

City of Santa Barbara, Zero Net Energy Roadmap and Implementation Plan



City of Santa Barbara Zero Net Energy Roadmap

Energy Efficiency and Renewables Preliminary Feasibility Study
May 19, 2021

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Brief Summary

Between September 2017 and July 2020, the City of Santa Barbara, through a project funded primarily by a California Energy Commission (CEC) Local Government Challenge grant, determined the technical, financial, and organizational feasibility of achieving zero net energy (ZNE) for over 100 municipal facilities. An actionable roadmap, building energy report cards, and an implementation tool were developed through a detailed technical feasibility analysis supported by comprehensive building energy benchmarking and audits, energy simulation analysis, and a cost-effectiveness analysis of measures. Stakeholder engagement also helped establish operational and financial viability of the results.

The resulting [Zero Net Energy Roadmap](#), energy report cards, and implementation tool provide means for identifying, planning, and achieving deep energy savings

and integrated renewable energy generation in municipal buildings. This is a critical strategy for achieving local and statewide greenhouse gas (GHG) emission reduction goals, including the city's ambitious goals of 100 percent clean electricity by 2030 and carbon neutrality by 2035, and the state's goals of achieving zero net energy buildings and carbon neutrality by 2045.

While conducting the project, the city and TRC Energy Services (TRC) first focused on lowering building systems energy loads by addressing inefficient building envelopes, looking for opportunities to optimize appliance and plug loads by leveraging both technology and behavioral means, and when feasible, adding systems and controls. Next, they analyzed onsite renewable generation opportunities.

The analysis identified 17 energy efficiency measures with a potential annual savings of roughly 1.9 megawatt-hours (MWh) of electricity and 8,000 therms. Additionally, renewable energy generation and storage projects were identified to help offset overall annual building energy consumption by 9.8 MWh. Associated implementation costs were used to extrapolate capital costs for projects and helped identify which were the most financially feasible.

Lead Agency and Partnerships

The city partnered with TRC, a leading energy engineering firm, to perform site audits, make energy efficiency and renewable energy recommendations, conduct economic and technical analysis, and develop final deliverables. In addition, a local nonprofit organization, Community Environmental Council, conducted facility benchmarking using ENERGYSTAR Portfolio Manager. This portion of the project was funded by Southern California Edison's (SCE) Strategic Planning funds.

Drivers

This project was driven by several policy directives established in the city's General Plan, the 2012 Climate Action Plan, and the city's adopted goal of 100 percent renewable electricity by 2030.

Engagement Process

The city's Energy and Climate Division team engaged numerous stakeholders throughout the project from start to finish. Input from building managers, department heads, and other facility operations staff was included in the Request for Proposals project scope. Their recommendations directed which buildings, energy efficiency measures, and renewable energy projects were considered in the analysis. The team also coordinated with facility staff during building audits to gather the necessary data. Additionally, the team brought the initial results to stakeholders and their feedback helped refine the results.

Climate Impact Area

This project mitigates the city's climate change impact through providing a pathway for identifying, planning, and achieving deep energy savings, reducing the building sector's GHG emissions, and integrating renewable energy generation into municipal buildings.

Funding Source

The project was funded primarily through a CEC Local Government Challenge grant. It was also supported by the city's Strategic Energy Plan fund which covered staff time, and a SCE Strategic Planning Funds award which funded the benchmarking portion of the project. In total, the project cost was \$347,058; with over 54 percent coming from the Local Government Challenge grant, 46 percent from the SCE Strategic Planning Funds, and in-kind staff time allocations from the city's Strategic Plan fund.

Research and Data

The city used ENERGYSTAR Portfolio Manager for building benchmarking. Metrics used to track progress included the number of buildings audited and analyzed, potential energy savings (total and by measure), renewable energy generation potential, and GHG emissions avoided.

Challenges

One of the key challenges of this project was identifying the appropriate buildings to be included in the analysis. The scope of buildings covered decreased dramatically after removing buildings that were not tenant-occupied and facilities that offered little energy efficiency savings due to operational process requirements. In addition, by focusing on occupied buildings with clear energy usage, the study was able to predict future savings more accurately. Ultimately, the analysis covered 20 percent of the total energy consumption of the city, and about 100 out of the 300 city-owned facilities.

Outcomes

Thirty-six sites, with a total of 104 buildings, parks, and other properties were evaluated in this study. For these sites, energy efficiency measures and renewable generation and storage projects were analyzed with their respective savings, costs, and payback. Ultimately, the analysis found that if the city implemented all the recommended measures in this report the city would reduce its utility purchased energy of electricity and gas by 67 percent and 15 percent, respectively. The city would need to generate an additional 11 GWh of renewable energy to meet its ZNE goals.

The study determined the city has several good ZNE building candidates. Since the launching of the city's new community choice aggregator, Santa Barbara Clean

Energy, on October 1, 2021, all municipal facilities are supplied with 100 percent carbon-free electricity, thus removing the GHGs associated with electricity fueled systems. This opens a pathway for the city to achieve ZNE for municipal buildings by mitigating natural gas use. Next steps will be finding ways to support building electrification and electrification readiness, through equipment upgrades and updating appliances.

Replicability

The list of energy efficiency measures identified in the project roadmap could be used and applied to any building portfolio. Additionally, the implementation tool and energy benchmarking report cards could be helpful for other jurisdictions looking to replicate the city's ZNE roadmap. The implementation tool can be requested by emailing LocalSupport@energy.ca.gov.

Further Information

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