CASE STUDIES AND COST-EFFECTIVENESS FOR ALL-ELECTRIC BUILDING TYPES

Prepared by the City of Pinole with CEC funding September 2025

Table of Contents

Residential Buildings

Zero Net Energy Case Study Homes- Volume 1

Overview	**This publication follows five residential building types: new single-family, renovated single-family, modular, subdivision, and multifamily. For each building category, readers can learn about the project process, low energy design strategies, energy performance, and observations/conclusions post-occupancy**
Link	ZNE-Case-Study-Homes-Volume-1.pdf

Zero Net Energy Case Study Homes- Volume 2

Overview	**This publication enhances Volume 1 adding different residential building types to the mix. This compilation of six case studies also includes a look at a passive homes, a do-it-yourself home, apartments, senior housing, and luxury condominiums. This document hand holds readers through the design, construction, and lessons learned.**
Link	ZNE-Case-Study-Homes-Volume-2-All-Electric.pdf

Designing for Zero Carbon

Overview	**This publication caters to developers, owners and design professionals in the multifamily space to overcome challenges and barriers to going all-electric. Five multifamily success stories pave the path to increase adoption of electrification by demonstrating cost-effectiveness.**
Link	Designing-for-Zero-Carbon-Volume-2_Case-Studies-of-All-Electric-Multifamily-Residential-Buildings-1.pdf

A Pocket Guide to All-Electric Retrofits of Single Family Homes

Overview	**This comprehensive guide delineates simple and action ways to electrify your home without modifications. Contents include benefits, strategies, load calculations for a watt diet, case studies, and a product guide.**
Link	A Pocket Guide to All Electric Retrofits of Single Family Homes - Redwood Energy

City of Pinole Valor Village

Overview	**Built by Satellite Affordable Housing Associates, all-electric Valor Village in our very own Pinole provides veterans' housing with 33 units. The green building section of SAHA's webpage explores some of their design strategies from a case study of Lakeside Senior Apartments. Contact City of Pinole Sustainability Project Manager, Kapil Amin, at kamin@pinole.gov for additional information about the building design.**
Links	1. Green Building | SAHA 2. Valor Village | SAHA

2022 Cost-Effectiveness Study: Existing Single-Family Building Upgrades

Overview	**This study details the methodology and results which prove cost-effectiveness for a variety of energy-efficiency measures for existing single-family homes.**
Link	https://storage.googleapis.com/proudcity/sanrafaelca/2024/05/Single-Family-Retrofits-CostEff-Report.pdf

2025 Cost-Effectiveness Study: Single-Family AC2HP

Overview	**This study details the methodology and results which prove cost-effectiveness for single-family homes to convert to heat pump HVAC.**
Link	2025 Single Family AC2HP Cost-Effectiveness Analysis

The Economics of Electrifying Buildings

Overview	**This publication demonstrates all-electric single-family new construction is more economical to build and operate in all nine cities studied.**
Link	**rmi_economics_electrifying_buildings_residential_new_construction.pdf**

Accelerating Residential Building Decarbonization

Overview	**This report provides product manufacturers, fabricators, contractors and installers, design professionals, owners, and real estate developers with technical performance and cost guidance for scalable zero-carbon-aligned new construction pathways and retrofit packages across the nation's climate regions.**
Link	**abc_industry-guidance-report_2023_v5.pdf**

San Mateo County Case Studies

Overview	**In 2022, the Sustainability Department conducted a study to assess the upgrade costs for decarbonizing existing single-family homes in San Mateo County. Ten homes of varying sizes and vintages were selected from across the county to ensure a diverse representation of housing stock and geography. The final case studies outline both the upfront costs and long-term financial impact of decarbonization, helping homeowners understand the investment and potential savings. Rationale for energy strategies are also provided.**
Link	**Cost Studies: Existing Homes - Sustainability Department - San Mateo County**

Mutual Housing at Farview Terrace

Overview	**The Mutual Housing at Fairview Terrace Project is designed as an all-electric, 55+ senior affordable housing and mixed-use development. The development includes 76 residential units, a courtyard, a local nonresidential community nonprofit office space, urban agriculture, and a community cooling center. This report details the significant design features that contribute to this highly sustainable, energy-efficient, net-positive energy development.**
Link	**Mutual Housing at Fairview Terrace - Affordable Mixed-Use Housing Development**

Decarbonizing Affordable Housing: Case Studies on Developer Experiences with New Construction

Overview	**This report explores stakeholders' experience developing lower-carbon affordable multi-family housing. Three case communities in California were studied to yield insights about the decisions, challenges, and successes that emerged in the design, financing, operation, and maintenance of the buildings.**
Link	**Project Report_Decarbonizing Affordable Housing.pdf | Powered by Box**

Non-Residential Buildings

World Green Building Council Case Study Library

Overview	The library consists of over 100 case studies in an array of building types. Library filters include sustainability focus and certification/rating. Kaiser Permanente Santa Rosa is the sole healthcare building listed. This building utilizing a thermodynamically zoned heat pump (TZHP) strategy saved over $1,000,000 in HVAC construction cost compared to the industry standard Variable Air Volume with Reheat (VAVRH) solution that uses gas-fired boilers for heating.
Link	Case Study Library - World Green Building Council

2025 Cost-Effectiveness Study: Non-residential Alterations

Overview	The Reach Code Team evaluated the energy savings and cost-effectiveness of various measures in three different vintages of the Small Office and Medium Retail prototypes for this report. The Team analyzed measures include packaged rooftop unit (RTU) replacements as well as efficiency measures, including cool roof, window film, lighting retrofit, HRV, DCV, and economizer FDD.
Link	2025 NR Alterations Cost-effectiveness Report

Designing for Zero Carbon: Volume 1

Overview	**The five non-residential case study buildings in this volume represent very common building types where the design approaches taken are likely to be readily adaptable to similar types of projects: a public school, a spec office building, a college classroom building renovation, a city services office building and a medical clinic/office. Thus, each of the case studies serves as an excellent model for many of new buildings now being planned that aspire to be zero-carbon emitters.**
Link	Designing-for-Zero-Carbon-Volume-1.pdf

Designing for Zero Carbon: Volume 3

Overview	**This Volume 3 presents case studies of all-electric K-12 school projects, identified as a building type with unique issues in making such a transition in the energy source used.**
Link	Designing-for-Zero-Carbon-V3_K-12-Schools-2.pdf

Zero Net-Energy Case Study Buildings: Volumes 1-3

Overview	**These compilations of case studies examine a variety of non-residential buildings such as The Exploratorium, California DMV Field Office, Stevens Library and more.**
Links	1. ZNE-Case-Study-Commercial-Buildings-Volume-1.pdf 2. ZNE-Case-Study-Commercial-Buildings-Volume-2.pdf 3. ZNE-Case-Study-Commercial-Buildings-Volume-3.pdf