

County of Santa Barbara

Energy Efficiency

Standards

For County Owned and Leased Facilities

Strategic Plan Task 1.1.2
Energy Efficiency Standard for County Facilities: Task 2
Deliverable 2.3 and 2.4

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Prepared for:
County of Santa Barbara
General Services
1105 Santa Barbara St
Santa Barbara, CA 93101

Prepared by:
Roy Hapeman, County Energy Manager
General Services
County of Santa Barbara

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Executive Summary

This Policy is developed under a grant provided by Southern California Edison that was approved by the County Board of Supervisors in 2011. It is the outcome requirement of an existing County ordinance (Ordinance 4452, Chapter 12a) approved and adopted by the County Board of Supervisors on March 26, 2002.

The expected outcome is the establishment of a County of Santa Barbara Energy Efficiency Policy that will ensure that all applicable County construction, and operations and maintenance activities are performed in a manner that leads to cost effective energy performance in County facilities. It is the County's expectation that the implementation of this Policy will result in energy consumption reductions that directly correlate with utility bill reductions and reductions in greenhouse gas emissions regulated by State Directive AB32.

This policy addresses approaches specific to the County of Santa Barbara to maximize its effectiveness and across all County Departments. The Policy has been developed specifically by the County of Santa Barbara (1) through assessment of County buildings, (2) in-person interviews with key County personnel, (3) review of existing County policies, processes, and procedures, and (4) solicitation of stakeholder feedback from County Department Representatives

The Energy Efficiency Standard is intended to work in coordination with other County energy management strategies and policies; specifically the Utility Manager System, Benchmarking Policy, Commissioning Policy, Energy Action Plan, and the Zero Net Energy Resolution. In tandem, these policies (1) provide a framework and tools for the County to proactively manage the performance of its building assets and (2) improve the long term energy performance of County buildings in a manner that supports the County's energy efficiency goals and leads to a Zero Net Energy building portfolio. It closes gaps in County protocols and procedures and complements existing County policies for a cohesive County Energy Policy

The Energy Efficiency Standard will:

- a) Increase participation of County buildings in energy efficiency practices and improvements resulting in reduction of energy usage across the County.
- b) Promote energy efficiency changes in the County's practices, policies, and procedures throughout all phases of a building's life cycle.
- c) Result in actions that improve energy performance through operations, maintenance, and management of existing County building assets, and promote long term actions that lead to a Zero Net Energy (ZNE) building portfolio.
- d) Institutionalize energy efficiency in County policies, programs, and processes and establish a culture of energy efficiency within the County's jurisdiction.
- e) Provide training to County staff on the Energy Efficiency Standard and Implementation.
- f) Provide the County measurable energy savings and reductions in operation and maintenance costs.

The County should expect to achieve improved energy performance leading to Zero Net Energy through a combination of (1) a reduction in electricity and natural gas end use consumption, (2) reduction in electricity peak demand, (3) and renewable energy (e.g. solar PV) to offset minimum electric and natural gas base loads and propane consumption.

1 Introduction

This Section provides the context and business case for the County's energy policy needs. It answers the questions -- what is needed? Why is it necessary? What are the desired outcomes, and how will it fit into existing County policy? This section (1) states the County's purpose and objectives, (2) provides background on the landscape of current regulations driving the County's energy policy, (3) introduces building energy and reach codes and the Zero Net Energy concept, and (4) provides an assessment of the County's building portfolio, energy policies, procedures, and processes. Finally it provides an initial assessment of opportunities and the potential costs and benefits for implementing a comprehensive energy policy.

1.1 Energy Efficiency Policy Abstract

The Energy Efficiency Standard, herein referred to as the "Policy", is intended to work in coordination with other County energy management strategies and policies; specifically the Utility Manager System, Benchmarking Policy, Commissioning Policy, Energy Action Plan, and the Zero Net Energy Resolution. In tandem, these policies (1) provide a framework and tools for the County to proactively manage the performance of its building assets and (2) improve the long term energy performance of County buildings in a manner that supports the County's energy efficiency goals and leads to a Zero Net Energy building portfolio.

It is paramount that the Policy is clear and actionable across all County Departments, occupants, and tenants of County owned and General Services maintained buildings, facilities, or structures to the extent possible to maximize effectiveness to the County and achieve real impact. As such, the Policy has been developed specifically for the County of Santa Barbara through assessment of County buildings, in-person interviews with key County personnel, and solicitation of stakeholder feedback from County Department Representatives.

This Policy is the outcome requirement of an existing County ordinance (Ordinance 4452, Chapter 12a) approved and adopted by the County Board of Supervisors on March 26, 2002. The expected outcome is the establishment of a County of Santa Barbara Policy that will ensure that all applicable County administrative, construction, and operations and maintenance activities are performed in a manner that leads to cost effective energy performance in County facilities. It is the County's expectation that the implementation of this Policy will result in energy consumption reductions that directly correlate with utility bill reductions and reductions in greenhouse gas emissions regulated by State Directive AB32.

1.1.1 Policy Purpose and Objectives

Policy Purpose

California State regulations mandate reductions in energy use and greenhouse gas (GHG) emissions. Specifically State Directive AB32 regulates statewide GHG reductions, by returning emissions to 1990 levels by 2020. In response to this Directive and other enacted State Executive Orders and Initiatives (which mandate energy efficiency in State owned buildings); the California Public Utilities Commission (CPUC) developed a Long-Term Energy Efficiency Strategic Plan (Commission C. P., 2008). The document outlines several "big bold" goals and provides an action plan for local communities to lead by example. An outcome of the Plan was an allocation of ratepayer or Public Purpose Program (PPI) surcharge, distributed through utilities, to support the development of local county energy policies consistent with the long-term plan.

The County of Santa Barbara was awarded a grant provided by Southern California Edison which was approved by the County Board of Supervisors in 2011. Under this grant, the County has already developed Policies that bookend a buildings operations; including, metering, benchmarking, and commissioning. The County has (1) resolved to reduce electricity consumption in County buildings by 20% in 2020 below 2008 levels, (2) to become Zero Net Energy (ZNE) across its building and facility portfolio, and (3) to take immediate, cost effective coordinated steps to reduce reliance on GHG emissions. This Policy leverages state energy codes and energy reach codes as an important tool for advancing County energy performance toward these ends. It closes gaps in County protocols and procedures and complements existing County policies for a cohesive County Energy Policy.

Figure 2 summarizes the enabling State and County regulatory and non-regulatory energy policy framework described above and summarized here. State policies (e.g. State Directive AB32) have been the key instruments driving statewide reductions in energy consumption and GHG emissions. In response, the CPUC developed several “big bold goals” for local counties, creating funding vehicles which the County of Santa Barbara has leveraged towards these ends. The County’s policies enable one another. That is, the Utility Manger System enables the Benchmarking Policy which in turn enables the Commissioning Policy. These policies underpin this Policy (Energy Efficiency Standard) and the Energy Action Plan, which will enable the County’s principal long term objectives of Zero Net Energy. It is the interaction of these County policies that will enable the County to manage its building assets to achieve long term energy and cost savings.

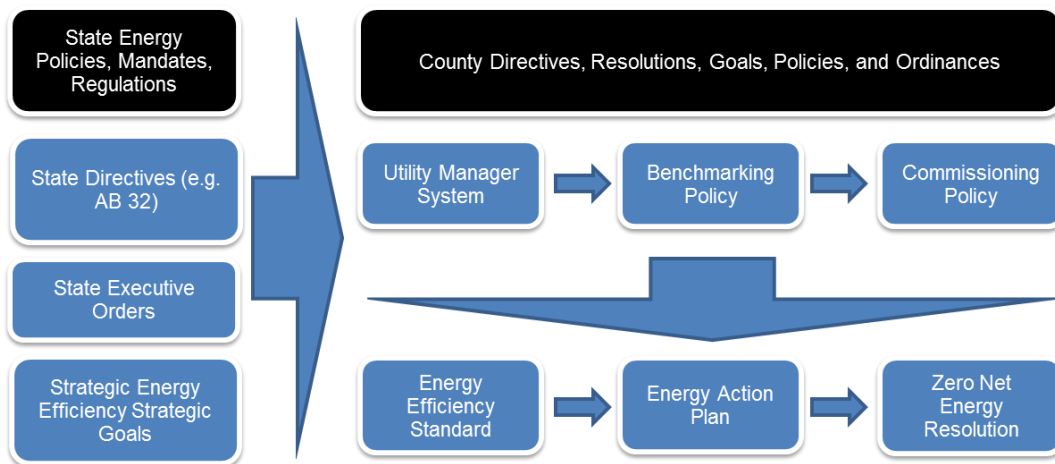


Figure 1: Framework of Key Regulatory and Non-Regulatory State and County Energy Policies

Policy Objective, Goals, and Outcomes

The policy will ensure that all applicable County administrative, construction, and operations and maintenance activities are performed in a manner that leads to cost effective energy performance in County facilities.

This Policy will improve the long term energy performance of County buildings in a manner that supports the County's energy efficiency goals and leads to a Zero Net Energy (ZNE) building portfolio. This is accomplished through improvements to policy, procedural, behavioral, and operational and maintenance practices that when implemented by various stakeholders support this goal. This Policy is intended to strengthen these protocols while integrating with and complementing existing County policies. The Energy Efficiency Standard will:

- 1) Increase participation of County buildings in energy efficiency practices and improvements resulting in reduction of energy usage across the County.
- 2) Promote energy efficiency through changes in the County's practices, policies, and procedures.
- 3) Be implemented by project stakeholders. That is, the Policy will be enforceable, complied with, and enforced.
- 4) Promote the use of above minimum standards across all energy end-uses, building types, climate factors, and throughout all phases of a building's life cycle.
- 5) Result in immediate actions that improve energy performance through operations, maintenance, and management of existing County building assets, and promote long term actions that lead to a ZNE building portfolio.
- 6) Institutionalize energy efficiency in County policies, programs, and processes and establish a culture of energy efficiency within the County's jurisdiction.
- 7) Provide training to County staff on the Energy Efficiency Standard and Implementation Plan.
- 8) Provide the County measurable energy savings and reductions in operation and maintenance costs.

1.1.2 Policy Scope

This Policy is comprehensive and applies to all County owned, operated and leased buildings and facilities, all County Departments, and all County building construction or improvement projects (e.g. new construction, existing building, leased space, and operation and maintenance).

1.1.3 The Benefits of an Energy Efficiency Policy

It is the County's expectation that the implementation of this Policy will result in energy consumption reductions that directly correlate with utility bill reductions and reductions in greenhouse gas emissions regulated by State Directive AB32. These quantifiable metrics can be monetized to justify their economics and to communicate their benefits to the County Board of Supervisors. Additional "non-energy benefits" (e.g. social benefits) are often difficult to monetize but are qualitatively known to improve overall building and occupant health and performance. Examples of tangible energy and environmental benefits are listed below.

- 1) Saves the County money, allowing local tax dollars to be spent on improving municipal services.
- 2) Provides a hedge against rising energy prices, in an environment where County budgets are resource constrained, by stabilizing County operational costs.
- 3) Makes progress towards State and County energy efficiency mandates by reducing energy demand, consumption, and emissions.
- 4) Reduces need for new utility power generation, transmission, and distribution systems.

1.2 Background

1.2.1 Drivers Influencing the Need for an Energy Efficiency Policy

State Initiatives

The state of California is very progressive and has the second most aggressive energy efficiency building standards, codes, and policies in the US. Several of these regulations mandate reduction in statewide energy use, with state and local municipalities acting as agents and leading by example. State Directive AB32 provides the main charge for regulating building energy and emissions in the state, which are amplified through various State Executive Orders, and the California Long Term Energy Efficiency Strategy Plan.

- 1) The State Directives collectively set the greenhouse gas (GHG) emissions requirements for the state, require local governments to reduce energy consumption and emissions from government projects. AB32 for example, regulates statewide GHG emissions, reducing emissions levels to 1990 levels by 2020.
- 2) State Executive Orders require increased energy production from renewable resources by 2020 and require State agencies and departments to reduce GHG emissions and improve energy efficiency at state owned buildings.
- 3) The Green Buildings Initiative requires a reduction in energy use in state owned buildings by 20% by 2018 compared to 2003 baseline.
- 4) The California Long Term Energy Efficiency Strategy (2008) outlines several “big bold goals” to achieve maximum energy efficiency in the State of California. The Plan provides a long term vision and comprehensive roadmap for energy efficiency to assist in achieving those goals. Three specific goals that are relevant to the Energy Efficiency Standard are (1) all residential construction shall be Zero Net Energy (ZNE) by 2020, (2) all commercial construction shall be ZNE by 2030, and (3) counties shall lead by example by improving energy efficiency within state and local buildings.

County Initiatives

In response to the various state initiatives, the County of Santa Barbara has shifted their approach for managing the long term energy performance, and operations and maintenance of its buildings. The County has developed several resolutions, policies, and ordinances that through implementation have resulted in a reduction in energy consumption and are expected to improve the long term operational and maintenance performance of County buildings. These include:

- 1) County Directive (Resolution 09-059) (3/17/09) requires the County to take immediate cost effective coordinated steps to reduce reliance on greenhouse gas emissions for compliance with the State Directives.
- 2) Benchmarking Policy (4/2/2013) was unanimously supported and approved by all of the County Board of Supervisors. It requires that all County buildings be benchmarked using ENERGY STAR Portfolio Manager to verify operational performance.
- 3) The Energy Action Plan (2013) (4/2/2013) sets a goal of reducing electricity consumption by 25% by 2020 compared to a 2008 baseline.
- 4) The Commissioning/Retro-Commissioning Policy (approved by the County Board of Supervisors 1/202015).
- 5) The Sustainability Action Plan reinforces the County’s commitment to energy efficiency and the use of renewable energy resources. It identifies specific actions (projects and initiatives) the county is taking towards that end.

- 6) The County’s Zero Net Energy Facility Resolution (2014) passed with a supermajority 4 of 5 County’s Board of Supervisors. It resolves that all new construction be Zero Net Energy (ZNE) by 2025 (with an interim target of 50% by 2020) and that ZNE progress is made towards existing buildings with 50% by 2025 and 100% by 2035.

1.2.2 The State of California Energy Code Landscape

Title 24, Part 6

The 2013 Building Energy Efficiency Standards for Residential and Non-Residential Buildings¹ (Title 24, Part 6) is the California State Energy Code. The code is mandated at the State level and adopted and enforced at the local jurisdictional level. The code is updated on a triennial basis with only two adoption cycles planned before 2020, as illustrated in **Figure 4**.

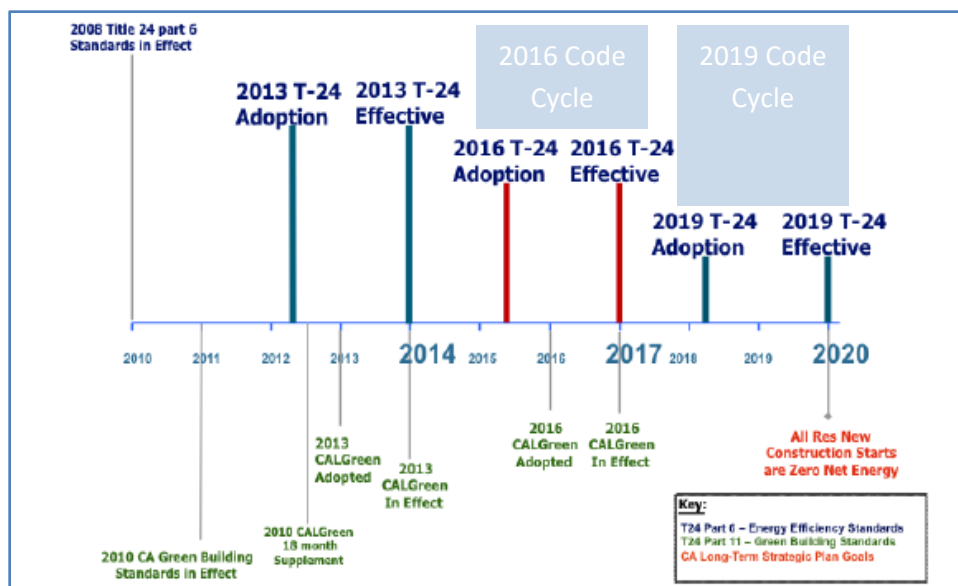


Figure 2: California Code Adoption Cycles (extracted from Mahong)

CALGreen

The 2013 California Green Building Standards Code, CALGreen Code (California Code of Regulations Title 24, Part 11), is the State of California’s Green Building Code. It includes a comprehensive set of green building measures that includes planning, design, energy efficiency, water efficiency, material conservation, resource efficiency, and environmental quality. The baseline energy regulations are Title 24, Part 6, (the state’s baseline energy code). There are voluntary provisions that increase energy performance requirements (i.e. Tier 1 and Tier 2). These reach provisions are adopted at the local jurisdictional level.

1.3 Introduction to Energy Codes and Zero Net Energy

The County of Santa Barbara has not adopted the current version of the California State Energy Code (Title 24, Part 6). Adoption and implementation (compliance and enforcement) of energy codes are key tools for policy makers for improving building energy performance. This is no less true in California in the wake of aggressive state mandates to reduce building related

¹ <http://www.energy.ca.gov/2012publications/CEC-400-2012-004/CEC-400-2012-004-CMF-REV2.pdf>

greenhouse gas emissions.

Successive Title 24, Part 6 code cycles have resulted in efficient practices. They are however not currently comprehensive (i.e. regulated end-uses, building operations and maintenance) or aggressive (i.e. efficiency requirements) enough to meet the County's Zero Net Energy Facilities Resolution. To achieve Zero Net Energy, the County will need to implement a comprehensive energy efficiency standard that (1) enforces existing state energy and reach codes, (2) encourages energy performance be deployed in an aggressive and cost effective manner, (3) is integrated with existing County policies, and (4) has reach across a building's life cycle (i.e. all construction and operations and maintenance activities).

1.3.1 Energy Codes

Baseline Energy Codes

Baseline energy codes (e.g. Title 24, Part 6) define a minimum acceptable standard or criteria for energy performance in building design and construction practice. That is, minimum requirements for energy efficient technologies, equipment, and systems (e.g. equipment efficiencies and appliance standards). They may consist of mandatory, prescriptive, and performance (voluntary) regulations that apply to new and existing building construction projects. Operations and maintenance activities (e.g. energy performance, equipment repair or rehabilitation, and replacement) are traditionally not regulated.

Energy codes traditionally regulate the following covered end-uses: (1) Building Envelope, (2) Heating, Ventilating, and Air Conditioning, (3) Domestic/Service Water Heating, (4) Lighting, (5) Electric Power, and (6) Other Equipment². Plug and process loads (e.g. receptacle loads for computers) are not regulated by baseline building codes, but can be a significant consumer of a building's annual energy use. California has adopted Title 20, Appliance Efficiency Regulations³ and the federal government regulates efficiency standards for most other appliances, limiting the reach States have in regulating appliance end use consumption.

In California, the State Energy Code (Title 24, Part 6) is developed by the California Energy Commission⁴ (CEC) and adopted, implemented, and enforced at the local jurisdictional level.

Reach Energy Codes

Reach energy codes encourage or regulate criteria that exceeds baseline building codes. That is, they establish requirements that are substantially above minimum energy code requirements. They are traditionally implemented by the "early adopter" and if effective may eventually be adopted as baseline code through the regulatory update process. Reach codes may be constructed as either mandatory or voluntary regulations and may be complied with by meeting prescriptive or performance criteria such as through the installation of equipment with specifications several tiers above baseline equipment efficiency levels or by exceeding the baseline code by a specified percentage.

² Applies to limited auxiliary equipment including electric motors, elevators, and service water pressure booster pumps.

³ <http://www.energy.ca.gov/2010publications/CEC-400-2010-012/CEC-400-2010-012.PDF>

⁴ <http://www.energy.ca.gov/>

According to the DOE (US Department of Energy E. E., Building Energy Codes 101 - An Introduction, 2010) there were more than 300 beyond code programs as of 2009. Examples of reach codes common in the US building design and construction industry include:

- 1) 2013 California Green Building Standards Code, CALGreen Code⁵ (Title 24, part 11).
- 2) Third party ANSI green building rating systems (e.g. The USGBC's LEED Certification⁶, The Green Building Initiative's Green Globes⁷, The International Living Future Institute's Living Building Challenge⁸).
- 3) New Building Institute (NBI) Core Performance Guide.
- 4) Advanced Energy Design Guides⁹.
- 5) ASHRAE 189.1.
- 6) International Green Construction Code¹⁰ (IgCC).
- 7) Ratepayer funded utility demand-side management programs.

1.3.2 Zero Net Energy

Zero Net Energy (ZNE) describes the performance of a building or facility when it produces as much energy as it consumes on an annual basis. ZNE is defined by building operational performance rather than asset performance (i.e. actual energy consumption rather than modeled). ZNE has assumed several definitions depending upon ultimate stakeholder or advocacy group¹¹. For example a building could be defined as ZNE Time Dependent Validated (TDV), ZNE emission, ZNE site energy, ZNE source energy, or ZNE electric only. Furthermore, the preceding definitions apply ZNE at a single building level. The County may choose to implement strategies to achieve ZNE at the building level, where cost effective, at the campus level, or aggregate portfolio level when deciding how to quantify and report ZNE performance.

Although definitions exist for these variations there is no single industry consensus or accepted standard for ZNE. The County's Zero Net Energy Facilities Resolution (Resolution No.: 14-49), defines ZNE as:

“A building that, on an annual basis, will consume as much energy as it produces from renewable sources, while maintaining an acceptable level of service and functionality. Zero Net Energy (ZNE) buildings can exchange energy with the power grid as long as the net energy balance is zero on an annual basis.”

A ZNE building may be achieved through any combination of available energy resources, such as efficiency, renewables, and power generation. A ZNE building may use an integrated project process, use both passive and best in class technologies and practices, achieve deep energy savings in all building end-uses, balance cost effectiveness of energy efficiency against renewable generation, and have verified performance. A ZNE building however, will always pursue lower cost energy efficiency through deep energy savings before deploying renewable

⁵ <http://www.bsc.ca.gov/Home/CALGreen.aspx>

⁶ <http://www.usgbc.org/LEED/>

⁷ <http://www.greenglobes.com/home.asp>

⁸ <http://living-future.org/lbc>

⁹ <http://energy.gov/eere/buildings/advanced-energy-design-guides>

¹⁰ <http://www.iccsafe.org/CS/IGCC/Pages/default.aspx>

¹¹ Stakeholders may include government entities, utilities, and building owners and operators. Advocacy groups may include the New Buildings Institute (NBI), the Zero Energy Commercial Building Initiative (CBC), and the US DOE.

and power generation resources.

Heschong (Heschong Mahone Group & Company, 2014) describes what is generally accepted as the loading order for sequencing implementation of ZNE:

- 1) **Minimize building loads** through the use of building form such as siting, orientation, and envelope.
- 2) **Optimize system efficiency** using passive and high efficient equipment and systems with optimized control systems.
- 3) **Use highest efficiency appliances** for reduction of end-use load and process requirements.
- 4) **Optimize building operations** through appropriate equipment scheduling and set points.
- 5) **Improve occupant / building interactions** through behaviors that reduce consumption of systems within their purview such as lighting and plug loads.
- 6) **Incorporation of renewable power** using on-site or remote generation.

Heschong (Heschong Mahone Group & Company, 2014) further describes the basic tenets of ZNE as a building system that:

- 1) Promotes highly efficient energy efficiency practices.
- 2) Addresses constraints on renewable energy generation.
- 3) Promotes whole building and community solutions.
- 4) Incorporates highly efficient design and operational practices, with verified performance.

This sequential and prescriptive process dictates a strategy of deploying lower cost energy efficiency through deep energy savings before more expensive distributed generation (e.g. photovoltaic panels, solar thermal collector, and small wind turbine). For existing buildings, where opportunities may be limited to change building form, an approach similar to that outlined in the US EPA's ENERGY STAR Building Upgrade Manual¹², should be followed. Energy loads should be reduced in the following sequence: (1) end-use, (2) distribution, then (3) unitary or central plant loads. This enables projects to further benefit from equipment rightsizing, leading to smaller lower capital cost equipment, increased performance, and reduced maintenance.

¹² <http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/save-energy/comprehensive-approach/energy-star>

1.3.3 Achieving Zero Net Energy through Deep Energy Savings

A study conducted by (Institute, Getting to Zero 2012 Status Update: A First Look at the Cost and Features of Zero Energy Commercial Buildings, 2012) reviewed 21 completed high performance buildings, 15 of which achieved Zero Net Energy (ZNE) status, and concluded that ZNE building's designed for deep energy savings have Energy Use Index's (EUI) that on average range between 25 and 30 kBtuh/sf/yr, depending upon the building type, function, and climate zone.

Results from 11 case studies evaluated by the New Building Institute (Institute, A Case for Deep Savings, 11 Case Studies of Deep Energy Retrofits in Support of NEEA's Existing Building Initiative and NBI's Getting to 50 Work, 2011) illustrated the 13 most prevalent efficiency measures for achieving deep energy savings.

These studies highlight several specific measures that have a heightened sensitivity to building performance and should be targeted as part of any energy project. They include measures with sensitivity to one another (i.e. have interactive effects) and those sensitive throughout the building's design and operations and maintenance phases. The sensitivity of operations and maintenance measures highlights the importance of (1) understanding occupant behavior and providing tenant engagement as key strategies for reducing energy consumption and (2) designing Zero Net Energy projects to bridge the gap between high performance designs and high performance building operations. The endgame is no longer high performance design but rather designing for high performance operations and maintenance.

1.4 Assessment of Santa Barbara County Building Portfolio and Energy Policies

The County has experienced a paradigm shift over the last decade, with the County moving from a business as usual philosophy towards taking conscious and proactive steps to improve building performance. As a result, the County has seen a reduction in energy consumption and complimentary actions which are expected to preserve the long term operational and maintenance performance of their buildings. Despite success, the County needs to sustain a concentrated effort to achieve Zero Net Energy. With more than 400 buildings and facilities¹³, County Departments must proactively identify, plan, and prioritize candidate buildings for compliance.

1.4.1 Santa Barbara County Building Inventory

The County of Santa Barbara's building portfolio consists of a diverse make-up of buildings that vary in age, use, and size across its 3,789 square miles, 3 climate zones, and 8 incorporated cities. The County has more than 400¹⁴ facilities and structures that make up approximately 2.4 million square feet of space managed by General Services and occupied by the County's 25 departments¹⁵.

The County's owned and operated and leased buildings are served by 232 electric and 88 natural gas meters and four utilities; Southern California Edison, Southern California Gas, Lompoc City, and Pacific Gas & Electric in New Cuyama. These buildings account for approximately 91% of the County's total electrical metered energy consumption and 49% the County's baseline greenhouse gas emissions.

The diversity in the makeup of owned and operated buildings in the County portfolio can be attributed to the following:

- 1) The median age of all County buildings is 36 years and consequently nearly half of the County's building stock was constructed before Title 24 was enacted in 1978.
- 2) Many of the buildings continue to utilize originally installed aging systems and equipment.
- 3) Due to the local climate, many of the County's buildings are not fully conditioned.
- 4) The County has over 40 building types¹⁶ each of which have different operational functions and occupant uses.

¹³ Quantity of buildings taken from County of Santa Barbara Sustainability Action Plan, 2012.

¹⁴ The County's owned and operated facility inventory includes buildings, facilities, and structures that range in size from small unoccupied buildings to large conventional office buildings that house hundreds of County employees. They include but are not limited to the following: restrooms at park and storage buildings, office buildings, fire stations, small sheds, clinic facilities, warehouses, jails and detention facilities, park and recreation facilities, libraries, maintenance shops, semi-permanent trailers, car ports, swimming pools, and mission critical facilities such as the Emergency Operations Center and 911 Call Center.

¹⁵ County Departments are occupants and tenants of the County owned and General Services maintained buildings, structures and facilities.

¹⁶ The County's owned and operated facility inventory includes buildings, facilities, and structures that range in size from small unoccupied buildings to large conventional office buildings that house hundreds of County employees. They include but are not limited to the following: restrooms at park and storage buildings, office buildings, fire stations, small sheds, clinic facilities, warehouses, jails and detention facilities, park and recreation facilities,

- 5) The County has 3 distinct Climate Zones¹⁷ within its boundaries.
- 6) Coastal located facilities experience further accelerated aging and corrosion issues due to the coastal climate.

1.4.2 Santa Barbara County Baseline Energy Consumption

The County’s baseline energy consumption (base year 2014) has been developed using data extracted from the County’s Utility Manager System¹⁸ (EnergyCAP). EnergyCAP is the County’s energy management platform for processing Department utility bills and warehousing historical energy data. Approximately 20% of the County’s legacy utility bills¹⁹ are not processed through EnergyCAP. The County has no formalized process for recording, tracking, or aggregating energy consumption for these facilities.

Figure 7 and **Figure 8** illustrate the County’s baseline building energy consumption, aggregated and segmented by fuel type, respectively. Between July and June, the County’s buildings and facilities consumed approximately 110,000 MMBtu of energy. The prevalence of County buildings located in the County mild coastal climate zones drives a year round demand for heating with energy consumption peaking during the winter months. Electric consumption remains flat throughout the year due to predominance of natural gas heated buildings and partially air conditioned buildings. Propane is predominately used in remote areas of the County and is not a significant energy contributor.

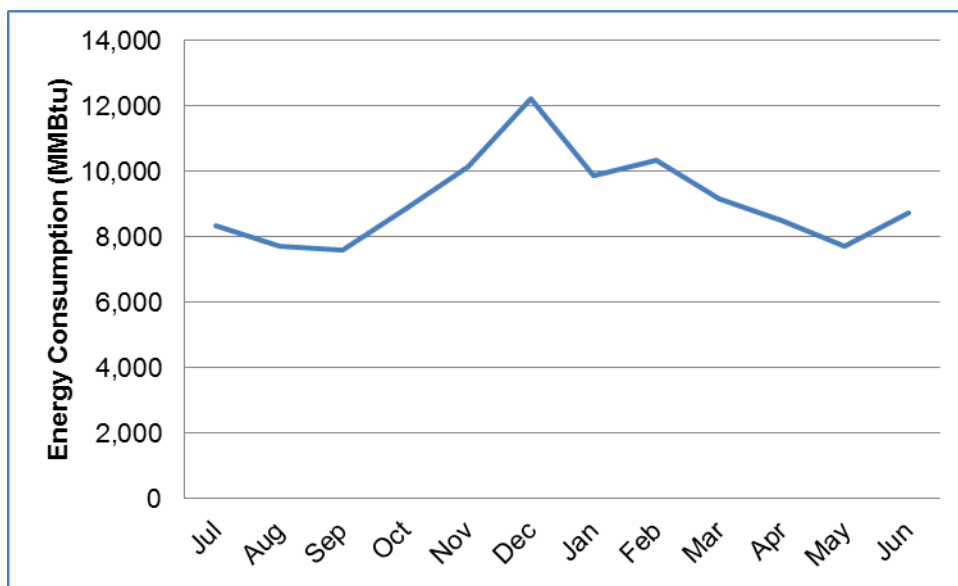


Figure 3: Total Energy Consumption (MMBtu) for All County Buildings

libraries, maintenance shops, semi-permanent trailers, car ports, swimming pools, and mission critical facilities such as the Emergency Operations Center and 911 Call Center.

¹⁷ The County’s distinct climate zones include: Zone 4 – central coastal valley; Zone 5 – central coastal; Zone 6 – south coastal.

¹⁸ The County’s energy cost and performance data was extracted from EnergyCAP and represents approximately 80% of the County’s building meter data.

¹⁹ This value is an approximation provided by the County Energy Manager.

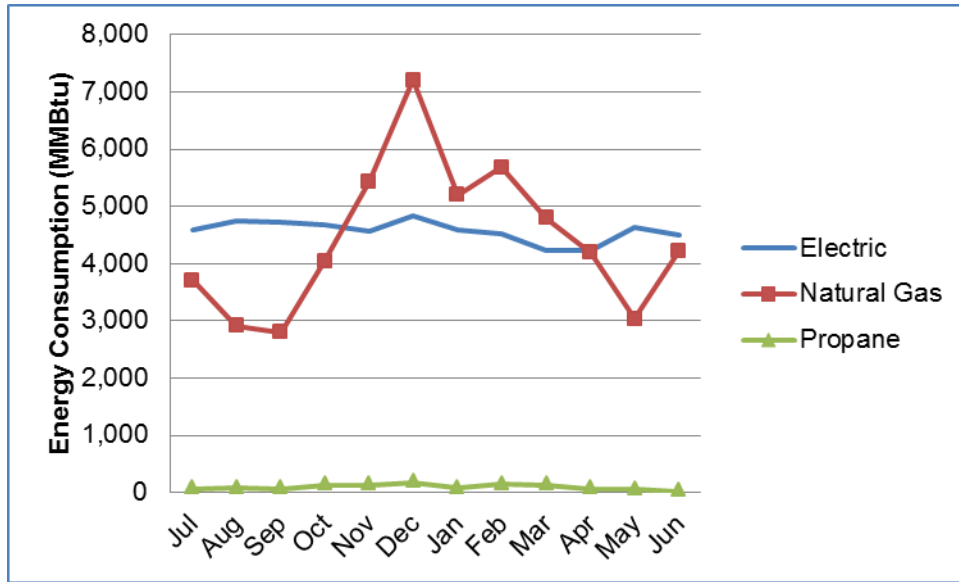


Figure 4: Energy Consumption (MMBtu) by Fuel, for All County Buildings

Figure 9 illustrates the baseline energy consumption by the “Buildings and Meters” category grouping in EnergyCAP. It includes the energy consumption for all County buildings and consumption disaggregated into the County’s two main campuses, various cities, and departments. It is used by the County Energy Manager to identify relative performance trends and anomalies. Similar graphics for each Department can be created in EnergyCAP to monitor and track performance of individual County Department progress towards compliance with this Policy.

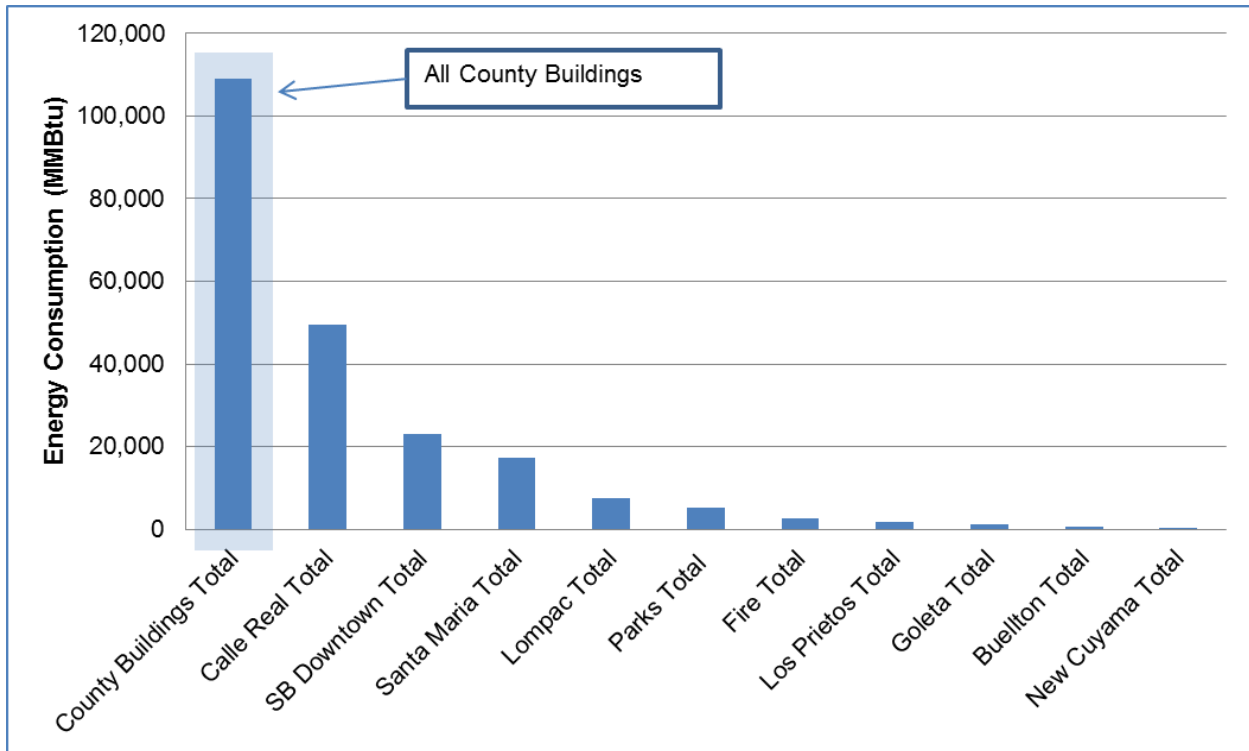


Figure 5: Annual Total Energy Consumption (MMBtu) by EnergyCAP Building and Meters Grouping –

The County’s estimated building Energy Use Index (EUI) is 55.0 kBtuh/sf/yr. Assuming the County achieves Zero Net Energy (ZNE) through deep energy savings (with an average EUI of 30) prior to deployment of renewable energy generation, the County will need to decrease annual energy consumption by approximately 45% (or approximately 60,000 MMBtu²⁰). The County should expect to achieve ZNE through a combination of (1) a reduction in electricity and natural gas end use consumption, (2) reduction in electricity peak demand, (3) and renewable energy (e.g. solar PV) to offset minimum electric and natural gas base loads and propane consumption.

1.4.3 Assessment of Santa Barbara County Energy Policies

Approach

Development of this Policy included the review and assessment of various policy tools and instruments to define the range of Policy coverage. Secondary literature research was performed to (1) catalogue peer municipality energy standards and reach codes, (2) summarize review of relevant industry resources, and (3) provide a policy framework. Primary research was conducted through (1) stakeholder meetings (to elicit support and solicit feedback from County stakeholders), (2) a site visit (to identify gaps in existing County practices through interviews with key County stakeholders), and (3) identification of gaps in existing County policies, processes, and documents. The convergence of these analyses resulted in a basis and need for the County’s energy policy. **Figure 10** illustrates the key inputs assessed and resulting policy coverage.

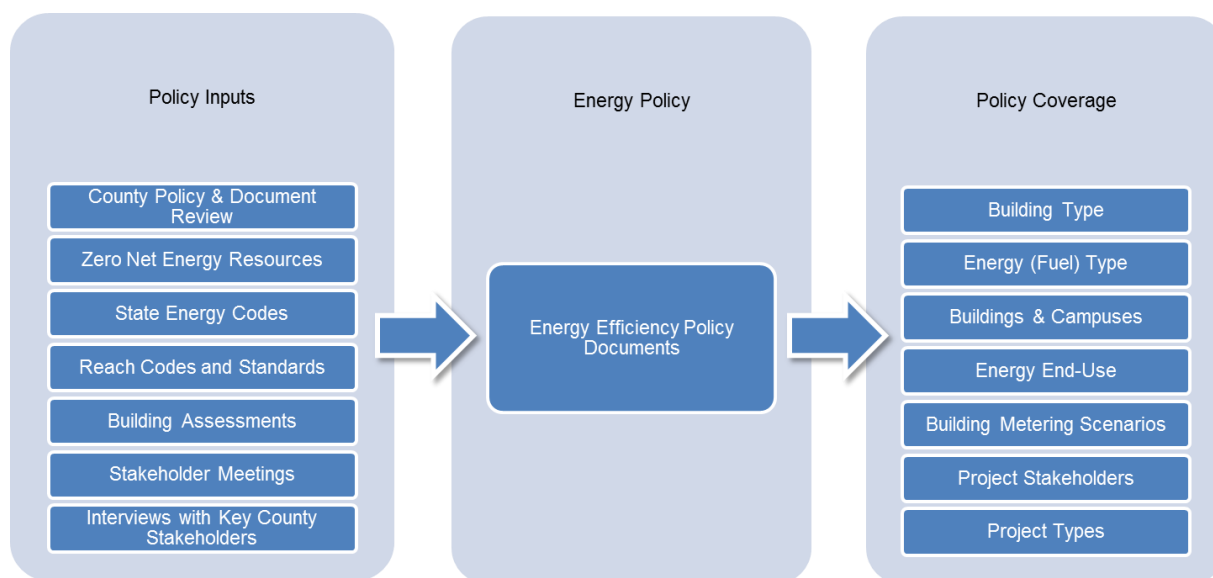


Figure 6 – Illustration of Policy Inputs and Range of Coverage

The County has the infrastructure and framework to adopt and implement a robust energy policy. The policy will need to strengthen existing energy efficiency protocols and formalize relevant ad hoc processes and procedures. **Table 1** summarizes key inputs identified and

²⁰ Based on an annual energy consumption value 20% greater than that reported in EnergyCAP due to unreported Department energy use.

recommended actions to close gaps in existing County policies. These provide the basis for the Policy Statement in **Section 2**.

Table 1 - Key Input Received from Stakeholder Interviews

Key Input Received	Recommended Policy Action
Department project planning and budgeting is performed by each County Department (i.e. decentralized from General Services).	Centralize planning and budgeting efforts, where appropriate, to enable greater consistency across departments in achieving progress towards County objectives.
General Services maintains Department tenanted and County owned and operated buildings.	County Department planning and budgeting should include specifications and criteria for the construction of high quality and high performance buildings, which lead to long term and sustained operational and maintenance performance.
Departments continue to direct pay legacy utility bills through their operations and maintenance budgets.	Department utility bills should be paid through the County's centralized energy management platform, Utility Manager System.
The County has not adopted the mandatory California State Energy Code.	Adopt and enforce Title 24, Part 6 and applicable CALGreen requirements in all County projects.
Leased space accounts for a significant portion of the County's building portfolio.	Include preferential selection of high performance leased space and leasing terms and conditions that permit net metering.
Planned new construction projects represent a small portion of the County's building portfolio when compared to the County's existing building portfolio.	Departments should plan, prioritize, and budget now for Zero Net Energy compliance.
External project stakeholders (e.g. Architectural and Engineering firms) are not incentivized to provide high quality and performance designs.	(1) Adopt and enforce the State Energy Code, (2) require transparency in system selection and design through life cycle costing and establishment of project energy performance criteria, and (3) formalized County review processes.
The County has over 400 buildings and approximately 300 electrical and 100 natural gas meters.	Require all new construction and major renovation projects to include building level metering. Sub meter leased space with net lease agreements.
The County has over 400 buildings and approximately 20 facility staff to maintain them.	Tenant engagement and education will be fundamental in reaching Zero Net Energy.

1.5 Potential Energy Efficiency Policy Costs and Benefits

Utility Costs

Between July 2013 and June 2014, the County's buildings and facilities consumed approximately 110,000 MMBtu's of energy, for a total cost of \$3M²¹, or about 0.4% of the County's \$800M annual budget. As the County takes steps towards greater energy efficiency and Zero Net Energy, it can expect a commensurate decrease in energy consumption and corresponding decrease in utility costs.

Energy Efficient Code Costs

Project costs are measured by the incremental cost to achieve energy savings over the baseline code. That is, energy improvements that meet baseline code requirements have no net cost. The incremental cost for high efficiency technologies that exceed code is equal to the difference between the baseline efficient technology and baseline code equipment. Reach codes, which regulate above code equipment standards, have an incremental cost impact. This cost may be offset through utility rebate programs which can reduce the incremental cost by as much as 50%. Even with the higher equipment cost, these technologies are often cost effective when evaluated through a life cycle cost analysis rather than simple payback or first cost decisions. Zero Net Energy (ZNE) construction is not a business as usual decision for most customers. Although California has the greatest number of ZNE buildings and the individual technologies needed to achieve ZNE are commercialized, there is anecdotal evidence from a study commissioned by NBI (Institute, Getting to Zero 2012 Status Update: A First Look at the Cost and Features of Zero Energy Commercial Buildings, 2012) that new construction ZNE buildings may have a first time incremental cost ranging of 0-15%. Similar data is not available for retrofitting existing buildings to ZNE, however, a study by the District of Columbia Department²² of the Environment assessed the costs of transforming three LEED v3 Platinum designed buildings to ZNE found that:

- 1) *"For a 1 percent to 3 percent added initial cost of construction, new developments in the district could save up to 60 percent of their energy consumption.*
- 2) *The return on investment for deep energy efficiency is 6 percent to 12 percent and rises to 33 percent to 36 percent when modeled for net zero energy using solar power"*

The bottom line is that to achieve Zero Net Energy, the County will need to evaluate projects on their total life-cycle cost rather than their initial capital investment cost.

Operations and Maintenance Costs

Designing and constructing energy efficient buildings combined with a strong predictive/preventative maintenance program has been shown to have average return on investments of 500% and according to Cruzan (Cruzan, 2009) *"is one of the most lucrative investment opportunities a business can undertake."*

²¹ The County's energy cost and performance data was extracted from EnergyCAP and represents approximately 80% of the County's building meter data.

²² <http://newbuildings.org/news/district-zero-energy-buildings>

Preventative maintenance can reduce energy consumption through proper timing and sequencing of maintenance activities that maintain building systems and equipment at peak performance. It may also reduce overall maintenance costs due to more efficient sequencing of maintenance activities (e.g. group re-lamping) and reduction of unplanned emergency or call-back maintenance that drains maintenance staff resources from planned maintenance activities and undermine sustaining long term energy performance.

2 Policy Statement

The County of Santa Barbara includes energy efficiency policies which apply to all County Departments and all County projects (e.g. new construction, existing building, leased space, and operation and maintenance). The County promotes Policies which incorporate coordinated and integrated energy strategies that begin with project planning and continue through the buildings operation and maintenance life.

This Policy is organized around the three predominate County construction project types (i.e. new construction, existing buildings, and leased space), and is bookended by Administrative and Planning Requirements (**Section 2.1**), and Operations and Maintenance Requirements (**Section 2.5**), which apply to all applicable projects. The New Construction Requirements (**Section 2.2**) applies to all new construction projects regardless of project size. The Existing Building Requirements (**Section 2.3**) provides distinct requirements for major renovation and minor renovation projects, with retroactive requirements. The Leased Space Requirements (**Section 2.4**) applies to new or renewed County leased space which exceeds a 3-year lease agreement. The subsequent sections define the County’s Policy Statement and are illustrated in **Figure 11**.

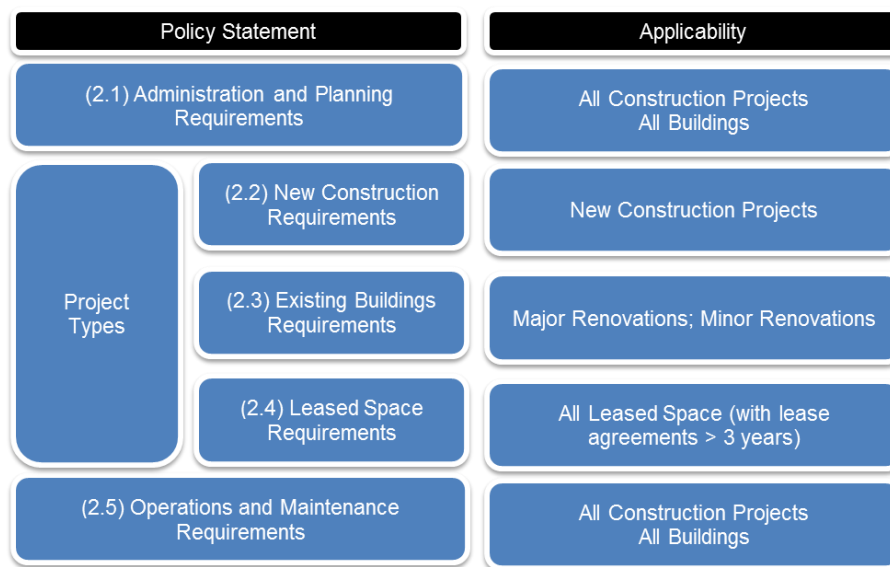


Figure 7: Policy Statement Organization

This Policy establishes minimum acceptable criteria for the energy performance of County buildings. Where differences exist between County adopted codes and relevant ordinances and this Policy, the more stringent requirement shall apply. This Policy requires that for all applicable projects, energy efficiency is applied in accordance with all adopted codes and relevant ordinances.

2.1 Administrative and Planning Requirements

2.1.1 Administrative Requirements

- 01) This Policy requires that all County new construction and major renovation projects include building level metering for all fuels consumed on site for buildings with greater than 5,000 gross square feet by 2017.
- 02) This Policy requires that all County owned and operated buildings, and leased space where the County directly pays utility bills (except for special revenue districts), report energy consumption²³ through the County's Utility Manger System. (ECAP).
- 03) This Policy requires that all County Project Managers and Department Facility Managers with responsibility overseeing the development of County buildings: (a) attend training on the County's Energy Efficiency Policy and (b) insure compliance with current Energy Efficiency Ordinances.
- 04) The County Energy Manager shall report annually to the County Board of Supervisors on County and Department level energy performance.

2.1.2 Project Planning Requirements

- 01) This Policy directs the County General Services Department to develop and maintain a County web page that provides this Policy document.
- 02) Departments must plan for and comply with this Policy. When a Department plans for construction or maintenance projects affecting the Facility Inventory, the Department plans shall meet the requirements of this Policy.

2.1.3 Building Codes and Standards Requirements

- 01) This Policy adopts the requirements of the latest version of the California State Energy Code (Title 24, Part 6).
- 02) This Policy adopts the California State Green Building Code (CALGreen), inclusive of all mandatory and prescriptive energy requirements. All applicable construction projects with an execution of construction contract (1) after July 1, 2016 shall meet or exceed CALGreen Tier 1 requirements and (2) after July 1, 2017 shall meet or exceed CALGreen Tier 2 requirements.
- 03) All County new construction, major and minor renovations, and leased spaces shall include equipment that meets or exceeds Title 24, Part 6, ENERGY STAR and federal equipment and California appliance standards (Title 20),.

²³ This includes energy consumed by the County but paid for by others as in a County leased and tenanted building (e.g. under a full-service lease agreement.)

- 04) In the event that a project or a portion of the project is exempt from Federal, State or County Energy codes, the project shall mitigate the loss of energy reduction had it not been exempt with solar on a County of Santa Barbara facility equal to the lost energy reduction.

2.1.4 Project Performance Standards and Criteria

All County energy projects shall employ life-cycle cost analysis that prioritizes energy and long term building operational and maintenance performance over first cost or lowest cost to the County. When evaluating projects, a life-cycle cost analysis, compliant with California standards²⁴, shall be used to rank competing projects by (1) total energy savings, (2) savings-to-investment ratio, and (3) present value.

2.1.5 County Project Review Requirements

Departments shall make available to General Services (for review with County project specific requirements and County energy policies) all project procurement and development documents prior to finalization, approval, or acceptance, affecting the energy performance of County owned and operated buildings. Departments shall ensure adequate time is provided in the project's schedule for General Services to review and provide substantive feedback. (Ord. 4522)

2.2 New Construction Requirements

This Policy adopts the California State Energy Code, Title 24, Part 6, and sections of the California Green Building Code (CALGreen). It requires that all new construction projects be designed and constructed to Title 24, Part 6, with requirements phased-in for increasing the level of energy savings beyond Title 24, Part 6.

- 01) All new construction projects shall comply with the California State Energy Code, Building Energy Efficiency Standards for Residential and Non-Residential Buildings (Title 24, Part 6) and the CALGreen Standard enforced at the time of execution of construction contract.
- 02) All minor renovation projects shall comply with the applicable mandatory and prescriptive sections of the California State Energy Code, Title 24, Part 6.
- 03) All new construction, with an execution of construction contract after **July 1, 2017**, shall be Zero Net Energy projects and the departments' utility bill from General Services shall reflect that reduction in energy.

2.3 Existing Building Requirements

This section provides distinct requirements for major renovation and minor renovation projects, with requirements for Zero Net Energy Compliance. Departments shall make progress towards Zero Net Energy in compliance with the County's Zero Net Energy Facilities Resolution

²⁴ <http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Cost-effectiveness.htm>

(Resolution No.: 14-49) which requires 50% of County existing buildings be compliance by 2025, and 100% by 2035.

- 01) All major renovation projects shall comply with the California State Energy Code, Building Energy Efficiency Standards for Residential and Non-Residential Buildings (Title 24, Part 6) and the CALGreen Standard enforced at the time of execution of construction contract.
- 02) All minor renovation projects shall comply with the applicable mandatory and prescriptive sections of the California State Energy Code, Title 24, Part 6.
- 03) All major renovation projects, with an execution of construction contract after **July 1, 2018**, shall be Zero Net Energy projects and the departments' utility bill from General Services shall reflect that reduction in energy.
- 04) When a building construction or renovation project results in that building having had a cumulative amount of renovated gross floor area that is equal to or exceeds 50%, since **January 1, 2010**, the project shall be a Zero Net Energy project and the departments utility bill from General Services shall reflect that reduction in energy.

2.4 Leased Space Requirements

The County will incorporate energy efficient processes and systems into new (and renewed) County leased building space, whose lease agreements exceed 3 years. This Policy includes tenant leases whether or not a tenant improvement renovation is planned.

- 01) Departments shall prioritize leasing decisions on the leased assets energy performance, when such information is publically available and when and all other Department leasing criteria are met.
- 02) Departments shall give leasing preferences to lease agreements that allow the County to direct pay their share of energy costs, rather than assuming a gross lease.
- 03) All leased space shall be assessed for compliance with applicable mandatory and prescriptive requirements of Title 24, Part 6, and the County's enabling code. All non-compliant systems and equipment, affected by the tenant lease, shall be renovated and brought into compliance before occupancy.

2.5 Operational and Maintenance Requirements

2.5.1 Tenant Engagement

- 01) All County projects in existing buildings that include the installation or replacement of material energy consuming equipment, for which the building tenant or occupants have or share direct control, shall include building specific project documentation that describes to the tenant how the system is designed and installed for efficient operation and control, and the impact of their control adjustments on the building's energy performance.

02) All new construction and major and minor renovation projects shall include project specific documentation that describes to the building's tenant how the system is designed and installed for efficient operation and control, and the impact of their control adjustments on the building's energy performance.

2.5.2 Operations and Maintenance (Planned and Unplanned)

All operation and maintenance activities and renovation projects shall comply with the applicable mandatory and prescriptive sections of the California State Energy Code, Title 24, Part 6, and CALGreen Standards and the County of Santa Barbara Capital Projects Standards Manual, whichever is more stringent.

3 Implementation Plan

The adoption and implementation of this Policy provides the County two key milestones; the adoption of the California State Energy Code (Title 24, Part 6) and a roadmap to achieve Zero Net Energy (ZNE) in County owned and operated buildings and facilities. The County's Zero Net Energy Facilities Resolution (Resolution No.: 14-49), repeated below:

“All new Santa Barbara County owned facilities and major renovations beginning design after 2025 be constructed as Zero Net Energy Facilities with an interim target for 50% of new facilities beginning after 2020 to be Zero Net Energy. Santa Barbara County departments shall also take measures toward achieving Zero Net Energy for 50% of the square footage of existing Santa Barbara County owned facilities by 2025 and the remaining 50% by 2035.”

Restated below, the County has resolved to achieve Zero Net Energy in County owned and operated facilities in accord with the following timeline:

- 1) 50% of new construction and major renovations beginning design after 2020.
- 2) 100% of new construction and major renovations beginning design after 2025.
- 3) 50% of the existing building stock by 2025.
- 4) 100% of the existing building stock by 2035.

By setting aggressive ZNE goals and developing a plan to achieve them through fundamental and cost effective strategies that promote energy savings first through changes in County policies and procedures the County is positioning itself as an early adopter and one of the first County's in the US to set ZNE goals.

The County acknowledges there are several key tenets to achieving Zero Net Energy, namely:

- 1) Planning, design, construction of high energy performance buildings that incorporate deep energy saving strategies.
- 2) All County Departments shall plan for and reduce their building energy consumption commensurate with their use and relative to a common baseline performance.

Key steps in the success of this Policy include:

- 1) Installing building level energy meters on all County buildings and facilities.
- 2) Incorporating tenant level metering in all General Services owned buildings with tenanted by multiple County Departments and County lease agreements.
- 3) Integrating building and tenant level metering with the County's Utility Manager System.
- 4) Benchmarking County and Department level building operational performance.
- 5) Setting County, Department, and building level energy performance goals.
- 6) Implementing the procedures and protocols regulated by this Policy.
- 7) Continued monitoring, measurement and verification of progress.
- 8) Communicating results, successes, challenges, to County stakeholders.

It is in the intent of this Policy that all County construction projects and operations and maintenance activities be performed in an integrated manner that promotes a high level of energy performance throughout the County's building portfolio and leads to compliance with the County's Zero Net Energy Facility Resolution.

Section 3.1 through **Section 3.5** provides the County's plan for implementing the Policy Statements in **Section 2**. This Implementation Plan is structured to mirror the flow of the Policy Statement and is illustrated in **Figure 12**.

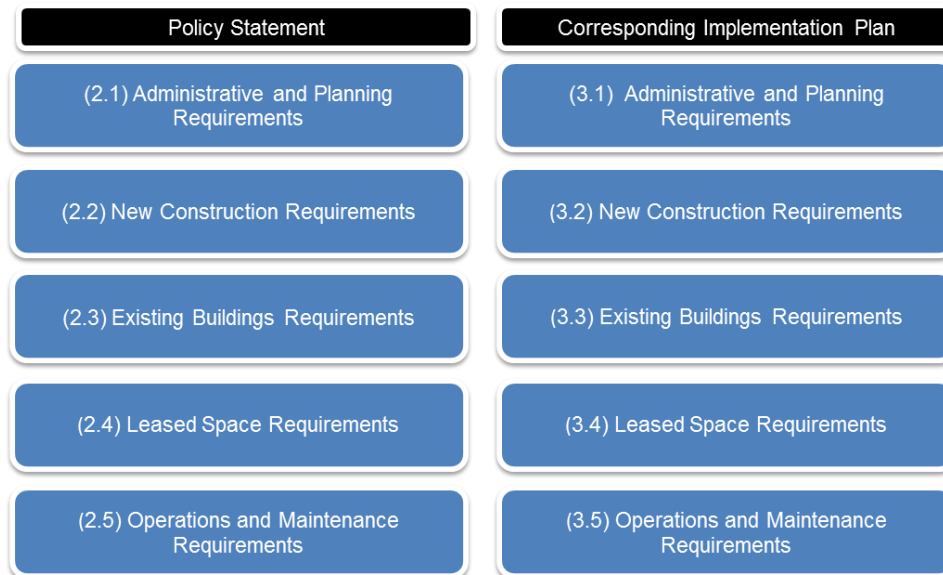


Figure 8: Policy and Implementation Plan Organization

3.1 Administrative and Planning Requirements

3.1.1 Administrative Requirements

- 01) In order to monitor, track, and record progress towards this Policy, building level metering is necessary to understand how individual buildings within the County and each Department operate. Departments shall include building level energy metering in all new construction and major renovation projects and shall begin making progress towards metering 100% of buildings greater than 5,000 gross square feet by 2020, beginning 2017. Building meter data shall be collected and integrated with the County's Utility Manager System. Having access to energy performance data will improve the County and Departments ability to monitor overall progress towards Zero Net Energy as well as how individual buildings within the Department perform relative their peers, providing valuable information for the Department's planning effort.
- 02) The performance of this Policy will be measured relative to the County's 2014 energy baseline. The County's Utility Manager System (UMS) processes utility bills for approximately 80% of the County's building portfolio. The remainder legacy accounts are not reflected in the County's current baseline. These accounts shall be retroactively processed (not paid) through General Services UMS with all future utility invoices paid through the UMS. The County Energy Manager shall use this updated data to develop a new 2014 County energy baseline and will maintain County and Department level energy baselines annually moving forward. The UMS provides a consistent and cost efficient resource to track, verify, and report County and Department level energy performance relative to the 2014 baseline as new buildings are commissioned, existing buildings are decommissioned or removed from service, and energy performance improvements are made across County and Department building stock.
- 03) The success of the Policy invariably relies heavily on the implementation by the various project stakeholders. This Policy requires all Department to direct County Project Managers and Department Facility Managers to attend training specific to the implementation of this Policy. Upon approval of the Policy from the County Board of Supervisors, The County Energy Manager shall organize and facilitate training on behalf of the County.
- 04) The County Energy Manager will report annually to the County Board of Supervisors on County and Department level energy performance. The report will provide Department level performance and achievements towards Zero Net Energy relative to baseline performance and annual established energy performance targets. When such data is available, the report will include (1) technical progress achieved towards compliance, (2) issues impeding progress, (3) planned and prioritized activities for fiscal year, and (4) successes which may transfer to other County Departments. The report will be inclusive of all County owned and leased departmental construction, operations and maintenance projects and will be available on the County's website.

3.1.2 Project Planning Requirements

- 01) This Policy should be communicated to all stakeholders. The County shall develop a web site that contains content and documents on the County's energy policies, directives, and resolutions. The site shall be used for disseminating County energy requirements and communicating the success and sharing best practices from energy projects, between departments and with peer communities. General Services shall maintain the site with updates performed not less than annually.

3.1.3 Building Codes and Standards Requirements

- 01) This Policy adopts the California State Energy Code, the 2013 Building Energy Efficiency Standards for Residential and Non-Residential Buildings, (Title 24, Part 6) as the County's first priority in moving towards Zero Net Energy. Once approved by the County Board of Supervisors, all County projects are required to conform to all mandatory and applicable prescriptive and performance requirements. The County Building Permit and Plans Reviewers shall use tools and resources developed by the California Energy Commission (CEC) to enforce Title 24 and aid in review of building documents, plans, specifications and energy models to verify building, system, and equipment energy performance. For larger, more complex projects where the County may require scale or subject matter knowledge or expertise, the County should engage the services of a certified third party plans review and inspection company to perform energy code compliance and serve as the inspector of record.
- 02) This Policy allows the County to set local energy efficiency and resource requirements more stringent than the California State Energy Code, to advance the energy performance of the County's building stock. The County Architect, County Energy Manager, County Facility Manager, and Capital Projects Group Project Manager shall convene triennially to review and update the County's Owner's Project Requirements (OPR) and the County's enabling code.

- 03) This Policy adopts the California Green Building Standards Code (CALGreen). Specifically it adopts the Tier 1 and Tier 2 compliance paths for energy projects. CALGreen's energy requirements are identical to the Title 24, Part 6 mandatory and prescriptive requirements. Tier 1 and Tier 2 provide reach compliance paths for 10% and 15% energy performance over Title 24²⁵, moving the needle closer toward the County's Zero Net Energy goal. Compliance is documented through energy modeling using software recognized by the California Energy Commission (CEC).
- 04) The county shall reduce energy consumption of plug loads through the procurement and use of commercially available plug load equipment such as ENERGY STAR labeled products. Departments shall specify and procure ENERGY STAR labeled products for all new construction, major and minor renovation projects, and occupancy of all new (or renewed) leased space. The intent is that Departments pursue energy efficiency through a reduction in all end-uses, whether or not they are regulated by code.

According to Heschong (Heschong Mahone Group & Company, 2014), equipment plug loads represent approximately 40% of an average building's electric energy consumption. Plug loads, which are not regulated by the State Energy Code (Title 24, Part 6) will consume an even greater portion of load as the County takes steps to decrease use of regulated building loads (e.g. envelope, HVAC, hot water, lighting, power).

3.1.4 Project Performance Standards and Criteria

- 01) Department new construction facility projects, major and minor renovations, effecting the buildings energy consumption, shall develop performance objectives and criteria in coordination with General Services. Establishing performance criteria will position the building for improved energy performance by identifying specific criteria the County wishes to include in the project's design and construction and the metrics which performance will be validated against. Project stakeholders should document and track established performance criteria throughout each project phase.
- 02) This Policy requires Departments to use life-cycle cost (LCC) analysis, for ranking, when selecting from mutually exclusive competing energy projects. Utility demand-side management programs use LCC for program planning and design and the federal government mandates its use through Executive Order (EO) 13514, when making energy and water capital improvement decisions. LCC evaluates a project's value over its useful life by discounting annual costs and benefits back to the present year. It provides equal footing for comparing competing projects that have varying costs (e.g. initial capital investments, operating and maintenance costs). It allows the County to evaluate projects on their long term value to the County rather than lowest first cost. Departments shall consider prioritizing the funding of projects that provide the greatest long term energy performance that are cost effective, in contrast to accepting the most cost effective project.

²⁵ http://www.ecodes.biz/ecodes_support/free_resources/2013California/13Green/PDFs/Appendix%20A5%20-%20Nonresidential%20Voluntary%20Measures.pdf

3.1.5 County Project Review Requirements

- 01) This Policy is intended as a backstop to ensure that life-cycle cost (LCC) criteria adequately represent the County's project requirements, and that the selected project provides value that will support Zero Net Energy compliance and lead to long term energy savings. The County Energy Manager will review and approve recommendations (e.g. LCC analysis) from Departmental Facility Managers and outside consultants.
- 02) Project resource planning is instrumental delivering high quality projects. Departments shall engage key General Service's stakeholders in preparation of project planning and budgeting.

3.2 New Construction Requirements

- 01) All new construction projects shall be planned for, designed, and constructed in accordance with the California State Energy Code, the 2013 Building Energy Efficiency Standards for Residential and Non-Residential Buildings, (Title 24, Part 6) and the California Green Building Code requirements enforced at the time of execution of construction contract by the County Board of Supervisors. The County shall make preparations for (1) communicating said requirements to internal stakeholders and to outside consultants and vendors, (2) updating standard project documents and communication (e.g. Owner's Project Requirements, County website), and (3) enforcement.
- 02) This Policy adopts and phases in requirements of the California Green Building Standards Code (CALGreen). While CALGreen layers on top of the California State Energy Code, the 2013 Building Energy Efficiency Standards for Residential and Non-Residential Buildings, (Title 24, Part 6), this Policy recognizes there are other similar green, sustainable, or energy industry programs (reach codes) administered by third-party contactors. The intent is for CALGreen to be the default County green building code, while allowing Departments the option to choose alternate paths for compliance, using industry recognized programs, so long as the County's energy efficiency requirements described in this Policy are met, or exceeded. When choosing an alternate path of compliance, the path of compliance shall be approved by the County Energy Manager and shall document the building's or project's performance relative to the Title 24, Part 6 and CALGreen requirements enforced by the County at the time of execution of construction contract by the County Board of Supervisors.
- 03) The County's Zero Net Energy Facility Resolution requires 50% of new construction and major renovation projects be Zero Net Energy (ZNE) by 2025. This Policy recognizes that there are more flexible options for applying ZNE to new construction than existing buildings and that new construction is a small percentage of the County's building portfolio; it therefore requires all new construction to be ZNE by July 1, 2017. Then, these new construction projects will support downstream existing building compliance requirements.

3.3 Existing Building Requirements

- 01) All major renovation construction projects shall be planned for, design, and constructed

in accordance with the California State Energy Code, the 2013 Building Energy Efficiency Standards for Residential and Non-Residential Buildings, (Title 24, Part 6) and the California Green Building Code requirements enforced at the time of execution of construction contract by the County Board of Supervisors. The County shall make preparations for (1) communicating said requirements to internal stakeholders and to outside consultants and vendors, (2) updating standard project documents and communication (e.g. Owner's Project Requirements, County website), and (3) enforcement. The purpose of this Policy is to bring all existing building major renovation projects and all associated building systems and equipment into compliance with the County's energy policy.

- 02) All minor renovation construction projects shall be planned for, designed, and constructed in accordance with all applicable mandatory and prescriptive requirements of the California State Energy Code (Title 24, Part 6) and the California Green Building Code enforced at the time of execution of construction contract by the County Board of Supervisors. The County shall make preparations for (1) communicating said requirements to internal stakeholders and to outside consultants and vendors, (2) updating standard project documents and communication (e.g. Owner's Project Requirements, County website), and (3) enforcement. The purpose of this Policy is to bring all systems and equipment affected by an existing building minor renovation into compliance with the County's energy policy.
- 03) This Policy requires that all major renovation projects after July 1, 2018 be renovated for Zero Net Energy (ZNE). With more than 400 buildings, the County must use every opportunity to bring existing buildings and structures into compliance. Major renovations where the County is already investing significant capital on infrastructure upgrades can benefit from installation of higher efficient appliances, systems, and equipment. Buildings constructed prior to 2018 may have select systems and equipment that will be at or near the end of its useful life, requiring replacement before the 2035 existing building ZNE requirement. Buildings constructed 2018 or thereafter are unlikely to require replacement systems before 2035 and will immediately convey towards the 2035 ZNE goal.
- 04) This Policy adopts and phases in requirements of the California Green Building Standards Code (CALGreen). While CALGreen layers on top of the California State Energy Code, the 2013 Building Energy Efficiency Standards for Residential and Non-Residential Buildings, (Title 24, Part 6), this Policy recognizes there are other similar green, sustainable, or energy industry programs (reach codes) administered by third-party contactors. The intent is for CALGreen to be the default County green building code, while allowing Departments the option to choose alternate paths for compliance, using industry recognized programs, so long as the County's energy efficiency requirements described in this Policy are met, or exceeded. When choosing an alternate path of compliance, the path of compliance shall be approved by the County Energy Manager and shall document the building's or project's performance relative to the Title 24, Part 6 and CALGreen requirements enforced by the County at the time of execution of construction contract by the County Board of Supervisors.
- 04) This Policy requires Departments to bring their buildings up to Zero Net Energy (ZNE) when more than 50% of the building's cumulative gross square feet have been renovated (since January 1, 2010). Departments may choose to bring their buildings into compliance sooner, however, when a Department chooses to invest in renovating

significant portions of a building it should be preceded by planning that includes building assessments and budget to bring the building into ZNE compliance.

3.4 Leased Space Requirements

- 01) With approximately 10% (200,000 gross square feet) of County floor space consisting of leased tenant space, it is the County's intent to prioritize high performance buildings for tenant lease agreements, when doing so would not adversely impact Department services and would be equally cost effective for the County lease term. The County Real Estate Manager shall provide to the County Energy Manager access to available building energy performance data.
- 02) Net lease agreements are preferred as they provide incentive for the Department to reduce energy consumption. The County assumes payment for their direct (or prorated) portion of the building's utility expenses. Utility bills for net lease agreements shall be processed and paid through the County's Utility Manager System.
- 03) County leased space shall comply with the California State Energy Code, the 2013 Building Energy Efficiency Standards for Residential and Non-Residential Buildings, (Title 24, Part 6) and all other County standards. Departments are responsible for annual resource planning and carrying the budget to retrofit non-compliant leased space before assuming occupancy. Department Facility Managers shall notify the County Architect and County Energy Manager of intent to lease space prior to lease acquisition. The County Energy Manager or an appointee on his behalf will assess the property for compliance.

3.5.2 Operations and Maintenance (Planned and Unplanned)

- 01) All operation and maintenance activities and renovation construction projects shall be planned for, designed, and constructed in accordance with all applicable mandatory and prescriptive requirements of the California State Energy Code (Title 24, Part 6) and the County of Santa Barbara Capital Projects Standards Manual, whichever is more stringent. The purpose of this Policy is to bring all systems and equipment affected by an operations and maintenance activities and renovation construction projects into compliance with the County's energy policy.
- 02) Setting building energy targets are analogous to department operations and maintenance budgets. Although all buildings may benefit from an energy target it is most important that buildings designed to or designated to achieve Zero Net Energy (ZNE) are operated and maintained to meet stipulated performance goals. Building energy performance is sensitive to operations and maintenance activities, maintaining ZNE status, and delivering cost savings. The Department Facilities Manager may employ a combination of strategies that include predictive and preventative maintenance, leverage the County's Utility Manager System (EnergyCAP), and engage in a tenant or building occupant energy awareness campaign.

3.8 Costs and Benefits of Compliance

3.8.1 Costs of Compliance

The cost of compliance will depend upon the type of project (e.g. new construction, existing building, leased space, or operations and maintenance), the buildings baseline condition, and what specific strategies or technologies are commercially available, how the project is funded, and what specific strategies are utilized to achieve compliance. The principal incremental cost to achieve Zero Net Energy (ZNE) will be linked to the County's existing building stock. That is, the County's rate of new construction is small and expected to remain small in comparison to the County's existing portfolio. The cost of compliance for new construction is controllable and may be incorporated into the projects with modest impact, whereas, existing buildings represent an opportunity cost that requires a deliberate planning process to make the most cost effective use of energy efficiency and renewable energy resources.

To estimate the costs of achieving ZNE over the Policy horizon, the S-Curve in **Figure 15** was applied to the "County Buildings Total" baseline developed in **Section 1.4.2, Figure 9**. It represents one possible scenario for compliance.

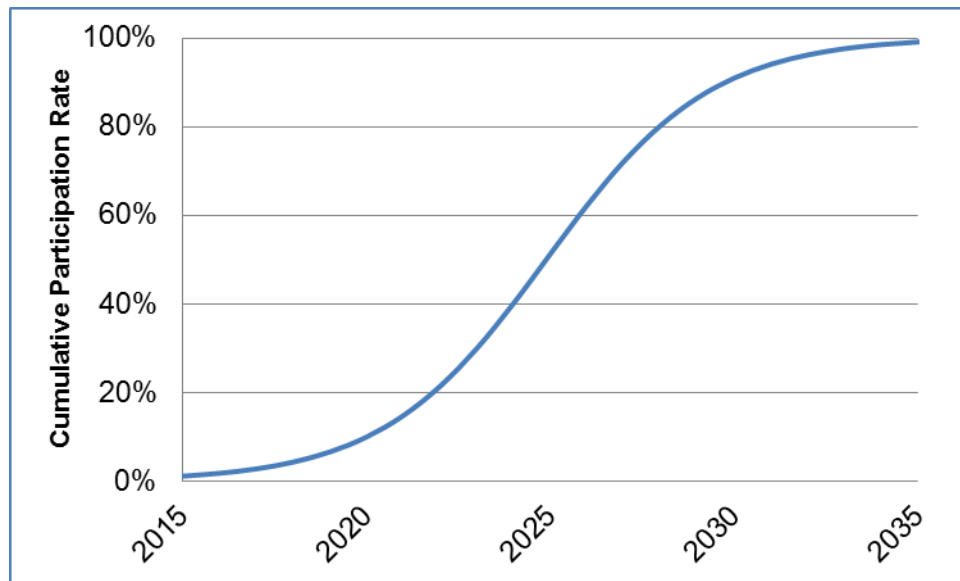


Figure 9: ZNE Adoption Curve

In theory, new programs take time to build participants. This is reflected in the shape of the S-Curve which reflects the County's adoption rate for implementing ZNE compliant buildings, with 0% ZNE in 2015, 50% ZNE in 2025, and 100% ZNE in 2035. In this scenario, progress towards ZNE begins immediately with the bulk of compliance occurring between program years 2020 and 2030. The result is a County energy consumption target (or goal) for every year on the horizon illustrated in **Figure 16**.

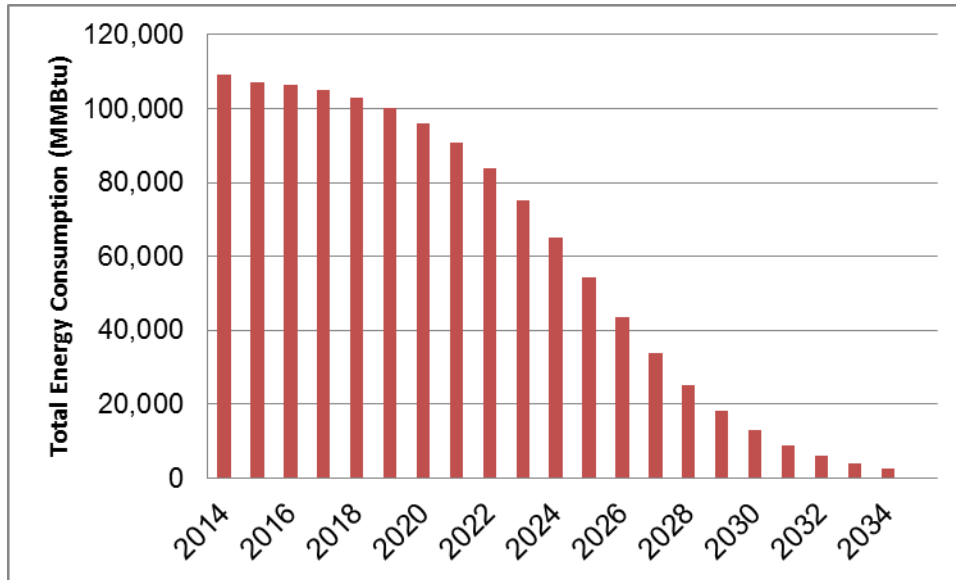


Figure 10: County Energy Annual Consumption Target

The estimated annual cost of compliance was developed by applying a generic energy resource supply curve, similar to the curve in **Figure 17** (Heschong Mahone Group & Company, 2014)²⁶.

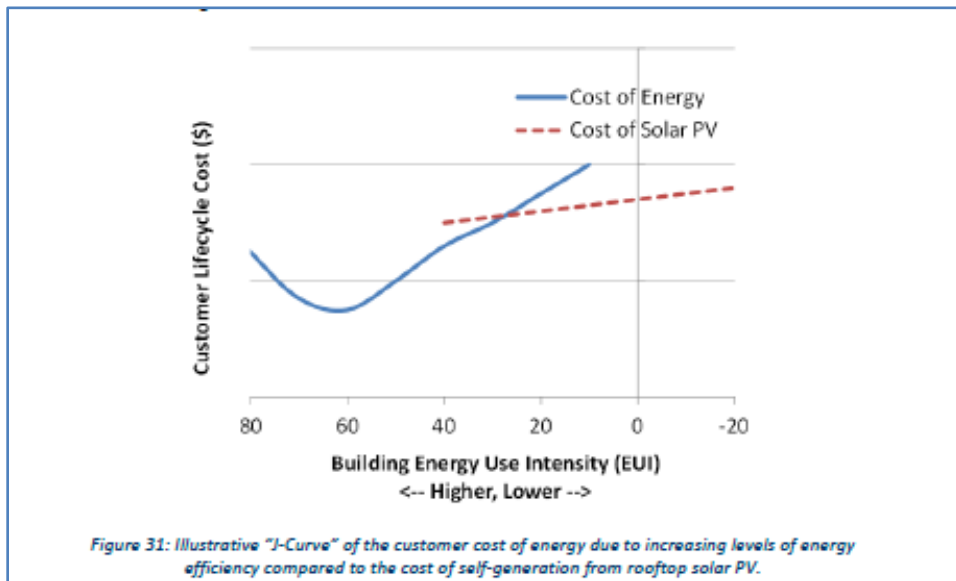


Figure 11: Generic Energy Efficiency and Renewable Energy Resource Curve

The shape of the curve represents the cost of energy efficiency and renewable energy resources as a function of building energy performance. Lower cost energy efficiency is preferred up to the point where renewable energy is equally or more cost effective.

²⁶ Energy supply curves used for energy efficiency and renewable energy (commercial and industrial PV) to estimate the annual cost of compliance were adapted from (Company, 2008) and (Lazard, 2014), respectively. Actual cost for implementation of this Policy will vary according to industry and market acceptance, changes in commercialization and pricing of building technologies, and methods used by the County to achieve compliance.

4 Tracking Success, Providing Recognition, and Communicating Results

4.1 Tracking Energy Savings and Monitoring Success

The performance of this Policy will be measured relative to the County's 2014 energy baseline. The County Energy Manager will maintain County and Department level building baseline energy performance data and will report annually to the County Board of Supervisors on County and Department level energy performance. The report will report provide Department level performance and achievements towards Zero Net Energy relative to baseline performance and annual established energy performance targets. When such data is available, the County Energy Manager's report will include (1) technical progress achieved towards compliance, (2) issues impeding progress, (3) planned and prioritized activities for fiscal year, and (4) successes which may transfer to other County Departments. The report will be inclusive of all County owned, operated, and leased departmental construction, operations and maintenance projects and will be available on the County's website.

4.2 Leveraging Industry Resources and Best Practices for Training and Communication

The County has two building policy frameworks that can be leveraged to ensure successful implementation of the Energy Efficiency Standard. They are, the Facilities Policy Framework and Sustainable Public Architecture Policy. Both of these documents have been approved by the County Board of Supervisors and provide the Policy a context that emphasizes its relevancy within County operations.

In addition, there are numerous energy efficiency resources that promote above code standards. ZNE knowledge resources are also becoming more prevalent, such as the New Buildings Institute Zero Net Energy Communications Toolkit²⁷ which includes links to Zero Net Energy resources, training presentations, case studies, and communications documents for project stakeholders. **Appendix D** contains links to these resources.

4.3 Sharing Best Practices and Providing Recognition

It is the County's intent to communicate the results of this Policy to promote the collaboration of best practices within and across County departments and provide transparency to the local community leaders and constituents. As such, case studies serving as "example projects" will be required for select projects as determined by the County Energy Manager. Projects may be selected based on scope, budget, and ability to scale, replicate, or transfer their benefits across the County's departments and portfolio.

²⁷ <http://newbuildings.org/index.php?q=zne-communications-toolkit>

This Policy directs the County Energy Manager to develop a basic framework for departments that addresses the following minimum criteria. The New Buildings Institute²⁸ has examples of case studies for high performing and Zero Net Energy buildings.

- 1) Project performance objectives and criteria for success.
- 2) Technical and economic performance objectives.
- 3) Performance results.
- 4) Findings and recommendations.
- 5) Technology transfer potential to other County Departments

Furthermore, this Policy directs the County to establish a communications plan for reporting Policy success that has capability to provide both internal and outward facing communications that could a centralized website and repository.

²⁸ <http://newbuildings.org/case-studies-zne-projects>

Appendix A: Definitions and Acronyms

Baseline Performance

Total annual building energy consumption from which all future building performance is measured. It is reported for fuels types at the County level, Department level, or individual building level.

County Owned and Operated Buildings and Facilities

Energy for County owned and operated buildings and facilities includes all on-site energy consumption or production used in the building's operation. In addition to energy for indoor environmental quality, it includes fuels used in the operation of emergency power generators, site or roadway lighting, and parking structures, where connected to building level meters.

Energy Use Index (EUI)

EUI is a metric for defining a building's annual energy consumption per gross square feet (sf) of occupied space. It is defined as the sum of all building energy consumption (for all fuels) divided by the buildings gross square feet and is reported in units of kBtuh/sf/yr. The EUI is a common metric for benchmarking a buildings relative energy performance against similar buildings.

Energy Efficiency Standard

Refers to this Policy document prior to approval by the County Board of Supervisors.

Life-Cycle Cost (LCC) Effectiveness

Project cost effectiveness shall be determined through a quantitative life-cycle cost analysis using the States recognized cost effectiveness test and protocols²⁹. A total life-cycle cost considers a project's long term cost and benefit to the County over lowest first cost investment. A successful alternative shall have a discounted benefit-to-cost ratio greater than 1.0 from the County's perspective using the Participant Cost Test (PCT). Baseline and alternative technology (i.e. energy conservation measures) and economic performance criteria shall be applicable to the specific project for which the analysis is performed. That is the baseline and technology investment capital costs, operations and maintenance costs, energy savings, project useful life and the chosen economic discount rate shall be specific to the County project. Criteria, including assumptions and resource data, shall be transparent and included in project documentation.

²⁹ <http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Cost-effectiveness.htm>

Maintenance Connection

Building maintenance front-end software operated by the County's Facility Group that manages, maintains, coordinates, and records County owned and operated building maintenance and operations activities. The software's Service Request function includes building tenant complaint logs at the campus, building, and room level; and all maintenance and preventative maintenance activities at the building and individual equipment level. The software also acts as a repository for building documentation such as architectural and engineering documents, construction photos to the extent that they are available and for recording anecdotal or qualitative maintenance requirements.

Major Renovation

A project which materially modifies the buildings envelope, mechanical, electrical, or plumbing systems. It may be a building infrastructure or tenant improvement project. These projects usually involve the moving of walls, ceilings, and seating arrangements or making material changes to the building or tenant infrastructure systems.

Minor Renovation

A project where only finishes or furniture are modified and there are no substantial changes to seating arrangements and no changes to walls, ceilings, or system zones.

[Reach Codes](#) (refer to Section 1.3.1)

Utility Manager System (UMS)

Building energy performance management system that tracks the County's owned and operated building energy consumption data. When paired with building level-metering it can be used to facilitate real time measurement and verification, trending of building system and equipment performance, and response to changes in building performance. The County has establishing a bridge that allows back and forth communication with the County's ENERGY STAR Portfolio Manager Account. This Policy requires that all County owned and operated buildings energy consumption³⁰ be reported through the County's UMS.

[Zero Net Energy](#) (refer to Section 1.3.2)

Zero Net Energy (ZNE) describes the performance of a building or facility when it produces as much energy as it consumes on an annual basis. The County's Zero Net Energy Facilities Resolution (Resolution No.: 14-49), defines ZNE as:

“A building that, on an annual basis, will consume as much energy as it produces from renewable sources, while maintaining an acceptable level of service and functionality. Zero Net Energy (ZNE) buildings can exchange energy with the power grid as long as the net energy balance is zero on an annual basis.”

³⁰ This includes energy consumed by the County but paid for by others as in a County leased and tenanted building (e.g. under a full-service lease agreement.)

Appendix B: Soliciting and Incorporating Stakeholder Feedback

The County Department Representatives are staff directly involved in the issues facing building energy efficiency, code compliance, and ongoing building operations and maintenance performance. That is, they are stakeholders and are directly impacted by this Policy. As part of the Policy development process, ICF conducted two stakeholder meetings to solicit their input into the viability of Policy requirements, why some Policies may succeed while others may not, in the context of County operations.

The purpose of the first meeting was to solicit feedback and garner support for the objective, approach, and viability for the policy. The second meeting was used to build a larger consensus on the policy statement through collaboration and negotiation with the various stakeholders.

The first of two stakeholder meetings was conducted on October 30, 2014, by ICF International with support from the County Energy Manager. The purpose was to solicit feedback and gather input on the Policy purpose, objectives, approach from various County staff and stakeholders. Feedback was solicited from 8 County Department Representatives from a cross section of the County's Departments and operations. A copy of the Power Point presentation delivered is embedded below.

The County Department Representative Attendees included:

- 1) County Facilities Manager (1)
- 2) Capital Projects Project Manager (1)
- 3) Department Facility Managers (9 invited, 6 in attendance)



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Their feedback included: (1) approval of the stated Policy purpose, objectives, and approach, (2) resounding support for the stated Policy outcome, (2) recommendations for detailed, in-person interviews with other key County staff, and (3) recommendations for qualitative building, process, or internal Policy document review. Their feedback was used to frame the Policy outline and draft Policy documents.

On December 2014, ICF International, with support from the County Energy Manager, facilitated a second stakeholder meeting. In advance of the meeting, ICF provided County Department Representatives the 90% Final Policy and instrument for recording and documenting their feedback. A copy of the Power Point presentation delivered is embedded below.

The County Department Representative Attendees included:

- 1) Don Grady, Real Property Leasing
- 2) Scott Hoskins, County Facilities Manager
- 3) Lieutenant Kelly Hamilton, Sheriff's Department
- 4) Grady Williams, General Services Capital Facilities Planning Manager
- 5) John Green, County Department Representative



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ICF received feedback on the Policy which is included in the embedded comment form. During the meeting, ICF and the County Energy Manager worked with the stakeholders to refine the Policy language while retaining the intent and expected outcome.



Stakeholder
Comment Collection F

Appendix C: Supplemental Documents includes specific roles and responsibilities for outside consultants such as Architectural and Engineering consultant and contractors.

Appendix D: List of Resources

Codes and Reach Codes

- **California Energy Commission (CEC):** The California Energy Commission is the state's primary energy policy and planning agency. The CEC promotes efficiency, conservation, cutting edge research, and developing the State of California renewable energy resources. The CEC provides resources and links to California building efficiency standards and codes.

<http://www.energy.ca.gov/>

- **California Building Standards Commission**

<http://www.bsc.ca.gov/Home/CALGreen.aspx>

Zero Net Energy Resources

- **Energy Design Resources**

<http://energydesignresources.com/resources/publications/other-publications/zne-defined.aspx>

- **New Buildings Institute:** The California Public Utility Commission (CPUC) is working with New Buildings Institute to provide resources that will help designers, owners, facilities managers, policymakers and others expand their knowledge about ZNE and encourage development of zero net energy projects. A new ZNE Communications Toolkit is available to share lessons learned from early adopter owners, address commonly asked questions about ZNE, and support advancing communications around California's goals.

<http://newbuildings.org/index.php?q=shareZNE>

- **Center for Sustainable Energy**

<http://energycenter.org/zne>

Miscellaneous Resources

- **Database of State Incentives for Renewables & Efficiency (DSIRE):** DSIRE is a comprehensive source of information on incentives and policies that support renewables and energy efficiency in the United States funded by the U.S. Department of Energy.

<http://www.dsireusa.org/>

- **American Council for an Energy Efficient Economy (ACEEE):** ACEEE provides a comprehensive listing of state policy resources, policy priorities, and utility policies and programs.

<http://www.aceee.org/sector/state-policy/california>

- **US EPA ENERGY STAR:**

<http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/save-energy/comprehensive-approach/energy-star>

- **California Public Utility Commission:**

<http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Cost-effectiveness.htm>

Appendix E: Embedded Policy Documents

The embedded attachment includes the following tables:

- **Table 2** – Policy Implementation Crosswalk
- **Table 3** – Implementation Plan Checklist
- **Table 4** – External Stakeholder Guidance – Architectural and Engineering Firms

Appendix F: List of References

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