property owners, on the other hand, are not directly incentivized to pay for upgrades that would only benefit their tenants.

In considering equity, Building Energy Codes (BECs) have the potential to reduce energy costs by \$125 billion by 2040 and provide households with a 6.47% reduction in monthly energy expenditure. Weatherization and renovation of existing buildings can generate substantial cost savings while improving health, safety, and overall living conditions ([Zhu et. al, 2022](#)). When such programs are directed at rental buildings, they have the potential to benefit the most vulnerable community members, particularly with added [rent protection programming](#).

### Example Policies

Strong planning at the local level includes setting feasible goals with measurable benchmarks, identifying potential funding sources, dedicating staff, and creating an implementation timeline that can ensure policies move forward even as administrations cycle. Local jurisdictions can include policies in general plans, climate action plans, and municipal codes. Few general plans have focused on holistic decarbonization efforts, leaving room for local jurisdictions to celebrate new advances at the leading edge. For example, while decarbonization is a term commonly used by state agencies, local plans favor terms such as “climate neutral” or focus on technologies such as “microgrid” and “heat pump” adoption. Further, few include equity approaches that address decarbonization. We provide sample policies below for further consideration:

*Example policies:*

Lake Forest, 2020:

“Goal PF-6 Energy Management: A community with adequate power, provided through economically and environmentally sustainable means. Policy PF-6.6 Public-Private Partnerships. Investigate the opportunity to engage in public-private partnerships on energy efficiency, energy storage, and microgrid development to achieve cost savings, reduce energy use, and improve energy reliability.” Timeline: none. Funding: none. Personnel: none.

Rancho Cucamonga, 2021:

“Goal 3: Green Building. Development practices that demonstrate high environmental performance through decarbonization, sustainable design, and zero net carbon buildings.

Strategy 3.1: Zero Net Electricity for New Residential Buildings

Measure(s):



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- Adopt an ordinance or update development code requiring that new single- and multi-family residential development to meet a standard of zero net energy (i.e., on-site generation of energy is equal to on-site energy consumption).
- Encourage future residential development projects to be designed as Net Positive Energy Homes and take advantage of the State’s Net Energy Metering 2.0 policy, allowing customers to receive credits on their electricity bills for excess electricity generated by photovoltaic systems.”

Timeline: 4646 MTCO<sub>2</sub>E reduction by 2030; 3380 MTCO<sub>2</sub>e reduction by 2040; Funding: none.  
Personnel: none.

**We invite you to search for additional policies and approaches as your community considers actionable steps!**

#### **References:**

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- Brinkley, C. (2014). Decoupled: successful planning policies in countries that have reduced per capita greenhouse gas emissions with continued economic growth. *Environment and Planning C: Government and Policy*, 32(6), 1083-1099.
- Kontokosta, C. E., Reina, V. J., & Bonczak, B. (2020). Energy cost burdens for low-income and minority households: Evidence from energy benchmarking and audit data in five US cities. *Journal of the American Planning Association*, 86(1), 89-105.
- Zhu, Q., Leibowicz, B. D., Busby, J. W., Shidore, S., Adelman, D. E., & Olmstead, S. M. (2022). Enhancing policy realism in energy system optimization models: Politically feasible decarbonization pathways for the United States. *Energy Policy*, 161, 112754.