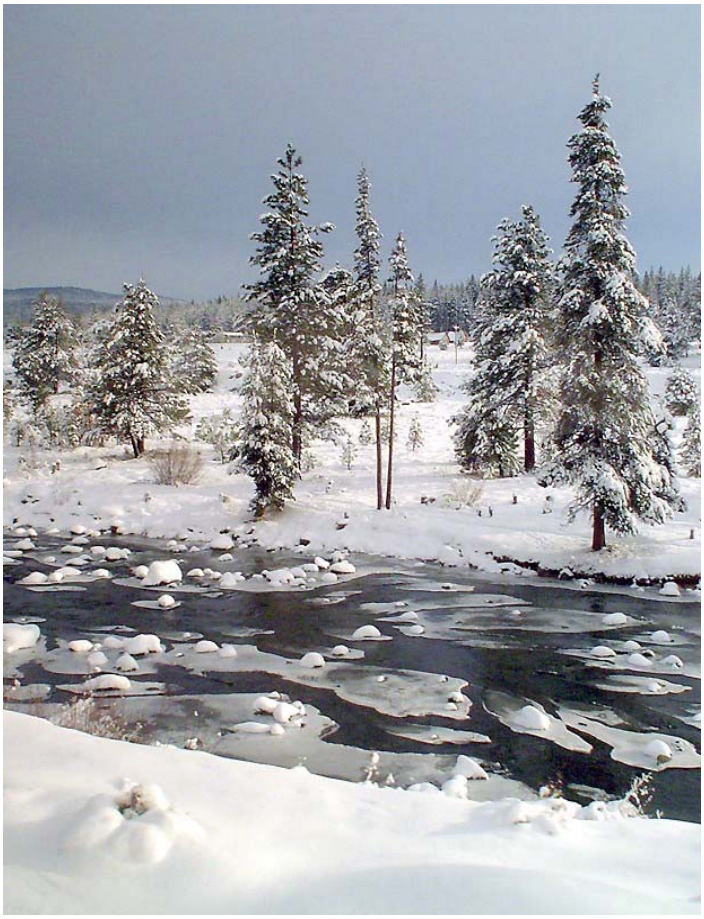
NEVADA COUNTY
ENERGY ACTION PLAN



FEBRUARY, 2019

PREPARED BY SIERRA BUSINESS COUNCIL

SUPPORTED BY PACIFIC GAS AND ELECTRIC COMPANY (PG&E)

IN COLLABORATION WITH NEVADA COUNTY AND COMMUNITY MEMBERS

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NEVADA COUNTY

STAFF

STEVE MONAGHAN,
Information and General Services Director

SEAN POWERS,
Community Development Agency Director

BRIAN FOSS,
Planning Department Director

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PAUL AHRNS, Program Director
BJ SCHMITT, Analyst and Planning Technician
BEN MARITATO, Planning Technician
JUSTINE QUEALY, Planning Technician
SIMONE CORDERY-COTTER, CivicSpark Fellow

PACIFIC GAS AND ELECTRIC COMPANY (PG&E)

KATE SCHULENBERG, Senior Program Manager

Pacific Gas and Electric Company provides a range of comprehensive climate planning assistance to local governments, from providing energy usage data and assistance with greenhouse gas inventories, to training and guidance on the development and implementation of climate action plans. This program is funded by California utility customers and administered by PG&E under the auspices of the California Public Utilities Commission.

LEGAL NOTICE

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This report was prepared for Nevada County by Sierra Business Council in partnership with PG&E. The authors would like to thank Nevada County staff for providing much of the insight and local information necessary for the completion of this report. The authors would also like to recognize PG&E for their administrative support of the Report, made possible through the use of Public Goods Charge funding.

EXECUTIVE SUMMARY

The Executive Summary provides the big picture overview of energy use in Nevada County, the goals and potential savings associated with the implementation of the Energy Action Plan.

The Nevada County Energy Action Plan (EAP) provides an analysis of the energy use within the unincorporated county limits by the community and County operated facilities as well as a roadmap for accelerating energy efficiency, water efficiency, and renewable energy efforts already underway in Nevada County. It is designed to assist the County in implementing the energy and water-energy related goals and policies in the County's General Plan and Housing Element, and inform the community of cost-effective programs and best practices that will help them save energy and money.

To inform the plan, Sierra Business Council (SBC) first evaluated the energy used in the entire community by the residential and non-residential sectors, including the County and public agencies. This evaluation found that the community - including residential, non-residential, county, and public agencies - consumed 344,045,975 kilowatt hours (kWh) of electricity and 2,943,632 therms of natural gas in 2017. This is a decrease of 2% in electricity use and a decrease of 14% in natural gas use from the 2005 baseline of 349,789,663 kWh and 3,433,874 therms. Of that energy use, the County's facilities accounted for 3,500,757 kWh of electricity use and 125,499 therms of natural gas use in buildings and 152,395 kWh of electricity for public lighting in 2017. This is a decrease of 31% in electricity use and a decrease of 36% in natural gas use in County facilities and a decrease of 11% in public lighting electricity use from the 2005 baseline of 5,089,265 kWh, 197,316 therms, and 171,917 kWh respectively. In addition, the community wide wastewater and potable water services, which includes county operated facilities, Nevada Irrigation District, and other small agencies, accounted for 3,698,605 kWh of electricity and 2,141,278 kWh of electricity in 2017. This is an increase of 79% for wastewater service and a decrease of 11% for potable water service from the 2005 baseline of 2,060,510 kWh and 2,404,070 kWh respectively. Since 2017, the County has installed five solar photo voltaic (PV) systems that are estimated to generate 4,544,725 kWh annually of which 758,571 kWh were generated in 2017.

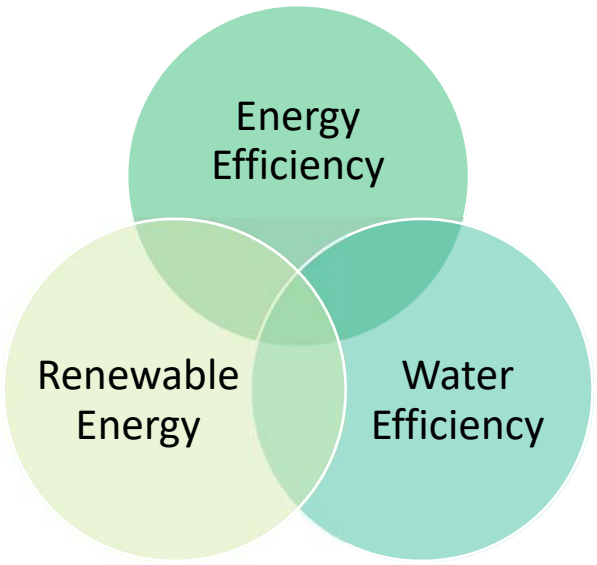
Table ES-1: Summary of 2005 Baseline and 2017 Re-Inventory Energy Use

Energy Use Sector	2005 Baseline Electricity Use (kWh)	2005 Baseline Natural Gas Use (therms)	2017 Electricity Use (kWh)	2017 Natural Gas Use (therms)	% Change in Electricity Use (2005-2017)	% Change in Natural Gas Use (2005-2017)
Residential	280,691,315	2,578,107	281,540,590	2,399,588	0.3%	-7%
Non-Residential (excludes County Operations, Wastewater, and Potable Water below)	59,372,586	658,451	53,012,350	418,545	-11%	-36%
County Operations	5,089,265	197,316	3,500,757	125,499	-31%	-36%
County Operated Public Lighting	171,917	-	152,395	-	-11%	-
Wastewater Energy	2,060,510	-	3,698,605	-	79%	-
Potable Water Energy	2,404,070	-	2,141,278	-	-11%	-
Total	**349,789,663**	**3,433,874**	**344,045,975**	**2,943,632**	**-2%**	**-14%**

SBC then projected the community's energy use from the 2005 baseline out to the year 2035 based on the actual and projected change in households and employment in unincorporated Nevada County if no actions were taken to lower energy use or improve the efficiency of current County and community-wide operations. The 2035 "business-as-usual" forecast of annual energy use showed that electricity consumption would increase 3% to 359,351,901 kWh in 2017 and 14% to 398,323,245 kWh in 2035 while natural gas consumption would increase 3% to 3,535,300 therms in 2017 and 14% to 3,924,430 therms in 2035 based on projected increases in households and employment in unincorporated Nevada County. The primary reasons that community electricity use decreased between 2005 and 2017 even though occupied households increased 3% were community efforts to save over 13,034,571 kWh of electricity and 163,282 therms of natural gas from PG&E energy efficiency programs, including Nevada City and Grass Valley customers,[1] and producing an estimated 23,543,975 kWh of electricity from solar PV systems[2], which underscores the importance of utilizing the available resources and funding. The actions within this plan are voluntary and do not require the County or community to meet the reduction goals; however, savings may only be realized if the recommended actions are taken.

Existing energy efficiency programs, new technologies, and improved economics provide significant opportunity for community members and the County to save money and energy by addressing the inefficiencies of current energy-consuming systems, operations, and behaviors. To achieve these savings, the Nevada County EAP was developed to provide a broad view of energy use in the county, set energy and water-energy saving goals, recommend actions that result in short and long-term energy savings, and educate the community on existing resources designed to save utility customers money, energy, and water.

The goal of the plan is to reduce the projected annual grid supplied electricity use in 2035 by 51% and annual natural gas use by 30%, which translates to annual energy savings of 202,936,611 kWh of electricity and 1,169,531 therms from the projected business as usual forecast. These savings are estimated to result in over $47.5 million in annual cost savings in 2035 through reduced energy use. The heart of the plan is contained in Chapter 3: Goals and Strategies and Chapter 4: Implementation Plan. The goals address three key areas of energy: energy efficiency, renewable energy, and water efficiency.



The strategies focus on voluntary measures that can be taken by residents, businesses, and public agencies to reduce energy use through energy efficiency, renewable energy, water efficiency. Key components include: developing and disseminating information on existing programs at community events and on the County's website; energy-related training

[1] Nevada County residential and non-residential energy savings based on projects completed 2010-2017. California Public Utilities Commission. Accessed September, 2018. http://eestats.cpuc.ca.gov/Views/EEDataShelf.aspx

[2] Unincorporated Nevada County residential and non-residential solar PV statistics based on installations completed 2005-2017 based on permit records and California Solar Initiative data. Accessed September, 2018. https://www.californiadgstats.ca.gov/

for County staff, building contractors, realtors, and homeowners associations; and partnerships with local and regional utilities and organizations to leverage resources and increase participation in existing and new programs.

The following table compares 2005 baseline energy use, 2035 business as usual forecast energy use, and potential energy use savings in 2035 with the successful implementation of the EAP strategies and actions. The majority of energy savings are attributed to existing structures and would have significant impact in the community regardless of the projected new construction. A critical way of achieving the energy savings estimated in this plan is by convening a Working Group that focuses on implementing the plan. In order to complete the actions in the Implementation Plan, it is recommended that with coordination assistance of the Local Government Commission's CivicSpark AmeriCorps fellow, the Working group can assist with implementation and alleviate the demand on County staff time. The Working Group should be comprised of representatives from the County, Nevada Irrigation District, Nevada County Resource Conservation District, Nevada County School District, PG&E, Nevada County Association of Realtors, Nevada County Contractor's Association, the business community, and residents.

Table ES-2: Summary of 2005 Baseline and 2035 BAU Forecast Energy Use and Potential 2035 Energy and Cost Savings

Energy Use	2005 Baseline	2035 BAU Forecast	2035 Potential Energy Savings	2035 Potential Cost Savings[3]	Percent Difference
Electricity	349,789,663 kWh	398,323,245 kWh	202,936,611 kWh	$45,948,490	51% reduction from 2035 BAU
Natural Gas	3,433,874 therms	3,924,430 therms	1,169,531 therms	$1,579,651	30% reduction from 2035 BAU

The plan recognizes that there are energy-consuming sectors such as transportation; while those other sectors are not addressed here due to the nature of funding, the County could address them in the future for additional community benefits.

[3] Forecasted composite rate for 2035 of $0.226 per kWh of electricity and 2035 average rate of $1.351 per therm of natural gas based on SBC forecast of PG&E Rates.

CHAPTER 1: INTRODUCTION

Chapter 1 explains the context, purpose, and scope of the plan, outlines the development of the plan, and provides a brief guide to the document. Background on Nevada County community and leading energy efficiency efforts that the County has prioritized is also provided.

DEFINITION OF KEY TERMS

Table 1-1: Definition of Key Terms

Key Term	Definition
Goal	An expression of a desired outcome or an ideal future result or condition based on community priorities and vision. Goals are not quantifiable or time-dependent but rather represent the end state. Example: Improve public safety.
Strategy	An intermediate step between a goal and an action. Strategies define specific pathways that, if followed, will help achieve the goal. Example: Improve lighting conditions in public spaces.
Action	Individual activities the jurisdiction will undertake to implement an energy-efficiency strategy. A strategy can have several actions. Example: Review existing lighting conditions and install new light fixtures where required.
Community Member	A community member is a resident, business owner, or worker in Nevada County.
Water-Energy Nexus	This term is used to describe the intersection of water and energy resources. Energy is required for the collection, transportation, treatment, distribution, and disposal of water and wastewater. Therefore reducing water use and wastewater generated, reduces the energy required to provide water and treat wastewater.
Zero Net Energy	A building that uses energy equivalent to the amount produced on-site.
Title 24	Title 24, Part 6 is the section of the California building code dealing with energy. Building Energy Efficiency Standards are designed to ensure new buildings and significant remodels achieve cost effective energy performance and preserve outdoor and indoor environmental quality.
Leak Loss Detection	Leak Loss Detection is a state of the industry practice to proactively identify and fix leaks in the water system, before pipes break and leaks surface, in order to reduce water losses and the costs to fix the leaks.

WHY PREPARE AN ENERGY ACTION PLAN?

In 2005, Nevada County community - including residential, non-residential, county, and public agencies - consumed 349,789,663 kWh of electricity and an estimated 3,433,874 therms of natural gas, costing an estimated $58.7 million.[4] The majority of this money leaves the community. Additionally, because of the projected increase in occupied housing and employment in Nevada County, the community's residential energy use is forecast to increase by 13% by 2035 and non-residential energy use is forecasted to increase by 19% by 2035. Nevada County residents and businesses can reduce

[4] Average composite rate for 2008 used as a proxy for 2005 of $0.157 per kWh based on ratio PG&E rates for residential and commercial accounts, 2005 average rate of $1.115 per therm of natural gas based on ratio PG&E rates for residential and commercial accounts. Accessed April 22, 2018

their energy use through efficiency projects that pay for themselves, some in as little as 6 months, or completely eliminate their energy costs through on-site renewable energy projects, which often pay for themselves in 6 to 12 years depending on system size and financing options By implementing this plan, the community could realize the following benefits:

Energy & Money Savings

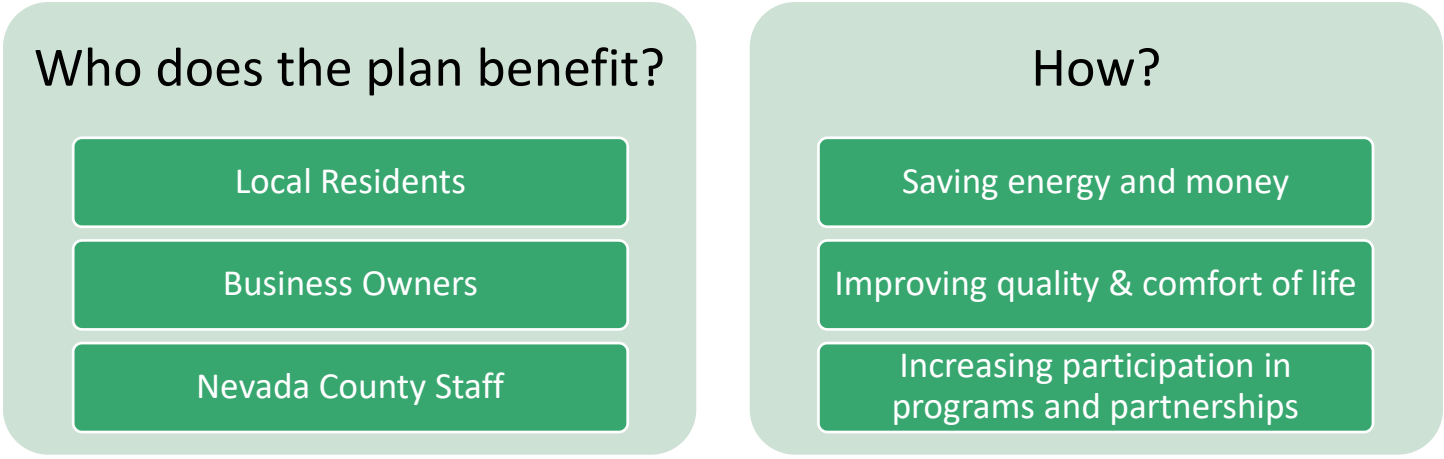
Community Resiliency

Local Air Quality Improvements

The economies of Sierra Nevada communities rely heavily on natural resources for tourism, recreation, forestry, agriculture and other industries. Changes in weather patterns resulting in extreme weather events, greater year-to-year variation in precipitation and temperature extremes have the potential to adversely affect the vitality of these natural resources, which in turn directly impacts the businesses and residents in these communities.

Communities can more readily and flexibly meet their energy needs and lessen the grid impacts (an over stressed grid often results in rolling blackouts and power outages) when efficiency is improved and local renewable energy systems are combined with energy storage. Retrofitting homes and businesses to be more efficient reduces energy costs, improves indoor and outdoor air quality, creates local jobs, and makes homes and businesses more comfortable. In addition, hiring local contractors and spending money saved on energy bills at local businesses can significantly stimulate the local economy. Finally, prioritizing energy efficiency, local renewable energy, and water efficiency will enhance the County's ability to respond to the ever-changing external conditions related to energy supply and demand, and help community members become more self-sufficient and resilient to future changes in energy prices and weather.

The plan sets goals and recommends strategies and actions that support the efforts of the community to increase energy efficiency, expand energy independence through local generation and storage of renewable energy, and address the water-energy nexus by reducing water waste and by more efficiently transporting and using water resources. It is intended to guide local government decisions that will help achieve greater efficiency, reduce costs, and demonstrate the County's commitment to energy independence and community resilience. It is also intended to inspire residents, businesses, and other public agencies in Nevada County to participate in community efforts and maximize energy efficiency, renewable energy, and water efficiency.



Most energy projects are cost-effective because energy savings are seen immediately, and the money saved offsets the upfront costs over time. Depending on the size and scope of the project, energy projects can pay for themselves in a few months or several years. With financing, projects can be cash flow positive from day one. The money saved through energy projects can then be reinvested into the local economy.

CLIMATE SCIENCE BASICS

Naturally occurring gases[5] dispersed in the atmosphere determine the Earth's climate by trapping solar radiation. This phenomenon is known as the greenhouse effect, which is a natural process that perpetuates life on earth by keeping the planet's surface warm. Scientific observation indicates that average air and ocean temperatures have steadily increased globally over the last 100 years. Evidence of this includes rapid levels of glacial melt, reductions in sea ice, shorter freezing seasons, and decreases in snowpack.

Scientific studies suggest that human activities are accelerating the concentration of greenhouse gases (GHG), which affects the global climate. The most significant contributor is the burning of fossil fuels for transportation and electricity generation, which introduces large amounts of carbon dioxide and other GHGs into the atmosphere. Collectively, these gases intensify the natural greenhouse effect, causing global average surface temperatures to rise.[6]

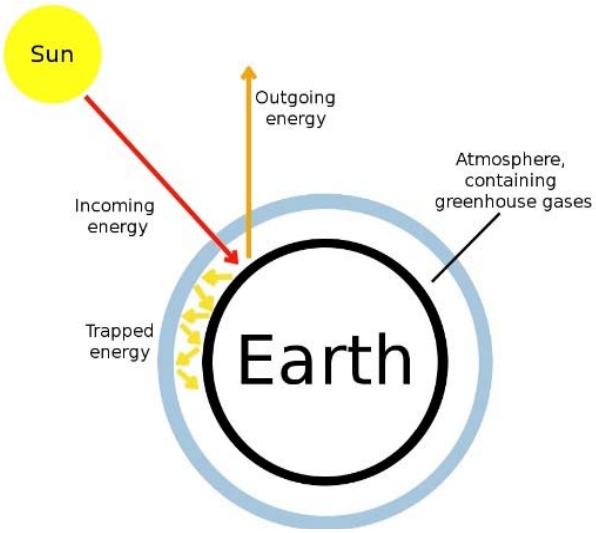


Image Credit: simpleclimate.wordpress.com

LOCAL CLIMATE CHANGE IMPACTS

Nevada County, like most communities in the Sierra Nevada, faces challenges associated with regional climate change. From record temperatures to proliferating wildfires and changing precipitation patterns, climate change poses an immediate and escalating threat to the region's environment, economic strength, and public health. The region is affected by more intense dry periods under warmer conditions which lead to extended and more frequent periods of drought in California. The area burned by wildfires across the state increases in tandem with rising temperatures. Tree mortality in forested areas increases dramatically as they become stressed from higher temperatures and decreased water availability, making them more vulnerable to insects and pathogens. The region is also impacted by a higher proportion of precipitation falling as rain instead of snow, more intense atmospheric river storms, and shortages in runoff and water supply, as well as substantial changes in runoff patterns and timing. This will affect groundwater recharge, and in turn affect Nevada County, as well as downstream communities. Climate change can impair the ability of ecosystems to provide goods and services, including reliable snowfall and healthy fishing ecosystems. Many these resources represent cultural, social, and economic benefits that local communities rely on for agriculture, tourism, recreation, and other industries.[7]

Though this plan does not address the impacts of climate change beyond the energy sector, the Sierra Climate Adaptation and Mitigation Partnership (Sierra CAMP) provides resources, information, and action opportunities to its partners within the Sierra for acting on climate change and improving community resiliency. Individuals or organizations interested in engaging with Sierra CAMP should contact Nikki Caravelli at ncaravelli@sierrabusiness.org. For more information visit the website at www.sbcsierracamp.org.

REGULATORY CONTEXT

California is a leader in developing policies to boost savings from energy efficiency efforts and lower greenhouse gas emissions. These policies are some of the drivers behind the completion of energy planning at the local level:

[5] The primary gases occurring naturally in the earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide and ozone.

[6] Intergovernmental Panel on Climate Change. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.

[7] Dettinger, Michael, Holly Alpert, John Battles, Jonathan Kusel, Hugh Safford, Dorian Fougeres, Clarke Knight, Lauren Miller, Sarah Sawyer. 2018. Sierra Nevada Summary Report. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-004. Accessed November, 2018. http://www.climateassessment.ca.gov/regions/docs/20180827-SierraNevada.pdf

Table 1-2: Regulatory Context

1978	•**Title 24, Part 6.** Energy Efficiency Standards first adopted in 1978. Ongoing updates. Established minimum energy efficiency performance standards for residential and non-residential buildings. Effective January 1, 2020 new energy efficiency standards will require near zero net energy for residential cost-effectively through efficiency and onsite renewable energy.
2002	•**Senate Bill 1078.** Established Renewable Portfolio Standards for each of the state's investor-owned utilities (IOUs), electric service providers, and community choice aggregators to acquire 20% of their electricity from renewable resources by 2010 and 33% by 2020.
2005	•**Executive Order S-3-05.** Governor's Executive Order. Set GHG reduction targets for state agencies at Year 2000 levels by 2010, 1990 levels by 2020 and 80% below 1990 levels by 2050.
2006	•**Assembly Bill 32.** Landmark legislation that requires the California Air Resources Board (ARB) to develop regulatory and market mechanisms that will reduce greenhouse gas emissions to 1990 levels by 2020.
2007	•**Senate Bill 97.** Requires lead agencies to analyze GHG emissions and climate change impacts under the California Environmental Quality Act.
2011	•**CALGreen.** Enhances sustainable construction practices through mandatory and voluntary measures including reduced construction waste, water conservation, non-toxic sealants and use of renewable materials. Now part of Title 24 and updated on same schedule.
2015	•**Senate Bill 350.** Expanded the Renewable Portfolio Standards for each of the state's investor-owned utilities (IOUs), electric service providers, and community choice aggregators to acquire 50% of their electricity from renewable resources by 2030.
2016	•**Senate Bill 32.** Expands upon AB 32 and requires the California ARB to develop regulatory and market mechanisims that will ensure that statewide greenhouse gas emissions are reduced to 40% below 1990 levels by 2030.
2017	•**Assembly Bill 398**. Extends the cap-and-trade program mandated by AB 32 to continue through 2030.
2018	•**Senate Bill 100:** Revised the Renewable Portfolio Standards to require achievement of 50% renewable resources target by 2026 and 100% eligible renewable energy or zero-carbon resources by 2045.

ECONOMIC OPPORTUNITIES

One of the potential outcomes of implementing the plan is increased investment in the clean energy industry which could open the door to new economic development opportunities in the County and surrounding communities. Some economic benefits include increased opportunities to train the local workforce in industries that directly affect the energy and water sectors. Additionally, the following indicators suggest a robust market for clean economy businesses and industries as we move forward into the next decade.[8]

- Job growth in California post-AB 32 has outpaced the growth rates prior to 2006, and outpaced total U.S. employment gains by 27%.
- Across the U.S., for every one job in fossil fuel generation, there are roughly 2.5 jobs in renewable generation. In California, each fossil fuel job is outnumbered by 8.5 jobs in renewable generation.
- California continues to lead the U.S. in clean technology patent registrations, these rose by 25.5% between 2015 and 2016 in the U.S. and 26.3% in California.
- The U.S. energy industry includes these sectors: Electric Power Generation, Energy Efficiency, and Transmission, Distribution, and Storage (TDS).
    - California has over 300,000 Energy Efficiency jobs. TDS is one of the fastest growing sectors in terms of employment: Employment in the storage subsector in the U.S. increased 234.7% from 2015 to 2016, with California as a top state with 27.7% (25,000 jobs) of the national workforce.

[8] 2017 California Green Innovation Index, 9th Edition. Next 10. Accessed July, 2018. http://next10.org/sites/default/files/2017-CA-Green-Innovation-Index-2.pdf.

RELATIONSHIP TO CEQA

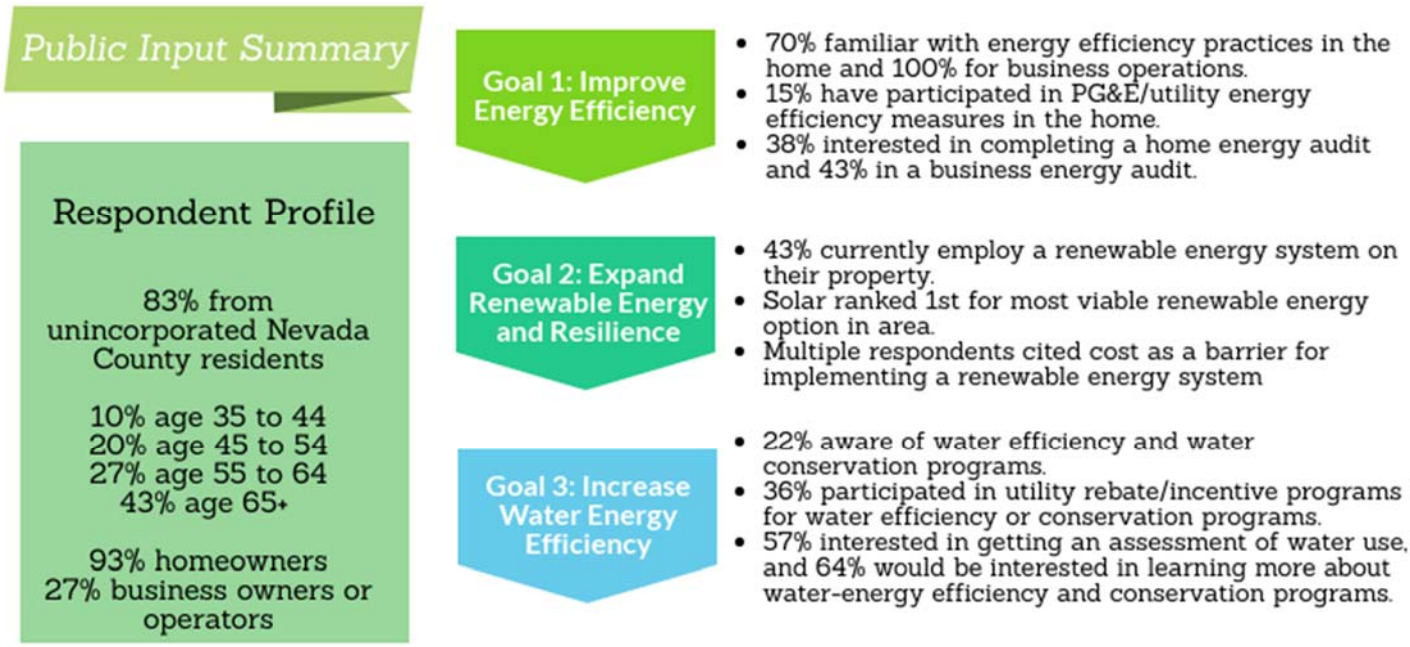
Nevada County determined the California Environmental Quality Act (CEQA) does not apply to the acceptance of the EAP, because the activity is not a "project" within the statutory definition of Public Resources Code section 21065. The County's acceptance of the EAP is not a "project" subject to CEQA because it will neither cause a direct physical change in the environment, nor a reasonably foreseeable indirect physical change in the environment. The activity is also exempt under CEQA Guidelines section 15061 (b) (3), which is the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment because it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment.

ENERGY ACTION PLAN DEVELOPMENT

The path to the EAP began in summer of 2018 when the County engaged Sierra Business Council (SBC) to analyze energy use and develop a roadmap for the community to reduce energy use and costs. Energy consumption data was gathered for baseline year 2005 and re-inventory year 2017. Next, the baseline energy use was forecast out to 2035 using local and regional growth projections validated by County staff. The data gathered during the inventory and forecasting process helped identify those activities within the community that consumed the most energy. This information pointed to areas where the greatest energy-efficiency improvements could be realized, resulting in a series of goals, strategies, and actions the County and community can undertake to reduce energy use as well as money spent on energy.

Community involvement is an essential part of successful planning efforts, and input was widely sought throughout the County to ensure the scope of the plan is appropriate, the goals are realistic, and the actions are doable. The public outreach strategy included an online survey and a community workshop hosted by the County on October 22nd, 2018. The online survey was activated October 4th, 2018 and closed November 5th, 2018 and received 36 responses. Both the survey and study session were publicized at the County Administrative Center, the Public Library, Sierra College campuses, and other local community bulletin boards. It was also featured on the two local radio stations (KVMR and KNCO), posted on community calendars, and displayed on the SBC website and Facebook page, as well as the County online newsletter and Facebook page.

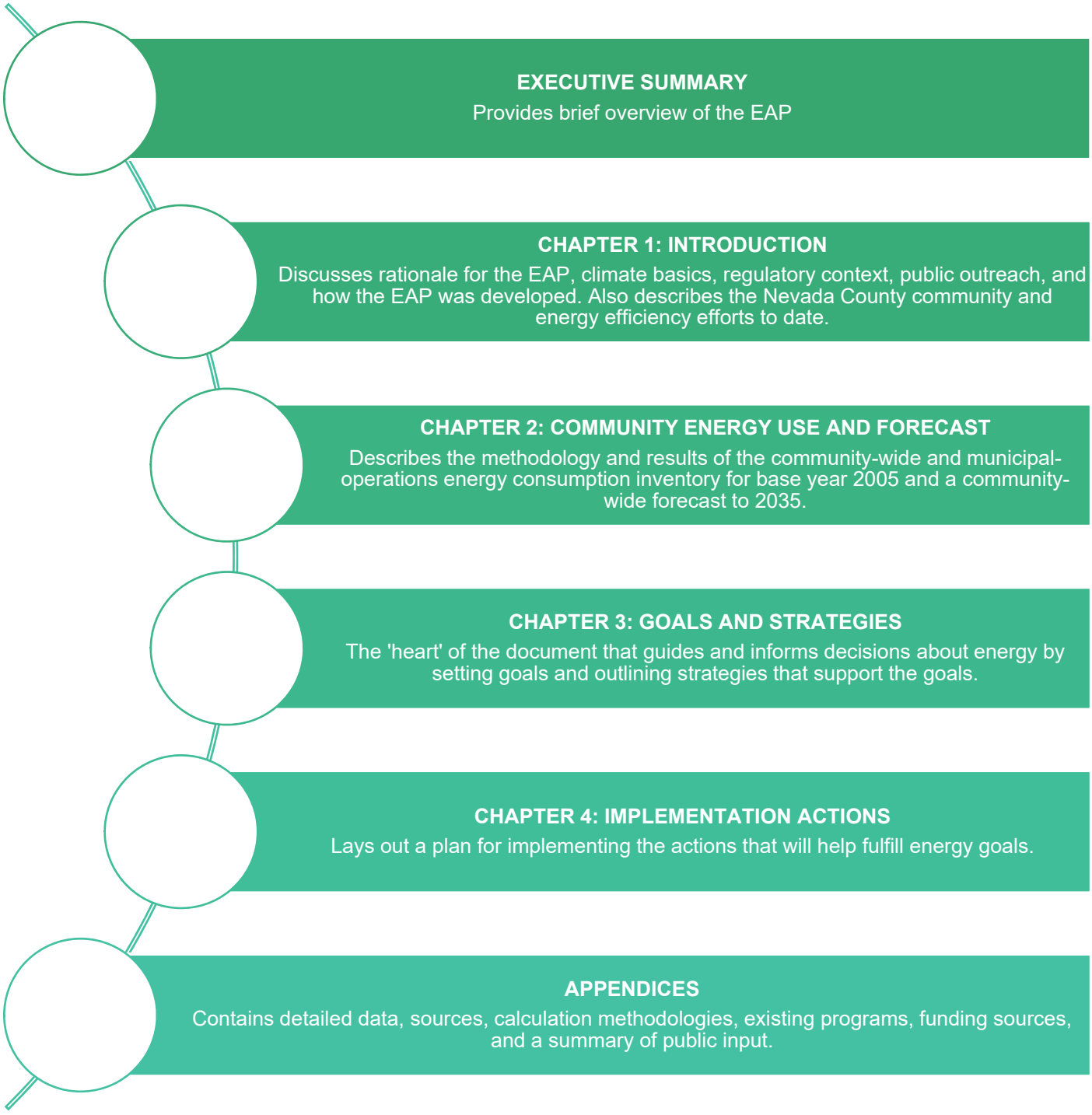
Figure 1-3: Public Input Summary



USER'S GUIDE TO THE REPORT

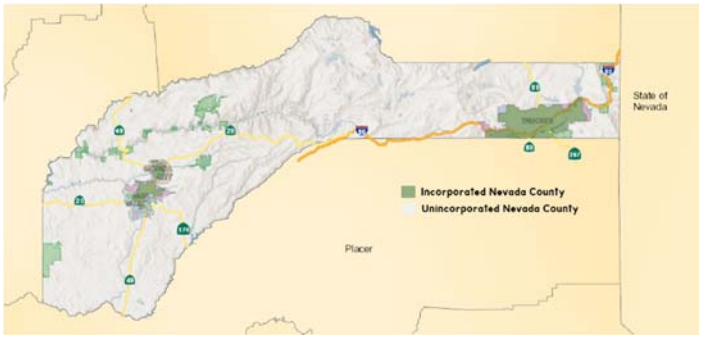
The EAP can be used as a tool to guide municipal and community decisions regarding the best ways to improve energy efficiency in homes, businesses, and municipal facilities. It is designed as an integrated 'living' document that can be modified and augmented as new information, programs, and technologies become available. The following diagram describes the information contained in the four chapters and appendices of the EAP. It serves as a roadmap to assist the reader in accessing relevant information on existing and future energy consumption, policy direction, implementation actions, performance targets, and a work plan for implementing the EAP.

Table 1-4: Energy Action Plan Content and Organization



COMMUNITY PROFILE

Nevada County is located in the Gold Country of the Sierra Nevada mountain range in northern California. The County was incorporated in 1851 and is named after the Spanish word for "snow covered." With a total area of 974 square miles, Nevada County sits between Sierra County to the north, Yuba County to the west, Placer County to the south, and the State of Nevada to the east. The 2010 United States Census reported that Nevada County had a population of over 98,000. Interstate 80 runs along the southern border, while State Highways 20 and 49 serving as the major transportation arteries through the western half of the County.



The County's elevation ranges from 300 ft in the Sacramento Valley up to the crest of the Sierra Nevada Mountains at 9,143 ft, which lends itself to a diversity of ecological resources and recreational opportunities. Nevada County landscapes include forest, grassland, riparian and meadow habitats, all of which support agricultural resources as well as timber and mineral commodity production. The natural environment predominates, supporting a wide variety of wildlife, and an abundance of year-round recreational activities, including fishing, hiking, mountain biking, and snowsports. Weather in Nevada County is characterized by precipitation-heavy winters, with an average of 193 inches of snow per year, and a summer average high of around 74 degrees, with warmer temperatures more common in the lower altitudes, while Truckee experiences cooler average temperatures at 5,817 feet.

Residents enjoy the County's rural character and historic small town charm, with most residing in the incorporated areas of the Town of Truckee, City of Grass Valley, and City of Nevada City, which were incorporated in 1993, 1893, and 1856, respectively. Human populations predated the incorporation of the County and its municipalities - prior to the County's incorporation and the designation of the Tahoe National Forest, the area was home to the Nisenan and Washoe tribes.

Nevada County is governed by a Board of Supervisors and offers election services, social and criminal court services, as well as emergency response through several municipal and special fire districts. The County offices also provide planning and building directives, and a library network. Pacific Gas & Electric is the predominant electric and gas provider, with Liberty Utilities and Southwest Gas Providers supplementing some customers on the east side of the county.

LOCAL ENERGY EFFICIENCY EFFORTS

Electricity and natural gas are the two primary forms of energy used in the County. Electricity and natural gas is distributed primarily by PG&E. Residential propane is supplied by several regional providers, and heating residential buildings through burning firewood is also common. Because of limited data availability propane and wood use are not analyzed in this plan.

Nevada County has already implemented programs that have resulted in or will lead to additional benefits in the form of energy efficiency, renewable energy, and water efficiency. Summarized below are activities and programs the County has initiated to meet their resource and energy efficiency goals:

> *The County's Municipal Code includes the following examples of energy conservation measures: allow development opportunity for passive heating and cooling design, landscaping and native vegetation standards and irrigation efficiency for water and energy savings, development design to maximize solar access, and energy conservation in the layout of subdivisions.*
>
> *In April, 2009, the County adopted the "Nevada County Energy Plan" to support the reduction of energy use throughout the County facilities and operations. The Plan sets energy reduction goals and targets and correlates to the County's 2011 GHG study. Numerous County energy projects have been completed to date.*
>
> *The County Board of Supervisors unanimously approved a resolution in April, 2016, to enter a cooperative agreement to allow mPOWER to administer the Property Assessed Clean Energy Program (PACE Program) in Nevada County.*

Additionally, the County's General Plan and Municipal Code has several goals, policies, and measures that specifically promote energy efficiency:

Table 1-5: Nevada County General Plan Energy Efficiency Components

Housing Element	Increases in the price of energy affects the costs of providing shelter. Increased energy efficiency can assist in reducing the cost of shelter. Provision of housing in proximity to jobs reduces the need for the use of energy, thereby reducing the overall cost of living. Energy policies support alternative and efficient transportation systems, reduction of energy consumption in buildings through design and proper landscaping, and implementation of other energy conservation techniques. Energy conservation measures requiring substantial improvements can result in increasing the initial cost of the unit. Programs now in effect to minimize the cost of energy conservation include Federal and State tax credits for installation of solar heaters and insulation. Loans are available to low-income families through the Pacific Gas and Electric's Weatherization Program. (General Plan Housing Element 8-138)
	Financing Resources for Housing Preservation: The potential resources that could become a part of the County's overall financial plan for retaining affordable units, which might become at-risk in the future, including the Nevada County Home Energy and Weatherization Program.
Air Quality Element	Objective 14.2 Implement standards that minimize impacts on and/or restore air quality. The Action Policy includes the following as part of the Comprehensive Site Development Standards: a. Encourage maximized solar access, where feasible, and consistent with the maintenance of scenic values, in new subdivision designs to optimize energy efficiency; b. Require all installations of solid fuel-burning devices comply with the current Federal EPA emission standards; c. Require installation of masonry and zero-clearance fireplaces in new construction to comply with the current EPA Phase particulate emission limits.
Water Element	Objective 11.1: Promote and provide for conservation of domestic and agricultural water. Action Policy 11.1: Adopt water conservation standards, consistent with State guidelines, for multi-family, commercial and industrial development encouraging installation and use of low-flow plumbing fixtures, drip irrigation systems, and drought-tolerant landscape plantings.
Municipal Code	Sec. L-II 4.2.7 Landscaping is of considerable importance to both existing and proposed development in Nevada County, contributing to the overall quality and character of our communities, especially when native vegetation is used or retained. Properly designed and maintained, landscaping provides visual interest and variety, complements structures, provides a transitional area between competing land uses, and aids in reducing air pollution, heat and glare. Efficient use of water used for landscaping by establishing standards for the design, installation and management of landscapes that avoid excessive water demand. The County strongly encourages the retention of on-site native vegetation where it does not pose a fire hazard. Where native oaks are retained, plant materials within the dripline of the oaks shall be drought-tolerant to minimize the application of water at the base of oaks. Existing, on-site native vegetation may serve as alternative landscaping to that landscaping required below where the Planning Agency finds that the existing vegetation has the same practical effect and furthers the intent of this Section.
	Sec. L-II 4.3.9 Energy Conservation of energy resources without significantly increasing the cost of housing. All projects shall be designed to incorporate passive heating and cooling opportunities such as the retention or planting of deciduous shade trees along the south and west sides of structures and along access streets, minimize obstruction of any developed solar access on an adjoining parcel, building envelopes that are oriented for maximum solar access opportunities for future residences, and site planning for multi-family residential development to maximize solar access, such as clustering development in areas with good solar orientation, east/west street orientation, uniform setbacks that increase south-wall exposure, height limitations for multi-structured developments, siting accessory structures so as not to shade the south walls of structures and siting parking areas to break shade or shadows.

CHAPTER 2: ENERGY USE & FORECAST

Chapter 2 summarizes the 2005 baseline, 2017 re-inventory and 2035 forecast of community-wide energy consumption as well as the 2005 baseline and 2017 re-inventory of municipal-operations energy consumption.

SBC completed an inventory of baseline energy use for 2005, a re-inventory of energy use in 2017, and forecast energy consumption out to 2035 under a business as usual scenario to inform the strategies for improving energy efficiency, expanding utilization of renewable energy resources, and addressing the water-energy nexus. The baseline inventory and re-inventory serve as a benchmark against which future progress can be measured.

2005 BASELINE COMMUNITY-WIDE INVENTORY

The County's community-wide energy consumption data is expressed as aggregated residential and non-residential energy consumption by energy source. The County's municipal energy use for facilities located within the County is excluded from the aggregated non-residential energy use and reported separately. Electricity and natural gas consumption were the largest energy sources in Nevada County built environment. In 2005, the County's community wide residential electricity consumption totaled 280,691,315 kWh and residential natural gas consumption totaled 2,578,107 therms. In addition, in that year, non-residential electricity consumption totaled 59,372,586 kWh and non-residential natural gas consumption totaled 658,451 therms. The County's buildings used 5,089,265 kWh of electricity, 197,316 therms of natural gas, and 171,917 kWh of electricity for public lighting. As an additional point of insight, electricity used by potable water and wastewater services provided for County residents and businesses by the County and Nevada Irrigation District (NID) was analyzed separately from non-residential energy and County operations. In 2005, the County's wastewater services used 2,060,510 kWh of electricity and potable water services used 2,404,070 kWh of electricity.

2017 COMMUNITY-WIDE RE-INVENTORY

Similarly to the 2005 baseline, the 2017 re-inventory found that electricity and natural gas consumption were the largest energy sources in the unincorporated Nevada County built environment. In 2017, the County's community wide residential electricity consumption totaled 281,540,590 kWh and residential natural gas consumption totaled 2,399,588 therms. This represents a 0.3% increase in residential electricity use and a 7% decrease in residential natural gas use. Additionally, in that year, non-residential electricity - excluding County operations, wastewater, and potable water energy use - totaled 53,012,350 kWh and non-residential natural gas use totaled 418,545 therms. This represents an 11% decrease in non-residential electricity use and a 36% decrease in non-residential natural gas use. The County's facilities accounted for 3,500,757 kWh of electricity use and 125,499 therms of natural gas use in buildings and 152,395 kWh of electricity for public lighting in 2017. This is a decrease of 31% in electricity use and a decrease of 36% in natural gas use in County facilities and a decrease of 11% in public lighting electricity use from the 2005 baseline. As an additional point of insight, electricity used by potable water and wastewater services provided for County residents and businesses by the County and NID was again analyzed separately from non-residential energy. In 2017, the County's wastewater services used 3,698,605 kWh of electricity and potable water services used 2,141,278 kWh of electricity. This represents a 79% increase in wastewater services' electricity use and an 11% decrease in potable water services' electricity use. These changes in energy consumption illustrate the progress that has already been made towards achieving the 2035 energy reduction goals in this report as well as opportunities for additional energy savings.

Overall the unincorporated Nevada County community reduced electricity use 2% and natural gas use 14% between 2005 and 2017. The primary reasons that community electricity use decreased between 2005 and 2017 even though occupied households increased 3% were community efforts to save over 1,336,368 kWh of electricity annually from PG&E energy

efficiency programs[9] and producing an estimated 23,543,975 kWh of electricity from solar PV systems[10], which underscores the importance of utilizing the available resources and funding.

Table 2-1: Summary of 2005 Baseline and 2017 Re-Inventory Energy Use

Energy Use Sector	2005 Baseline Electricity Use (kWh)	2005 Baseline Natural Gas Use (therms)	2017 Electricity Use (kWh)	2017 Natural Gas Use (therms)	% Change in Electricity Use (2005-2017)	% Change in Natural Gas Use (2005-2017)
Residential	280,691,315	2,578,107	281,540,590	2,399,588	0.3%	-7%
Non-Residential (excludes County Operations, Wastewater, and Potable Water below)	59,372,586	658,451	53,012,350	418,545	-11%	-36%
County Operations	5,089,265	197,316	3,500,757	125,499	-31%	-36%
County Operated Public Lighting	171,917	-	152,395	-	-11%	-
Wastewater Energy	2,060,510	-	3,698,605	-	79%	-
Potable Water Energy	2,404,070	-	2,141,278	-	-11%	-
Total	**349,789,663**	**3,433,874**	**344,045,975**	**2,943,632**	**-2%**	**-14%**

2035 BUSINESS-AS-USUAL COMMUNITY-WIDE FORECAST

The unincorporated Nevada County 2005 community-wide residential, non-residential, potable water, and wastewater energy use was forecast out to 2035 under a business-as-usual (BAU) scenario using the Statewide Energy Efficiency Collaborative (SEEC) ClearPath California toolkit (See Figure 2-2). Because the County's municipal energy use is included with the community-wide energy use, a separate forecast for municipal energy use was not completed. The BAU forecast estimates how energy use would change from 2005 to 2035 in the absence of any energy efficiency, renewable energy, or water efficiency policies or programs based solely on change in households and employment in the community. The two required inputs for a forecast — baseline energy consumption data and growth rates — are presented in Appendices A and B, respectively. The baseline data was collected from PG&E for electricity and natural gas use. The growth rates were calculated using projections of the number of households and in-County employment prepared by state agencies. The Community's total energy use in 2035 was forecast to increase by 13%. Total electricity use was forecast to increase by 14% to 398,323,245 kWh (a net increase of 48,533,582 kWh). Total natural gas use was forecast to increase by 14% to 3,924,430 therms (a net increase of 490,556 therms).

The unincorporated County's 2035 residential energy use was forecast to increase by 13%, resulting in 316,285,003 kWh of electricity use (a net increase of 35,593,688 kWh) and 2,905,030 therms of natural gas combustion (a net increase of 326,923 therms) in 2035 (See Figure 2-2). This forecast is based on the projected change in the number of households in

[9] Unincorporated Nevada County residential and non-residential energy savings based on projects completed 2010-2017. California Public Utilities Commission. Accessed September, 2018. http://eestats.cpuc.ca.gov/Views/EEDataShelf.aspx

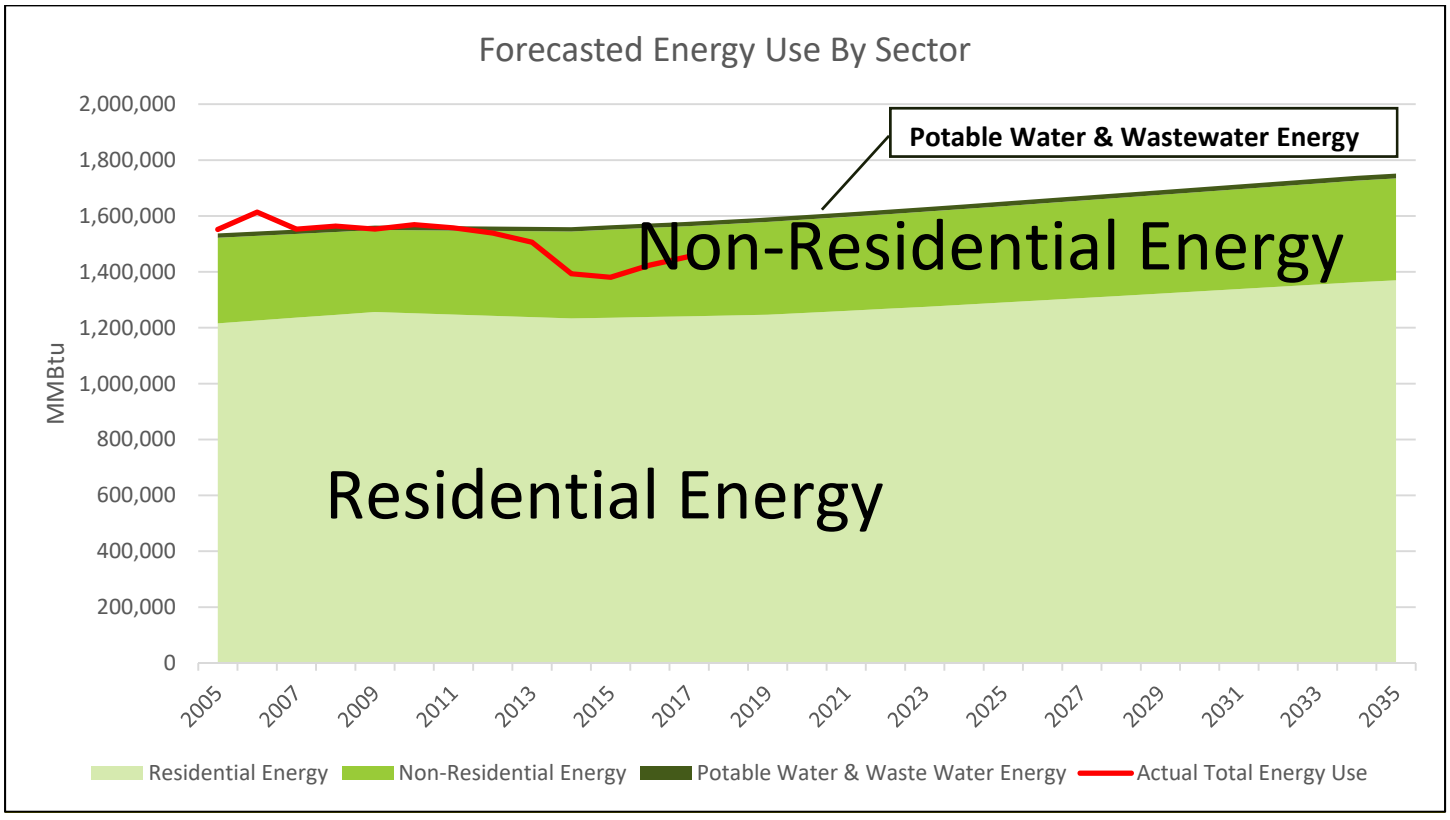
[10] Unincorporated Nevada County residential and non-residential solar PV statistics based on installations completed 2005-2017 based on permit records and California Solar Initiative data. Accessed September, 2018. https://www.californiadgstats.ca.gov/

Nevada County. The annualized growth rates for the number of households in the County were calculated based on the actual change in the number of households from 2005 to 2016 and projected change in the number of households from 2016 to 2035 reported by the CalTrans Long-Term Socio-Economic Forecast of households for Nevada County.[11] This projected growth would result in an additional 5,092 households in Nevada County based on the 2005 baseline of 39,852 households.

The unincorporated County's non-residential energy use was forecast to increase by 19%, resulting in 76,992,489 kWh of electricity use (a net increase of 12,358,721 kWh) and 1,019,400 therms of natural gas use (a net increase of 163,633 therms) in 2035 (See Figure 2-2). This forecast is based on the projected change of in-County employment in Nevada County. The annualized growth rates for employment in Nevada County were calculated based on the actual change from 2005 to 2016 of in-County employment and the projected change from 2016 to 2035 of in-County employment based on the CalTrans Long-Term Socio-Economic Forecast for Nevada County.[12] This projected growth would result in an additional 5,753 jobs in Nevada County based on the 2005 baseline of 29,810 jobs in Nevada County.

The unincorporated County's wastewater and potable water services electricity use was forecast to increase 13% based on the projected change in the number of household and business establishments in the unincorporated County. This increase would result in 2035 annual wastewater service electricity use of 2,328,764 kWh (a net increase of 268,254 kWh) and 2035 annual potable water service electricity use of 2,716,989 kWh (a net increase of 312,919 kWh). The annualized growth rates for the number of households and business establishments in the unincorporated County were calculated based on the projected change in the number of households and employment from 2005 to 2035 reported by the CalTrans Long-Term Socio-Economic Forecast of Nevada County.[11,12]

Figure 2-2: Total Community Wide Energy Use Forecasted Out to 2035 Under BAU Scenario by Sector



[11] Caltrans Long-Term Socio-Economic Forecasts by County – Nevada County 2017. http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html, Households. (Accessed April, 2018).

[12] Caltrans Long-Term Socio-Economic Forecasts by County – Nevada County 2017, http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html In-County Total Employment, All Industries. (Accessed April 19, 2018).

Figure 2-3: Total Residential Energy Use Forecasted to 2035 Under a BAU Scenario by Source

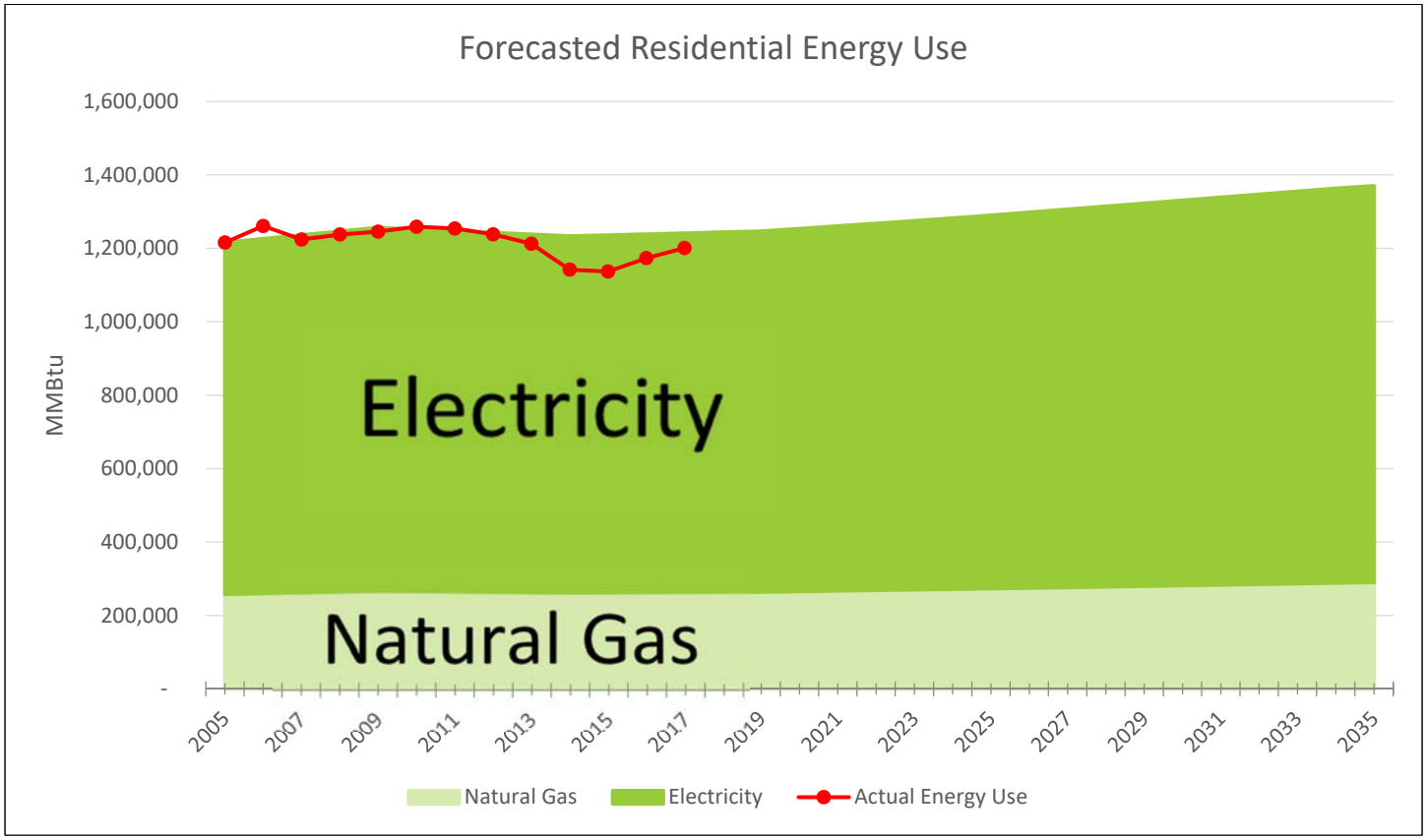


Figure 2-4: Total Non-Residential Energy Use Forecasted to 2035 Under a BAU Scenario by Source

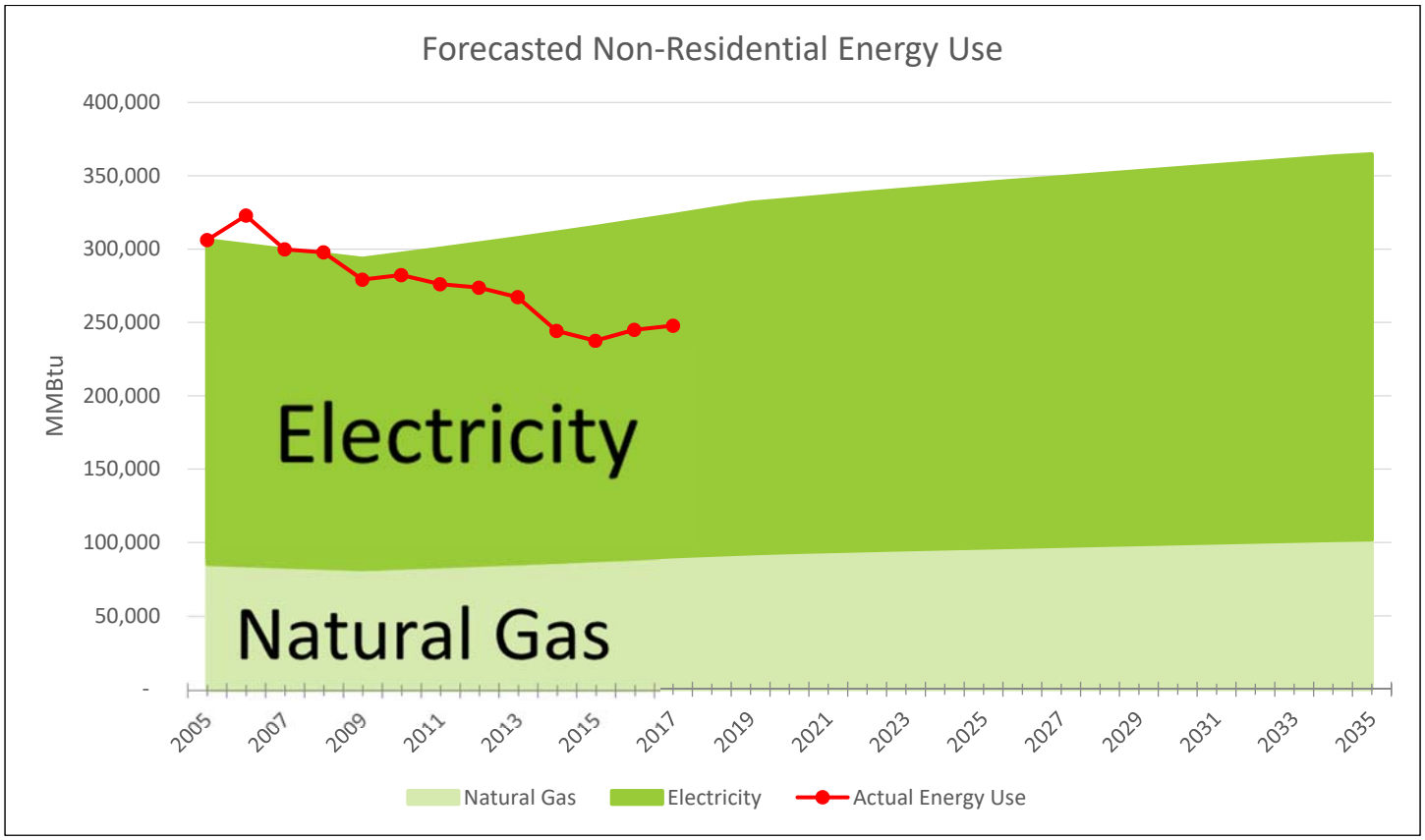
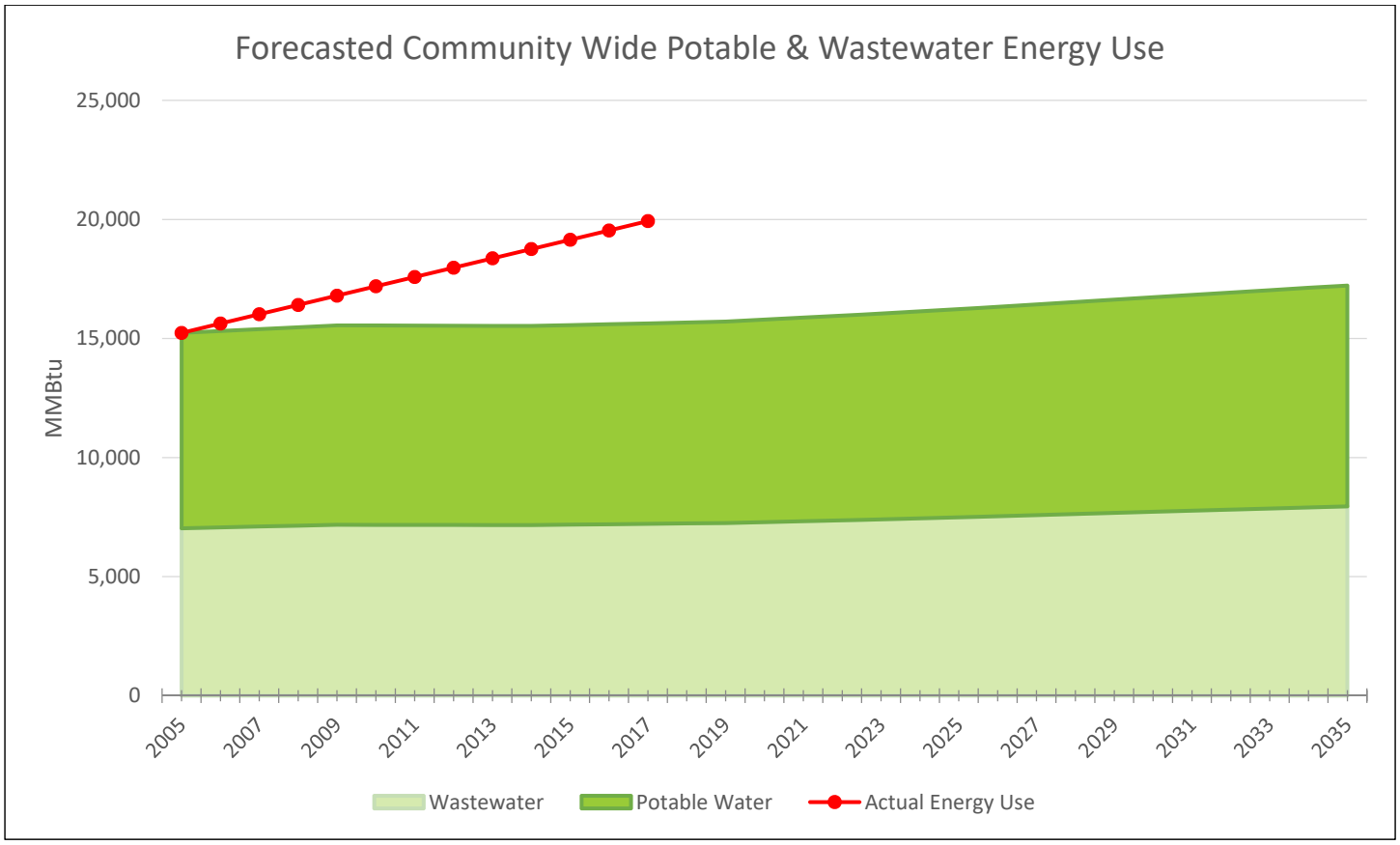


Figure 2-5: Total Wastewater and Potable Water Service Energy Use Forecasted to 2035 Under a BAU Scenario



2005 BASELINE AND 2017 RE-INVENTORY OF NEVADA COUNTY'S FACILITIES ENERGY USE

Nevada County's facilities' main types of energy use, presented in Figure 2-6 and 2-7, are electricity and natural gas. The Eric Rood Administrative Center, Nevada County Jail – Nevada City, Nevada County Courthouse / Jail Annex, and Nevada County Juvenile Hall used the most electricity of County facilities. In 2005, Nevada County's facilities' natural gas consumption totaled 197,316 therms and the County's facilities' electricity consumption totaled 5,261,182 kWh. In 2017, the County's facilities' electricity consumption decreased by 30.6% to 3,653,152 kWh, and the County's facilities' natural gas consumption decreased by 36.4% to 125,499 therms. These decreases in energy consumption reflect progress that has already been made toward meeting the energy reduction goals in this report including the generation of 758,571 kWh of electricity from solar PV systems in 2017. Additionally, County wastewater facilities used 2,025,602 kWh of electricity in 2005 increasing 80% to 3,644,405 kWh of electricity in 2017. In 2005 the County facilities and operations accounted for an estimated $1,213,346 worth of energy consumption. In 2017, the County facilities and operations energy costs increased 23% to $1,498,444 primarily due to increased electricity use at wastewater facilities.

Since 2005, the County has taken actions to reduce energy use saving an estimated 1,313,255 kWh and 9,875 therms annually through PG&E incentivized energy efficiency programs and are currently generating an estimated 4,544,725 kWh annually from five solar PV systems installed in 2017 and 2018. After accounting for the current solar PV electricity generation the County's total estimated energy use would be 3,511,403 kWh for County operated building, public lighting, and wastewater facilities a decrease of 52% from the 2005 baseline electricity use.

Figure 2-6: 2005 Baseline & 2017 Re-Inventory Nevada County Facilities Electricity Consumption

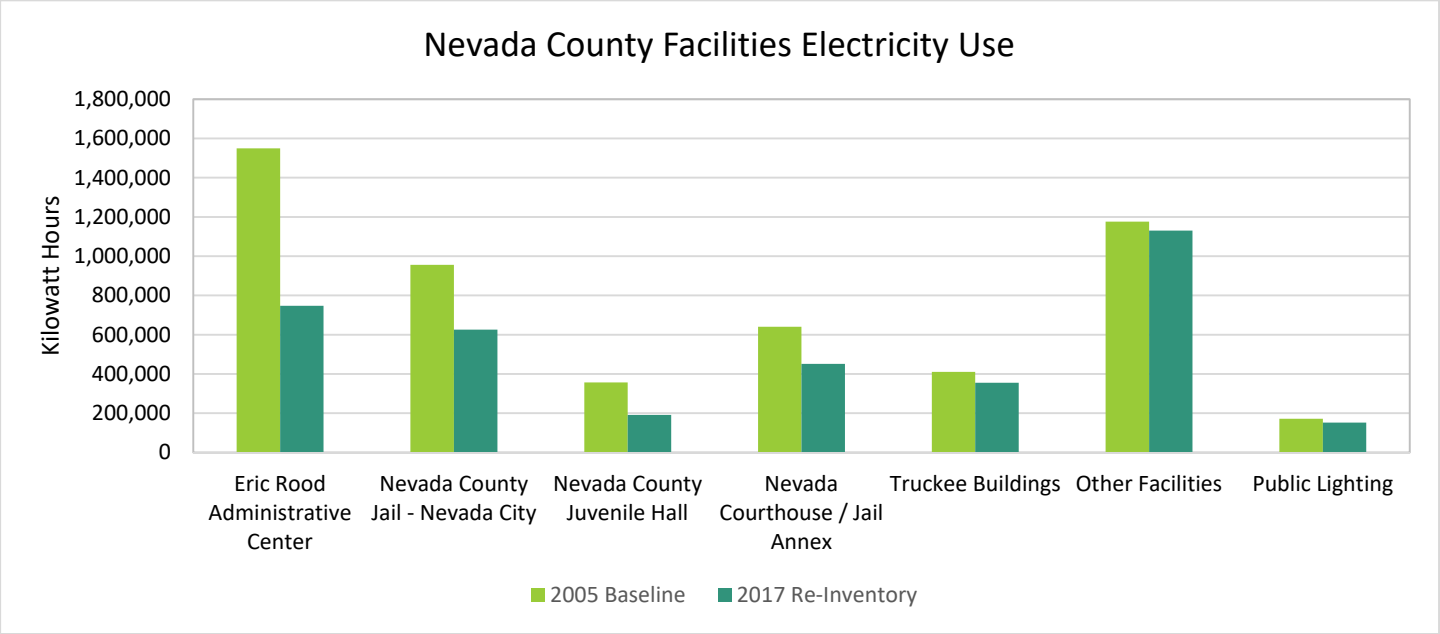
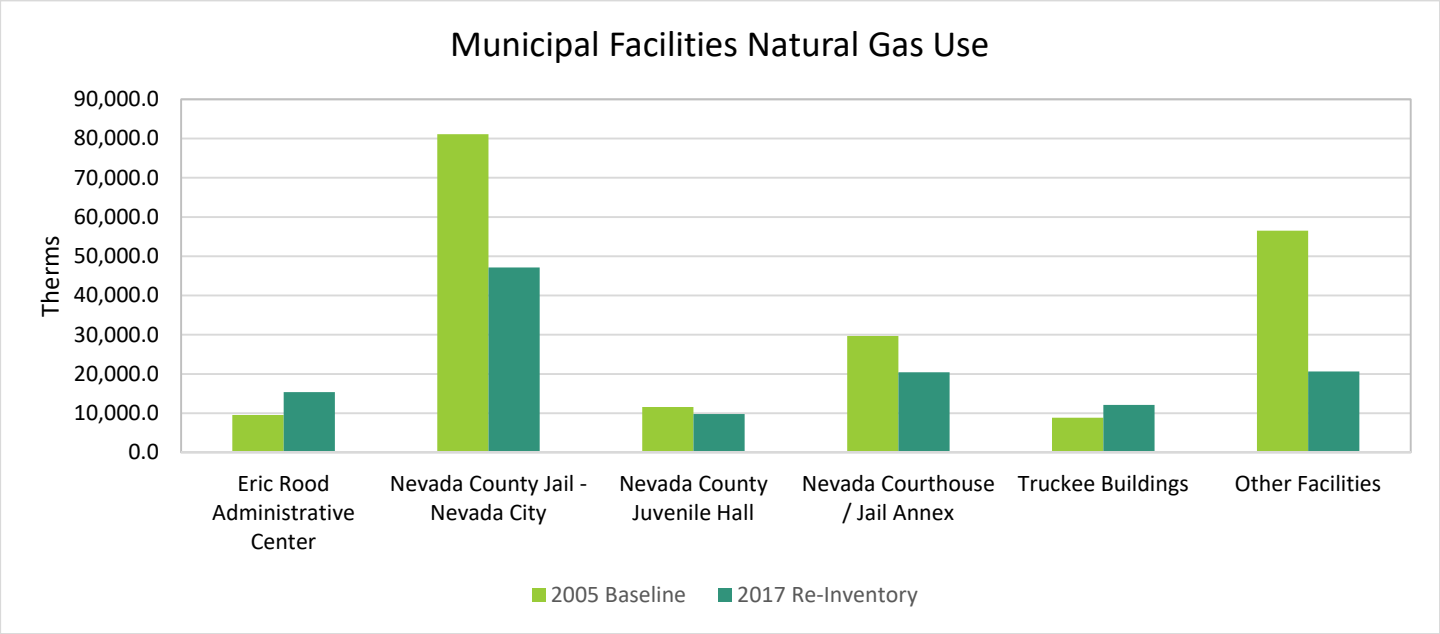


Figure 2-7: 2005 Baseline & 2017 Re-Inventory Nevada County Facilities Natural Gas Consumption



CHAPTER 3: GOALS & STRATEGIES

Chapter 3 identifies three big-picture energy reduction goals, and details strategies that will help Nevada County and the unincorporated community reduce their energy needs and the accompanying costs. In summary, this is achievable by practicing energy efficiency, utilizing renewable energy, and efficiently utilizing water resources.

BASIS FOR ENERGY GOALS AND STRATEGIES

To identify the most appropriate energy-efficiency strategies for Nevada County the following documents and resources were reviewed:

- Nevada County General Plan 2020[13]
- Nevada County Municipal Code[14]
- Nevada County Energy Plan[15]
- Review of 2005 - 2017 community and municipal energy use
- Review of 2005 - 2017 energy efficiency PG&E program activity
- Review of 2005 - 2017 solar PV statistics
- Review of active energy efficiency and water conservation initiatives and programs
- Review of measures in other similar jurisdictions
- Meetings and consultation with County staff
- Public input received from community members and Planning Commission

There are many ways to reduce energy consumption while building greater community resiliency, benefiting not only energy resources, but also water resources, improving the health, safety, and prosperity of Nevada County community members. The selection of measures most appropriate for the County and community was based on the criteria below and in consultation with County staff:

1. Potential of actions to reduce energy use
2. Availability of other organizations to assist with implementation actions
3. Co-benefits outside of energy savings (ex. air-quality improvement, public safety, economic development)

The goals, strategies, and actions pertain to the energy consumed by buildings and facilities in the residential, non-residential, and municipal sectors. Other sectors of energy use, such as transportation, are not included in this report but could be addressed in future studies. The energy reduction potential was calculated for each goal using the baseline energy use data, the energy use forecasts, and the estimated energy savings associated with reaching specific targets. The annual energy reduction potential was calculated using top-down methods[16] to estimate energy savings achievable in 2035 by meeting the associated 2035 targets. Calculations are documented in Appendix C. The potential annual energy savings in 2035 were calculated for each strategy and, where applicable, reported for residential and non-residential energy use. By implementing the EAP and through actions taken by community members and the County, the community can potentially reduce energy use by 202,936,611 kWh of electricity (51% reduction) and 1,169,531 therms of natural gas (30% reduction). A portion of these reductions have already occurred, evidenced by some of the sectoral decreases in energy use from 2005 to 2017, as noted in chapter 2. Specifically, from 2005 to 2017 Nevada County saw a 7% decrease in residential natural gas use, 11% decrease in non-residential electricity use, 36% decrease in non-residential natural gas use, and an 11% decrease in County operated public lighting electricity use, resulting in a total reduction of 15,305,926 kWh of electricity and a total decrease of 591,668 therms of natural gas below the 2017 BAU forecast of energy use.

[13] Nevada County General Plan https://www.mynevadacounty.com/1065/General-Plan

[14] Municipal Code. Nevada County. https://www.mynevadacounty.com/349/County-Codes

[15] Nevada County Energy Plan. Adopted April, 2009.

[16] An approach that begins with community-wide energy use, breaks it down into smaller sub-sectors (residential, non-residential, water-energy, and municipal) and then applies reduction estimates based on the targets for each strategy.

ENERGY EFFICIENCY GOALS AND STRATEGIES

The goals and strategies in this section are focused on improving unincorporated Nevada County's community energy efficiency by broadening the reach of existing programs, expanding renewable energy utilization, and employing efficient practices that address the water-energy nexus. The goals in this chapter are interrelated and many of the actions, when implemented, may simultaneously achieve multiple strategies and goals. The Implementation Plan in Chapter 4 describes the actions that support the strategies in more detail. The goals were designed with California's preferred "loading order" in mind for meeting energy demand:

1st: Cost-effective energy efficiency

2nd: Cost-effective renewable energy

3rd: Conventional energy sources

For the County, the economic implications of implementing the strategies and actions primarily involve costs associated with staff time and the potential costs associated with retaining outside consultants to assist with program implementation. The strategies and actions were designed to be low/no-cost to the County by leveraging partnerships with other organizations and utilizing resources available to help with implementation.

For residents and businesses, almost all actions with significant private costs result in a return on investment in energy cost savings that will accrue over time, thus defraying the initial investment costs. Additionally, there are funding sources and financing mechanisms available to offset the upfront costs that often can make projects cash flow positive from day one.

The following table compares 2005 baseline energy use, 2035 BAU forecast energy use and potential energy use savings in 2035 with the successful implementation of the EAP strategies and actions. The majority of energy savings are attributed to existing structures and would have significant impact in the community regardless of projected new construction. A critical step in achieving the energy savings estimated in this plan is convening a Working Group that focuses on implementing the Plan. In order to assist with implementation of the Plan, the County partner with Grass Valley to utilize the Local Government Commission's CivicSpark AmeriCorps fellow currently working with the City. The Working Group should be comprised of representatives from the County, Nevada Irrigation District, Nevada County Resource Conservation District, Nevada County School District, PG&E, Nevada County Association of Realtors, Nevada County Contractor's Association, the business community, and residents.

Table 3-1: Summary of 2005 Baseline and 2035 BAU Forecast Energy Use and Potential 2035 Energy and Cost Savings

Energy Use	2005 Baseline	2035 BAU Forecast	2035 Potential Energy Savings	2035 Potential Cost Savings[17]	Percent Difference
Electricity	349,789,663 kWh	398,323,245 kWh	202,936,611 kWh	$45,948,490	51% reduction from 2035 BAU
Natural Gas	3,433,874 therms	3,924,430 therms	1,169,531 therms	$1,579,651	30% reduction from 2035 BAU

[17] Forecast composite rate for 2035 of $0.226 per kWh based on SBC forecast of PG&E Rates, 2035 average rate of $1.351 per therm of natural gas based on based on SBC forecast of PG&E Rates. https://www.pge.com/tariffs/electric.shtml , https://www.pge.com/tariffs/GRF.SHTML#RATEFINDER . Accessed May 22, 2018.

Table 3-2: Nevada County Energy Action Plan Goals and Strategies

NEVADA COUNTY ENERGY ACTION PLAN GOALS AND STRATEGIES	
Goal 1: **Energy Efficiency**	Improve Energy Efficiency in Buildings, Facilities, and County Operations
	Strategy 1.1: Expand outreach and education on existing energy efficiency practices, programs, and financing options for residential and non-residential utility customers. **Strategy 1.2:** Improve compliance with current California Building Energy Efficiency Standards (Title 24, Part 6) by providing informational materials when available. **Strategy 1.3:** Continue to increase the energy efficiency of County buildings, facilities, and operations.
Goal 2: **Renewable Energy**	Expand the Utilization of Renewable Energy and Resilience Measures
	Strategy 2.1: Prepare for the inclusion of renewable energy systems in new construction and large retrofit projects in order to meet California Zero Net Energy Goals by providing informational material when available. **Strategy 2.2:** Encourage renewable energy projects through education, outreach, and local leadership. **Strategy 2.3:** Encourage energy storage and grid optimization infrastructure projects that support local renewable energy systems and community resilience.
Goal 3: **Water Energy**	Encourage the Efficient and Safe Transportation and Use of Water Resources
	Strategy 3.1: Improve and increase the County's outreach and education efforts in collaboration with Nevada Irrigation District and other water agencies by providing information on existing and future water efficiency and conservation programs. **Strategy 3.2:** Coordinate with Nevada Irrigation District and other water agencies to participate in proactive leak detection programs in order to reduce water losses. **Strategy 3.3:** Continue to improve the efficiency of County Wastewater Treatment operations and encourage and collaborate with Nevada Irrigation District and other water agencies to improve the efficiency of agency water operations.

GOAL 1: **IMPROVE ENERGY EFFICIENCY IN BUILDINGS, FACILITIES, AND COUNTY OPERATIONS**

Target Audience
Residents
Businesses
Public Agencies

Projected Energy Savings
64,095,719 kWh of electricity
653,288 therms of natural gas

Benefits
Comfort
Convenience
Low-maintenance
Reduced Energy Costs
Workforce Skills Improvement

Improving the energy efficiency of new developments and existing buildings is a crucial best-practice in reducing long-term energy costs. There are a variety of ways to improve the efficiencies of energy-consuming appliances, devices, or processes used daily in our homes, offices, communal spaces, and public and commercial facilities. The following strategies are recommendations for increasing community participation in programs that are designed to save energy and money, encourage the County and public agencies to lead by example, and assist all parties involved in the planning and design review process of new developments to meet and exceed energy efficiency standards.

Many energy efficiency projects have a return on investment ranging from a few months to several years, depending on the size and scale of the project. Incentives and financing programs can offset some of the upfront costs and can often make projects cash flow positive from day one. Incentive and financing programs are listed in Appendix F.

STRATEGY 1.1: EXPAND OUTREACH AND EDUCATION ON EXISTING ENERGY EFFICIENCY PRACTICES, PROGRAMS, AND FINANCING OPTIONS FOR RESIDENTIAL AND NON-RESIDENTIAL UTILITY CUSTOMERS.

Since 2010, Nevada County residents and businesses have saved 13,034,571 kWh of electricity and 163,282 therms of natural gas annually from PG&E energy efficiency programs including Nevada City and Grass Valley customers.[18] As technology continues to improve, there is significant opportunity for residents and businesses to save more energy through efficiency improvements. Energy efficiency improvements make homes, offices, and facilities more comfortable, safe, and sustainable while reducing energy bills and operational costs. The improvements also increase the value of the property. The first way to encourage participation is by ensuring that community members, both residential and non-residential, understand the benefits of energy efficiency, simple ways they can practice being more efficient, and are informed of the wide variety of energy efficiency programs available for participation. The Implementation Program in Chapter 4 describes the actions that support this strategy in more detail.

Common energy efficiency practices for existing buildings include retrofitting indoor and outdoor lighting, refrigeration and heating, ventilation, and air conditioning (HVAC) systems to more efficient technology. Other common practices include ensuring proper weatherization practices are in place, upgrading windows and insulation to maintain comfort without requiring significant energy use. Additionally, PG&E offers Time-of-Use rate plans, which helps support energy management and can reduce costs by incentivizing energy use during times of low demand when energy costs are low and discouraging energy use during times of high demand when costs are high.

STRATEGY 1.2: IMPROVE COMPLIANCE WITH CURRENT CALIFORNIA BUILDING ENERGY EFFICIENCY STANDARDS (TITLE 24, PART 6) BY PROVIDING INFORMATIONAL MATERIALS WHEN AVAILABLE.

There is significant opportunity to achieve high levels of energy performance in new development projects, and in large renovations through utilizing new technology, advanced materials, and holistic design. Since 1977, when the first California Energy Efficiency Standards were implemented, the required measures have saved Californians billions of dollars in reduced electricity bills.[19] In Nevada County, 44.2% of the housing stock or 23,534 of the 53,189 housing units were built prior to the adoption of the state's first Title 24 Energy Efficiency Standards in 1978 and the non-residential building stock is likely similarly dated.[20] While there are certain challenges to renovating historic buildings, energy reduction goals for these

[18] Nevada County residential and non-residential energy savings based on projects completed 2010-2017. California Public Utilities Commission. Accessed September, 2018. http://eestats.cpuc.ca.gov/Views/EEDataShelf.aspx

[19] Energy Efficiency Standards. California Energy Commission. Accessed August, 2018. http://www.energy.ca.gov/efficiency/savings.html

[20] U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates, Selected Housing Characteristics, Nevada County, CA. https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml

buildings is feasible with well-planned and implemented energy efficiency improvements that take into account not only the potential energy savings, but also the protection of the historic property's materials. The number of historic and older buildings that make up a significant part of Nevada County's housing and building stock presents a unique opportunity for energy efficiency renovations. Historic buildings can take advantage of the Federal Historic Preservation Tax Incentive program.[21] The National Park Service of the U.S. Department of the Interior prepared a Preservation Brief on Improving Energy Efficiency in Historic Buildings that details the inherent energy efficient features of historic buildings and the opportunities to improve the efficiency through minimal alteration of the buildings.[22] The Nevada County General Plan includes references to the preservation of historically significant structures and promotion of cultural heritage in the County in several chapters including the Land Use Element, Economic Development Element, Circulation Element, Recreation Element, Housing Element, Aesthetics Element, and Cultural Resources Element. The County's preservation goals can be met while simultaneously reducing operational costs by incorporating energy efficiency improvements into the goals and actions found in the County's General Plan.[23] Due to a rapidly evolving field and advancements in technology, Title 24's Energy Efficiency standards are updated every 3 years, and it is important that designers, planners, building inspectors, and contractors maintain a current, working knowledge of the standards. Additionally, there are numerous opportunities in the design phase for new developments and renovation projects to achieve savings through holistic design.

Figure 3-3: California Energy Efficiency Standards in Residential and Non-Residential Buildings

STRATEGY 1.3: CONTINUE TO INCREASE THE ENERGY EFFICIENCY OF COUNTY BUILDINGS, FACILITIES, AND OPERATIONS.

The 2005 baseline municipal operations inventory indicated that the County consumed 5,261,182 kWh of electricity and 197,316 therms of natural gas for County facilities and public lighting. The County is already saving 1,313,255 kWh and 9,875 therms annually through PG&E incentivized energy efficiency programs which will improve staff workspaces and reduce operational costs, thus allowing the County and public agencies to allocate money from savings elsewhere. Best practice is to benchmark building energy use with the U.S. EPA's free online software, Energy Star Portfolio Manager. It allows users to track the energy use of buildings or facilities, determine their efficiency, and evaluate opportunities to save energy and money. The facilities with the greatest energy use or highest energy intensity should be targeted for energy audits and retro-commissioning[24] to optimize energy performance and identify opportunities for energy efficiency projects.

[21] U.S. D.O.I., National Park Service, Federal Historic Preservation Tax Incentives. Accessed Aug. 2018. https://www.nps.gov/tps/tax-incentives.htm

[22] U.S. D.O.I, National Park Service, Preservation Brief: Improving Energy Efficiency in Historic Buildings. Accessed August 2018. https://www.nps.gov/tps/how-to-preserve/briefs/3-improve-energy-efficiency.htm

[23] Nevada County General Plan (1996), Volume 1: Goals, Objectives, Policies, and Implementation Measures

[24] Retro-commissioning is a systematic process to improve an existing building's energy performance through a whole-building systems approach.

Case Study – Retail LED Light Upgrade

Foothill Mercantile

Gift Shop

121 Mill Street | Grass Valley, CA 95945

(530) 272-8304 | www.foothillmercantile.com

"There is a noticeable difference in the store with the new LED lighting, it is brighter and even my sales reps noticed the new lighting. The installation went smoothly, and only took a couple of days, and they worked around my business hours."

- Susan Amick, owner

Foothill Mercantile, located in downtown Grass Valley, features toys, greeting cards, housewares, candles, holiday products, music, and more one-of-a-kind gifts. A long-time local favorite, Foothill Mercantile has happily served Western Nevada County residents for the last 30 years.

In December 2017, owner Susan Amick decided to take advantage of PG&E's lighting upgrade incentive program and upgrade the store's lighting. Foothill Mercantile partnered with American Wholesale Lighting and Sierra Business Council (SBC) to participate in a PG&E's Direct Install Energy Efficiency Program. American Wholesale Lighting retrofitted 159 fixtures with T8 LED lamps while SBC processed the PG&E incentive. SBC estimates that mercantile will annually save 11,745 in annual kWh and roughly $2,800 on their energy bill. The total cost of the project before PG&E incentives was $5,872, and with an incentive of $2,923 covering around 50% of the cost, the final cost for the project was $2,949. Based off of the kWh savings, this project will pay for itself in roughly 1 year.

Susan notes that the process went fairly quickly and did not disrupt her business; this was especially important as the installation was done during the busy holiday season. The mercantile has the most cash flow during December, enabling them to pay direct up-front costs, so the timing was ideal for this kind of project. The incentive from PG&E was a motivating factor, and as a small business owner, Susan was able to work with a PG&E business representative to find out how to improve the business's energy efficiency.

Previously, the mercantile was fitted with fluorescent bulbs and ballasts that would only last a couple of years and it was difficult to change them so often due to the 18-foot high ceilings in the store. The time and cost of keeping up with the old lighting was a motivating factor for Susan to upgrade the store's lighting. This upgrade will last longer, will not need to be replaced as often, and save on the store's energy costs.

GOAL 2: **EXPAND THE USE OF LOCAL RENEWABLE ENERGY AND RESILIENCE MEASURES**

Target Audience
Residents
Businesses
Public Agencies

Projected Energy Savings
136,430,984 kWh of electricity
516,243 therms of natural gas

Benefits
Reduced Energy Costs
Increased Resiliency
Improved Air Quality

Local renewable-energy projects benefit the County's economy by creating jobs, educating a new and emerging workforce, and reducing energy costs. In Nevada County, there are unique opportunities for generating energy from renewable sources including wind, biomass, solar, and micro-hydro. Rooftops, parking lots, and under-utilized open spaces provide excellent opportunities for solar energy generation. In particular, non-residential and municipal facilities tend to have large, flat roofs that are well suited for solar equipment. For historic buildings, it is recommended to select solar for locations where it will have the minimal impact on the buildings' integrity and keep with the County's historic building guidelines. As solar technology advances, there will be more aesthetically pleasing solar options available for culturally significant historic buildings, and one example of this are solar roof shingles that mimic the appearance of traditional roofing.

Additionally, Nevada County is home to significant hydro resources and bountiful forests that must be maintained in order to reduce the risk of catastrophic wild fires. Sustainably managing forests can provide the County and community of Nevada County with significant biomass resources that can be used to generate electricity and used for heating. Finally small scale hydro and wind systems can be implemented locally without negatively impacting the environment.

STRATEGY 2.1: PREPARE FOR THE INCLUSION OF RENEWABLE ENERGY SYSTEMS IN NEW CONSTRUCTION AND LARGE RETROFIT PROJECTS IN ORDER TO MEET CALIFORNIA ZERO NET ENERGY GOALS BY PROVIDING INFORMATIONAL MATERIAL WHEN AVAILABLE.

California's Zero Net Energy (ZNE) goals as part of the California Building Energy Efficiency Standards are for new residential construction to be built to achieve ZNE standards by 2020 and new commercial construction by 2030. A ZNE building produces as much energy through clean, renewable resources as it consumes over the course of a year.[25] These buildings are high performing, highly efficient, more resilient to economic and climate changes, offer more comfortable homes with higher resale value, and more productive workspaces. Achieving ZNE in new construction will help property owners and renters save money on energy costs, foster technological innovation, and improve the workforce skillset in Nevada County and surrounding areas to meet these standards. The California Energy Commission's (CEC) Local PV Ordinance Cost Effectiveness Study determined that incorporating a solar PV system in all single family and multifamily new construction is currently feasible and cost effective in all climate zones in California.[26] The County should provide information from the CEC to developers of new construction projects on the feasibility and cost effectiveness of incorporating solar PV systems into the construction process.

STRATEGY 2.2: ENCOURAGE RENEWABLE ENERGY PROJECTS THROUGH EDUCATION, OUTREACH, AND LOCAL LEADERSHIP.

Since 2005, 2,115 residential and 102 non-residential solar PV systems have been installed in unincorporated Nevada County producing an estimated 23,543,975 kWh of electricity annually. The County has also taken steps to streamline the permitting process to reduce costs for installing solar PV systems as mandated by AB 2188. There is still significant opportunity for property owners and renters to benefit from local solar PV systems. The most common barriers to renewable energy include property ownership, site obstacles (i.e. shading and structural integrity), and financing. To address these barriers, the U.S. Department of Energy and State of California have launched initiatives to increase access to innovative financing mechanisms and ownership structures. The innovative financing mechanisms include the Residential Energy Efficiency Loan (REEL) Program which provides subsidized loans for energy efficiency projects and other home improvement projects and Property Assessed Clean Energy (PACE) programs which allow property owners to finance

[25] California ZNE Communications Toolkit. July 2013. Energy Upgrade California. Accessed August, 2018. http://newbuildings.org/sites/default/files/ZNE_MessagePlatform.pdf

[26] California Energy Commission, Local PV Ordinance Cost Effectiveness Study, https://efiling.energy.ca.gov/getdocument.aspx?tn=217290 - Accessed August, 2018.

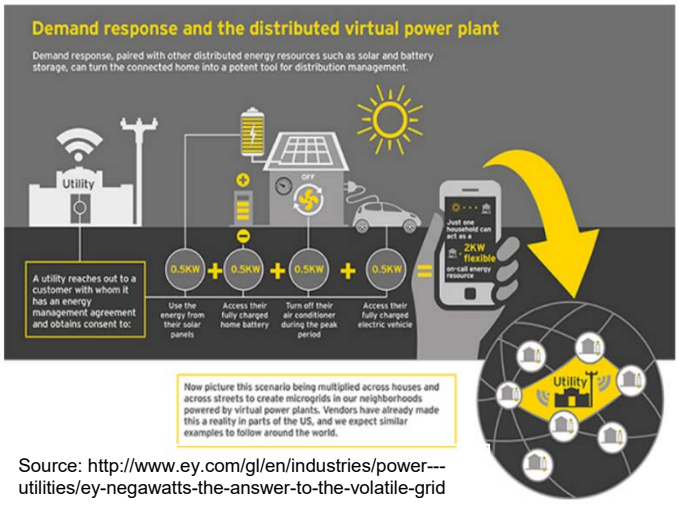
energy efficiency, water efficiency, and renewable energy upgrades through low interest loans that are paid back through an assessment on their property taxes. Additionally, installing solar PV systems do not trigger a reassessment of home value which could otherwise increase property taxes. Finally, collaborative solar procurement and community solar programs have the opportunity to reduce costs and increase access to solar for property owners with site obstacles or renters who cannot install systems at their home or business.

Outreach efforts should educate community members on the benefits of local renewable energy generation and emphasize the energy cost savings that can be realized. Community members can save additional money and improve the comfort of their homes and businesses by combining renewable energy systems with upgrades to high efficiency electric hot water heaters, heat pump air conditioning and heating systems, and electric vehicles. The program should also make information and resources available to community members through the County's website and at County Administrative Center on evaluating renewable energy systems and financing programs. It should also provide information on community solar programs that renters and property owners with site obstacles can utilize in order to benefit from the local renewable energy resources that are available. For instance, through community solar initiatives renters and property owners can opt into a local community solar array and realize the benefits of solar on their electricity bill without having to install solar on their home or business.

The County should encourage other public agencies in the community to show leadership by continuing to expand solar installation at public facilities to offset their electricity use or by providing sites for community solar projects. Public agencies in Nevada County could benefit from local solar projects that would have guaranteed electricity costs for up to 30 years, stimulate the local economy by contracting with local businesses, and serve as a reminder to community members of the benefits of local solar projects. The projects would also give the agencies more local control over their energy and allow for integration with battery storage to increase resiliency.

STRATEGY 2.3: ENCOURAGE ENERGY STORAGE AND GRID OPTIMIZATION INFRASTRUCTURE PROJECTS THAT SUPPORT LOCAL RENEWABLE ENERGY SYSTEMS AND COMMUNITY RESILIENCE.

As renewable energy has become more common, the value of electricity at different times of the day is changing. Peak demand is shifting to the early morning and late evening when solar systems are not producing as much electricity. Therefore demand response and energy storage systems have become more important in order to meet time varying energy needs at the lowest cost. Demand response and energy storage systems can shift demand to times of plentiful electricity or store electricity for times of high demand. Examples of demand response include pre-cooling homes earlier in the day or running high energy using appliances like dishwashers and dryers overnight. Energy storage systems can take the form of batteries that collect and store energy generated from a renewable energy system or a hot water heater that uses electricity from the grid to pre-heat water at times of lowest cost. The collected electricity can then be used at a time of higher electricity costs. California utilities are moving towards time varying pricing which will more accurately reflect the actual costs to provide electricity at different times of the day and year. Demand response and energy storage can help keep customer energy costs low when employed at hours of peak demand pricing, and also serve as a resource of energy reserves for utilities during times of peak demand when electricity is at its highest cost. Utilities, communities, and customers alike can save money by investing in energy storage systems.



Source: http://www.ey.com/gl/en/industries/power---utilities/ey-negawatts-the-answer-to-the-volatile-grid

Additionally energy systems, storage systems, and energy efficient appliances increasingly require high-speed internet/broadband access to communicate with utilities in real time. As such, it is necessary to have access to reliable high-speed internet to ensure that residents and businesses can take advantage of the latest technology and benefit from demand response programs. The County should encourage broadband infrastructure deployment through a Dig Once Policy which maximizes the opportunity for broadband infrastructure installation when there are open trenches for other new construction projects.

Case Study: Residential & Commercial Zero Net Energy buildings

Woolman House *ZNE House*

Home of Doug Hamm & Dorothy Henderson | Nevada City, CA 95959
www.atmospheredesignbuild.com/woolman-passive-house-1

"This is a commitment to our care about the earth. We believe in having a lesser footprint on the earth. When we discovered ZNE certification, we got excited about building a house to be certified as a model for people to learn that you can do this." – Dorothy Henderson- Mark Endicott, Manager

The Woolman House is a 3,040 sq ft single-family home that neighbors a Quaker education and retreat center near Nevada City, CA. The owners, Doug and Dorothy, who are Quakers, recently retired and embarked on building their dream home with the intent of embodying their values of peace, sustainability, and their care for the earth into the build and design on their new home. The house was built in 2017 using pre-certified passive house standards, and is on track to receive ZNE certification approval early 2019.

The Woolman House is a high energy performance building which reduces the need for indoor heating and cooling needs by 90%. The building achieves high energy efficiency with a continuous super insulated, air-tight building envelope complete with triple-paned windows and doors. The temperature, comfort, and air quality inside the home is attained passively through managed solar gain to exploit the sun's energy for heating in winter, and to minimize over-heating during the summer. Additional indoor temperature control is achieved through a balanced heat recovery ventilation system, a ductless indoor mini-split system, and a CO_2 heat pump water heater that supplies the homes hot water and radiant in-floor heat.

The roof mounted solar panels have been installed to offset the home's energy usage; all of the home's features and appliances are electric, including the induction stove and the electric vehicle charging station in the garage. The house is currently a net-positive energy building and will become Nevada County's first certified Passive and ZNE house.

Grass Valley Department of Motor Vehicles (DMV) *ZNE Field Office*

890 Sutton Way | Grass Valley, CA 95945 | *http://www.ldapartners.com/portfolio-content/2015/3/18/wine-roses-spa-axtj2-bypgj-9n9w4-hrcw3*

The DMV has Guiding Principles by which we set our compass, two of which are: Utilize energy efficient and sustainable building design and construction methods, and remain committed to environmentally friendly and energy and resource-efficient practices and policies.

The California DMV principles of environmentally-friendly energy and resource-efficient practices and policies are exemplified locally through the design and build of the new Grass Valley DMV office. The facility is an approximately 8,000 sq ft single story building designed and built to pursue zero net energy methodologies and meet LEED Silver standards. Since the office opened to the public in February, 2018, DMV has been working with PG&E's Interconnect Engineering Team to study a twelve month performance period before an auditor can review the building's ZNE status next year.

The building envelope and climate control systems maximize thermal storage and energy efficiency, creating a more consistent comfortable indoor temperature. Additional high efficiency design features include use of natural daylight with large windows, and energy efficient lighting and HVAC system. The facility was designed with a solar photovoltaic system in order to offset energy consumption. The PV system installed is a 75.6 kWdc/60 kWac system consisting of (252) 300W modules and (1) 60kWh inverter. The rooftop mounted solar panels currently generate the building's energy and provide enough electricity to offset the building's energy needs. The Grass Valley DMV office will be the department's second ZNE building - the first is located in Fresno - and is on its way to achieving ZNE status through the International Living Future Institute Certification process.

GOAL 3: **ENCOURAGE THE EFFICIENT AND SAFE TRANSPORTATION AND USE OF WATER RESOURCES**

Target Audience
Residents
Businesses
Public Agencies

Projected Energy Savings
2,409,909 kWh of electricity

Benefits
Reduced Energy Costs
Improved Drought Resiliency

Improving the efficiency of water systems and facility operations can save water agencies and utilities, residents, and businesses money and resources by reducing both the amount of energy needed to source, treat, and deliver water by improving the efficiency of operations as well as reduce the total amount of water required to be delivered through efficiency and conservation programs in the community. Finally, water agencies and utilities can reduce water losses through proactive leak detection programs. The State of California has a goal to reduce per capita water use, especially in drought years when water resources become scarce. In a typical California home the major indoor water users are toilets (33%), showers (22%), faucets (18%), washing machines (14%), leaks (12%) and dishwashers rank last (1%).[27] Given that indoor water is delivered to a small number of readily identifiable appliances, it is easy to target those with the greatest water efficiency potential and mitigate leaks. There is a significant amount of energy used in sourcing, treating, and delivering water to community members, and the County should improve the efficiency of their processes where possible and encourage Nevada Irrigation District (NID) to as well. Water efficiency measures taken at any point along the sourcing, treatment, delivery, and use of water will help alleviate this energy burden. Moreover, diversifying and streamlining our water sources and treatment systems can create more reliable water supply while utilizing fewer resources.

STRATEGY 3.1: IMPROVE AND INCREASE THE COUNTY'S OUTREACH AND EDUCATION EFFORTS IN COLLABORATION WITH NEVADA IRRIGATION DISTRICT AND OTHER WATER AGENCIES BY PROVIDING INFORMATION ON EXISTING AND FUTURE WATER EFFICIENCY AND CONSERVATION PROGRAMS.

Reducing water use by fixing leaks and improving the efficiency of appliances, showers, and faucets can help the community and County reduce costs for water and sewer service and increase community resiliency in future drought years. Water efficiency education can be effectively communicated by providing information on the County's website, at County Administrative Center, and through the County's ability to lead by example. To do this, the County should benchmark their facilities' current water use, both indoor and outdoor, to identity how much water is used by the County and the cost to the County for water and sewer service. After baseline use has been determined, the County should identify actions to reduce water use to meet the state's 25% water use reduction goal.

Based on the 2013 California Water Plan Update, use of more water efficient toilets, showers, faucets, and washing machines in addition to leak detection could reduce water usage by 15 gallons per capita per day (GPCD), a 25% reduction from typical daily residential water usage of 62 GPCD. The County should provide information and resources that County water users can employ to save water and money, including the programs NID provides to increase water conservation. Strategies to highlight include toilet and shower head rebates, water conservation information, and free advice from Master Gardeners in Nevada County.[28,29]

Additional water can be saved outdoors through improved irrigation, rain sensors, and the use of native landscaping that does not require irrigation. The County has adopted a water efficient landscape ordinance as part of this strategy, and should continue to provide relevant information to residents and businesses, as well as review new development landscaping plans for compliance with the water efficient landscape ordinance.

[27] California Water Plan Update, Volume 3, Chapter 3. Urban Water Use Efficiency. 2013. https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/California-Water-Plan/Water-Plan-Updates/Files/Update-2013/Water-Plan-Update-2013-Volume-3.pdf

[28] Nevada Irrigation District, Water Conservation Programs. https://nidwater.com/conservation/water-efficiency/ - Accessed September, 2018.

[29] Nevada County Master Gardeners. http://ncmg.ucanr.org/ - Accessed September, 2018.

STRATEGY 3.2: COORDINATE WITH NEVADA IRRIGATION DISTRICT AND OTHER WATER AGENCIES TO PARTICIPATE IN PROACTIVE LEAK DETECTION PROGRAMS IN ORDER TO REDUCE WATER LOSSES.

Old and aging water infrastructure often results in high water losses through leaks, inaccurate meters, and water theft. Studies have estimated that these leaky and outdated systems waste an estimated 14 to 18 percent (5.9 billion gallons) of daily water use in the United States.[30] A survey of California water agencies found water losses in California to range from 5% to 30%.[31] When systems are leaky, they also need more pressure to move water along the pipeline and into homes and businesses. Higher water pressure requires significantly more energy and equally heavy costs. By addressing leaks proactively with a leak detection program, the County in coordination with NID, can ensure that the community is receiving water efficiently, reduce the extra costs associated with treating and pumping the lost water, and identify customer side leaks or faulty meters. Typically water losses of greater than 5% can cost effectively be reduced through a proactive leak detection program.

In order to understand the scale of water losses, the County should encourage NID and other water agencies to complete water audits of their systems. The American Water Works Association (AWWA) and the International Water Association (IWA) co-developed a new standard method for conducting water audits. The AWWA/IWA water audit method is effective because it features sound, consistent definitions for the major forms of water consumption and water loss encountered in drinking water utilities. It also features a set of rational performance indicators that evaluate utilities on system-specific attributes, such as the average pressure in the distribution system and the total length of water mains.

The AWWA/IWA water audit method is detailed in the AWWA's manual Water Audits and Loss Control Programs. The AWWA also offers free software for this auditing method that assists in tracking water consumption and losses and calculates the costs of losses, giving agencies important information for assessing the cost-effectiveness of leak reduction measures.[32]

STRATEGY 3.3: CONTINUE TO IMPROVE THE EFFICIENCY OF COUNTY WASTEWATER TREATMENT OPERATIONS AND ENCOURAGE AND COLLABORATE WITH NEVADA IRRIGATION DISTRICT AND OTHER WATER AGENCIES TO IMPROVE THE EFFICIENCY OF AGENCY WATER OPERATIONS.

Water and wastewater treatment plants are high energy-consuming facilities, and as a necessary public service constitute some of the largest contributors to the community's total energy use. The economic and environmental costs of these operations can be reduced by improving energy efficiency of the facilities, promoting efficient water use in the community, and by capturing the energy from wastewater to generate electricity for the facilities' operations. Water and wastewater facilities can improve operational efficiencies through 3 main channels: increasing treatment and distribution equipment energy efficiency, reducing demand for water, and producing electricity through wastewater operations energy capture.

As technology in water sourcing and water treatment equipment is becoming more efficient, water agencies should look into potential funding for retrofits of old, inefficient equipment. Improving the efficiency of high energy consuming equipment at the water and wastewater facilities can decrease the amount of energy required to source, treat, and deliver water as well as the energy required to collect, treat, and dispose of wastewater. Improving the agency's water use efficiency can be done by implementing automatic meter reading at water end uses to increase water efficiency monitoring, and by reusing treated wastewater in appropriate applications to avoid energy use associated with traditional water treatment and distribution practices. Wastewater facilities can produce some or all of their own electricity and space heating by capturing and burning the biogas produced in the wastewater treatment anaerobic digester process, effectively creating a closed-loop energy system.[33]

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[30] "The Case for Fixing Leaks." November 2013. The Center for Neighborhood Technology. Accessed August, 2018. http://www.cnt.org/sites/default/files/publications/CNT_CaseforFixingtheLeaks.pdf

[31] California Department of Water Resources, Leak Detection Resources. https://water.ca.gov/Programs/Water-Use-And-Efficiency

[32] Resources & Tools. American Water Works Association. Accessed August, 2018. http://www.awwa.org/resources-tools.aspx

[33] Energy Efficiency in Water and Wastewater Facilities. U.S. EPA. Accessed August 2018. https://www.epa.gov/sites/production/files/2015-08/documents/wastewater-guide.pdf

Case Study – LEED Certified Building

Briar Patch Co-op

Local Sustainable Food and Grocery Store

290 Sierra College Drive | Nevada County, CA 95945

(530) 272-5333 | www.briarpatch.coop

"The key thing about it, the fundamental thing is -- we are a cooperative. It's not owned by foreign shareholders. It's actually owned by our community. They point the direction of the co-op and speak to sustainability as the key experience they want to get out of their shopping. It has allowed us to make that our focus, instead of creating money for shareholders."

- Chris Maher, Manager

Briar Patch is a community food cooperative committed to providing quality local, sustainable and organic food and groceries. They have been operating for over 40 years (1976) and have since expanded their store five times while remaining a valued community business.

In 2007, Briar Patch moved their business into a LEED Certified building in Nevada County. At the time of construction, the building was the first commercial LEED Certified building in Nevada County and used 25% less energy than contemporary 2007 buildings.

In 2016, Briar Patch built an additional parking lot to accommodate a growing customer base, and integrated a solar array as a shade structure for the lot. The solar array supports 700 panels and the energy generated directly supplies the store. According to manager Chris Maher, the solar electricity generated by the panels offsets 65-75% of the store's annual electricity demands, generating over 2,000 kilowatts per day. All labor was contracted locally in the construction of the solar array, and at the time of completion it was the biggest solar array in the area.

In 2017, Briar Patch participated in the Take Charge Tour in May where curious visitors and community members stopped at various establishments--both homes and businesses--that have been built or renovated to meet optimal environmental sustainability standards. In 2017 Briar Patch also replaced all overhead exterior watering with drip irrigation, which will save 250,000 gallons of water annually. They self-financed the upgrade of the last 3 remaining inefficient refrigeration pieces to energy-efficient units and installed additional LED lighting and computerized refrigeration systems. They have also partnered with Energy Smart Grocer to monitor the effectiveness of their recent upgrades, and participate in Co+Efficient, a program of the National Co+Operative Grocers, which helps food co-ops measure and manage their sustainability impacts.

Notable sustainability measures built into construction include:

Lighting: *Natural outside light reduces inside lighting needs. Nearly all lights in the store are upgraded to efficient LEDs. Timers and motion sensors turn on lights only when needed, mitigating energy waste.*

Sustainable Flooring: *Flooring consists of durable, sustainable fly ash concrete and recycled laminate wood and carpet.*

Heating and Cooling: *The HVAC system recaptures heat from the refrigeration units for store heating and draws 30% fresh air from outside. A combination of water and air is used to cool refrigeration pipes, which reduces the amount of County water needed to cool the system. All hot water is efficiently heated on-demand.*

CHAPTER 4: IMPLEMENTATION PLAN

Chapter 4 outlines specific actions that can be taken to implement the strategies detailed in Chapter 3 and achieve the three EAP goals.

The implementation plan breaks the strategies into achievable steps and discrete actions, identifies if actions are specific to municipal agencies or the community at large, and lays out a timeline for completion of each action. The timeline for achievement of the actions outlined here is broken down into three years based on the priority and efficacy of the actions. Completion of actions should be tracked annually and the plan should be reevaluated for effectiveness at the end of the 3 year timeline. Through the Institute for Local Government's Beacon Program, SBC can assist the County to track actions on an annual basis and evaluate their effectiveness. Finally, the implementation plan summarizes best practices in the energy action plan implementation field to provide context and additional guidance in achieving the goals of the EAP.

This chapter should be used to guide the actions that the County and community can take, when to take them, and how to take them, acknowledging any limitations related to capacity, availability of programs and assistance. Additionally, the most effective plans include guidance and measures for tracking progress. To best evaluate progress and effectiveness, it is recommended that the County periodically (at least every five years):

1. Track progress in all goal areas on actions taken
2. Re-evaluate overall community energy usage
3. Re-assess relevancy of goals

More information on how to track progress is included in the best practices section.

Finally, many national, state, and local organizations and programs offer tools and resources for becoming more energy and water resilient. Many of the programs available to Nevada County and other agencies are listed in detail in Appendices D-F. Partnership, training, networking, and funding opportunities may exist through many of these entities; the County should look into the available options to evaluate which resources would be most appropriate. To successfully improve energy and water efficiency in Nevada County, regional organizations, public agencies, and community members will need to work together to promote participation in existing local, state and federal programs.

IMPLEMENTATION TIMELINE

The Implementation Timeline identifies specific actions and steps the County and the Working Group can take to help the community achieve the 2035 goals. The timeline table prioritizes the actions by year based on staff resources, potential funding availability, and partner organizations' capacities. The timeline serves as a guidepost for County staff and Working Group members to initiate actions to implement the EAP and track progress. Rather than identifying week-by-week or month-by-month deadlines, the timeline merely identifies the actions that are best taken throughout each year to provide flexibility.

The implementation actions in the following table also address suggestions brought forth by community members during the public input process, including feedback collected during the study session and from the online survey. These include actions that promote lowering energy bills, incentives for solar procurement, and opportunities for increased water efficiency.

As previously indicated, it is optimal while implementing the goals and strategies outlined in this plan to follow the best practice recommended by the State of California, which is reduce the total amount of energy used through efficiency and conservation before switching to renewable energy sources to meet demand. As such, energy efficiency and educational measures are prioritized during the first year, and water efficiency and renewable energy measures are prioritized during the second and third year. It should also be emphasized that if switching energy systems (i.e. from gas to electric), it is optimal to complete the fuel switching before buying new equipment – this way, all new systems are optimized for that fuel system. Following this priority ensures the most effective and affordable use of funding and resources.

Table 4-1 below is broken into two sections to highlight actions recommended for the County and for the Working Group to take over the 3 year timeline.

Table 4-1: EAP Implementation Timeline

County Actions	
2019	☐ Promote existing energy-efficiency, water-efficiency, and renewable-energy programs and best practices by providing information when available at County offices and on the County website. (1.1, 3.1, 2.2) ☐ Develop or implement an existing public recognition system for businesses that audit and retrofit their facilities and business practices. (1.1) ☐ Join the Institute for Local Government's Beacon Program in order to receive assistance in tracking community and municipal energy use and learn more about best practices. (1.1, 1.3) ☐ Provide information regarding no-cost Title 24, Part 6 trainings for plans examiners, building inspectors, architects, designers, and contractors at County offices and on the County website. (1.2) ☐ Continue to conduct building audits to benchmark energy and water use in County facilities, and identify cost-effective retrofit projects. (1.3, 3.1)
2020	☐ Provide available information on incentives, resources, trainings, and funding opportunities for achieving Title 24 ZNE goals. Encourage new construction and renovation projects to participate in Energy Efficiency and Zero Net Energy design programs. (1.2) ☐ Provide heat gain mitigation information when available for streets and parking lots (i.e. light-colored building and paving materials, landscaping, green roofs, shade trees, and other green infrastructure). (1.1) ☐ Retro-commission facilities to maximize energy performance and complete cost-effective retrofit projects. (1.3) ☐ Provide information when it becomes available on the benefits of incorporating renewable energy and energy storage systems into retrofit projects and into new construction. (2.1, 2.2, 2.3) ☐ Encourage completion of Leak Loss detection by Nevada Irrigation District and other water agencies. (3.2)
2021+	☐ Upgrade wastewater treatment facilities and pumps to improve their efficiency (3.3). ☐ Consider adopting purchasing guidelines and energy-efficiency analysis requirements in RFPs. (1.3) ☐ Continue expanding on-site renewable energy at feasible County facilities and sites. Further renewable energy procurement efforts by evaluating additional sites for renewable energy on County facilities and property. (2.2) ☐ Encourage and participate in bulk purchasing of renewable energy systems and energy storage systems to support grid reliability and community resilience. (2.3) ☐ Encourage broadband infrastructure in new development proposals to ensure optimal connectivity for IT controls and networks of operating systems. (2.3)

Working Group Actions	
2019	☐ Promote existing energy-efficiency, water-efficiency & renewable-energy programs and best practices through outreach events in the community. (All Strategies) ☐ Assist Nevada County schools in offering an educational energy event, curriculum, or workforce training. (1.1) ☐ Assist Project Go with specific outreach targeting low income and older homes for upgrades. (1.1) ☐ Encourage tenants & landlords to incorporate elements of energy efficiency in lease agreements. (1.1) ☐ Promote no-cost Title 24 trainings and resources available trainings for plan examiners, building inspectors, architects, designers, and contractors. (1.2) ☐ Partner with realtors to encourage homeowners and commercial property owners to audit and retrofit their homes and commercial buildings to increase selling prices, comfort, and energy performance. (1.1) ☐ Encourage hotels and tourist organizations to educate visitors about water & energy efficiency. (1.1, 3.1) ☐ Promote Leak Loss detection trainings for Nevada Irrigation District and other water agency staff. (3.2)
2020	☐ Encourage property owners to collaborate with renters on community renewable energy projects. (2.2) ☐ Encourage property owners to consider projects that utilize renewable energy and incorporate energy storage. (2.2) ☐ Assist Nevada County schools and Nevada Irrigation District to coordinate a water wise student education program. (3.1) ☐ Coordinate with Nevada Irrigation District and other water agencies to develop and promote programs to reduce water waste and increase water use efficiency. (3.1)
2021+	☐ Partner with local organizations, other jurisdictions, and businesses to coordinate energy audits and bulk purchasing of energy efficient equipment and appliances. (1.3) ☐ Encourage businesses to participate in PG&E's Demand Response Program to reduce energy use during peak demand. (2.3) ☐ Work with internet service providers to support and expand broadband infrastructure projects. (2.3) ☐ Promote energy audits of potable water and wastewater systems. (3.3) ☐ Coordinate with Nevada Irrigation District and other water agencies to implement cost-effective energy-efficiency water systems projects. (3.3)

IMPLEMENTATION BEST PRACTICES

The most successful strategies and actions incorporate elements of the following best practices: regular emissions inventories, public outreach, alignment with current industry standards, preparation for future industry changes, green infrastructure and smart growth community design, prioritization of low-cost and high-impact measures, cross-sectoral and interjurisdictional partnership, and adoption and/or promotion of creative financing programs.

TRACK ENERGY ACTION PLAN PROGRESS

Successfully implementing an effective energy action plan is best paired with regular emissions inventories to track the overall effectiveness of the plan. Community-wide emissions inventories provide the best indication of the progress of the plan, although it will be important to reconcile actual growth in the County versus the growth projected in the forecasts developed for the EAP. Conducting these inventories periodically, instead of annually, will allow direct comparison to the 2005 baseline while lessening the impact on staff resources. It is recommended that inventories are completed at least every 5 years in order to monitor the effect of the EAP and adapt the strategies and actions to reach the identified goals.

The County could track progress through participation in the Institute for Local Government's Beacon Program. The Beacon Program provides a framework for local governments to share best practices and honors voluntary efforts by local governments to reduce GHG emissions, save energy, and adopt policies that promote sustainability. Program participants receive help to collect and organize data to advance the participant's achievements in the program, including technical assistance, networking and education, and recognition for achieving GHG emissions reductions and energy savings.

Throughout this process, it will be important to understand the effectiveness of each strategy in order to prioritize future actions. Evaluating strategy performance will require data on community participation rates and the associated energy savings. With the support from PG&E and resources such as the Beacon Program, the County should coordinate strategy evaluation on the same schedule as the community-wide inventories and summarize progress towards meeting the identified performance targets. For the EAP to remain relevant, the County should be prepared to evaluate and revise the actions and approach to strategies over time. It is likely that new information, technology and programs will emerge; therefore, the County must be ready to take advantage of these opportunities.

PUBLIC OUTREACH

The greatest barriers to energy efficiency upgrades are lack of information about efficiency practices and scarcity of low-interest financing to offset initial costs. A key to fully engaging with and reaching out to the public about the energy savings estimated in this plan is by convening a Working Group that focuses on guiding outreach and implementing the plan. This working group can be made up of representatives of the County, residents, business owners, and other interested community members. The Working Group can promote existing energy efficiency programs, and collaborate on activities such as hosting an energy fair event, or creating new outreach campaigns that encourage people to make energy-efficiency improvements within their living and work environments. The Working Group can also benefit from coordination assistance of the Local Government Commission's CivicSpark AmeriCorps fellow currently working with Grass Valley.

The CivicSpark fellow can provide support to the County with public outreach, Working Group facilitation, and preparation of materials and resources for presentation at the County's website and offices. The County website should include information and resources on energy efficiency best practices, links to current rebate, finance and incentive programs, and case studies of cost-effective energy efficiency improvements. The County website should also house information developed by the Working Group to mark implementation progress of the plan and keep the community engaged and aware.

The County should also link to resources and tools available for making informed decisions on renewable energy, financing options, and the permitting process. PG&E offers customers an opportunity to participate in a Community Solar program in which they can utilize renewable energy if they lack the capacity to support renewable infrastructure. The Working Group should work with utilities, community organizations and local banks to expand and promote available renewable energy financing programs – many of which can be found on California's Go Green Financing website. Additionally, there are new

financing mechanisms such as power purchase agreements, solar leases, and Property Assessed Clean Energy (PACE) financing options available where property owners can receive the benefits of solar power with little to no upfront costs. The federal renewable energy tax credit provides homeowners and commercial property owners with a tax credit for 30% of qualified expenditures through 2019 and then stepping down to 26% in 2020, 22% in 2021, and 10% after 2022.

Finally, the County should continue to lead by example and encourage the community by exemplifying best practices in energy efficiency, renewable energy, and water efficiency in all of its operations and buildings. For example, the County can continue to install solar arrays on or over parking lots, invest in energy efficient appliances, and maintain water-efficient landscaping in areas managed by the County to serve as public demonstration areas. Additionally, demonstrations of rainwater catchment or greywater systems should be available to homeowners to promote local onsite water reuse.

Moreover, encouraging the community to reduce energy use during peak load periods can ensure that energy needs are met even in times of emergency, as in extreme heat conditions. Conservation tips for reducing peak load include: setting thermostats at 78° or higher and turning them off when away, cooling with fans and drawing drapes during hot summer days, turning off unnecessary lights and appliances, and using major appliances in the morning or late evening.

TITLE 24 PART 6 – BUILDING ENERGY EFFICIENCY STANDARDS

The 2016 update to the Title 24 Green Building (Part 11) and Energy Efficiency Standards (Part 6) help make new construction significantly more energy efficient. The 2016 Energy Efficiency Standards are expected to be 28% more efficient than previous standards for residential construction according to the California Energy Commission. The California Green Building Standards Code (CALGreen) includes mandatory and voluntary green building measures that make buildings healthier, more comfortable, and more energy- and water-efficient. Architects, designers, contractors, developers and building inspectors with a strong understanding of the standards can help projects achieve higher efficiencies.

The County should provide information from Energy Code Ace, which offers free tools, trainings, and resources on Title 24 to assist the building industry, stakeholders, and the public in complying with the 2016 Building Energy Efficiency Standards. The Working Group, along with support from the CivicSpark fellow, should partner with local contractor associations and related building industry groups to provide opportunities for the building workforce to attend Title 24 trainings.

HIGH PERFORMANCE & GREEN BUILDING EDUCATION AND RECOGNITION

In 2019, the California building code will be updated to require Zero Net Energy (ZNE) compliance in all new single-family residential construction after January 1st 2020 (the ultimate goal is for all new commercial construction to be ZNE by January 1st 2030). In order to assist the local building industry with compliance, it is essential that the County provide resources to contractors as the code updates occur. The County should provide information on their website and directly to contractors and developers at County offices on available incentives and education resources related to energy efficiency and green building. The County should look into the feasibility of providing recognition or awards for buildings that exceed the current Title 24 Energy Efficiency Standards or achieve green building certification, such as LEED Building Certifications.

Providing incentives for energy-efficient and green buildings, such as priority permit review or a recognition program, encourages developers to incorporate energy-efficient and green-building features into their projects, which can save property owners and tenants money over the life of the building, improve the health of tenants, and increase the building value. Reduced permitting time can be an effective incentive because it can mean significant savings for developers that are paying interest on construction loans during the permit approval process. According to the Appraisal Institute[34], green building certifications for developers who pursue green building standards significantly increase the value of buildings through improved rental income, higher occupancy, lower operating costs, and lower risks. Recognition by the County can be an effective incentive for developers to pursue green building certification or exceed the Energy Efficiency Standards.

[34] Green Building Resources. The Appraisal Institute. Accessed August, 2018. http://www.appraisalinstitute.org/education/education-resources/green-building-resources/

ZERO NET ENERGY

To make compliance with the above discussed changes in California's building and energy code easier, the County and Working Group should incorporate zero net energy (ZNE) incentives and resources into the local design and building networks outreach. ZNE buildings are achieved by first developing an integrated design approach which considers systems and incorporates multiple strategies to decrease energy use and increase comfort, such as a well-insulated building shell. Highly energy-efficient technologies including HVAC, lighting and controls equipment should then be applied along with metering equipment. The building should then be optimized for the way it will be used and operated. Finally, renewable energy generation systems should be installed to meet the remaining energy needs of the building.

To make the ZNE design process easier, more efficient, and more affordable, the County and Working Group should encourage ZNE through actions such as: (1) remove barriers that hinder ZNE development and streamline permitting; (2) partner with organizations that can provide ZNE resources, trainings and assistance for planning and building staff, designers, and building contractors; (3) evaluate strategies to expand renewable systems through American Solar Transformation Initiative (ASTI)[35] and other DOE programs; (4) evaluate the potential for residential and non-residential sectors of the County to incorporate renewable energy; (5) create an awards-based recognition for achieving ZNE; and finally (6) the County should encourage building electrification and ultra-low energy performance design protocols, such as the following steps promoted by the American Council for an Energy Efficient Economy (ACEEE) [36].

Table 4-2: Ultra-low energy performance in existing buildings: Design Steps and Sample Technologies

Design Step	Sample Technology Options
1. Reduce building energy loads with improved envelopes and the use of passive systems.	Superinsulation, daylighting, exterior shading, natural ventilation.
2. Install high-efficiency systems to address primary building energy loads.	Heating, ventilation, air-conditioning systems (including distribution), water heating, appliances/equipment, lighting.
3. Install systems to manage building energy loads with effective control strategies and other mechanisms.	Energy management systems, plug-load control strategies, feedback to users and occupants.
4. Incorporate energy recovery mechanisms to minimize energy losses.	Energy recovery ventilation, heat-pump water heaters.
5. Use renewables to meet remaining building loads.	Rooftop and other photovoltaic systems.
6. Monitor & manage post-occupancy building energy use.	Monitoring-based commissioning, occupant engagement.

GREEN INFRASTRUCTURE AND HEAT GAIN

Incorporating natural design elements into overall community design can have a large effect on energy use in surrounding buildings, especially in higher density areas. Trees, shade structures, and cool (high albedo) paving and roofing materials reduce the amount of solar energy absorbed as well as the temperature of rooftops and parking lots. By increasing the use of these materials it is possible to reduce heat gain in residential buildings and commercial centers during warm summer months. The decrease in ambient air temperatures and reduced heat gain in warm summer months can reduce the amount of energy required for air conditioning. It is also possible to optimize heat gain in the winter through smart landscaping, passive solar design, and other community design measures; these can offset heating costs and speed the melting of snow and ice on roadways, sidewalks, and parking lots.

The County can optimize these effects by providing information on the benefits of reducing cooling loads during summer months and optimizing heat gain in winter months. Examples include land use and new construction requirements, such as tree standards for existing streets and parking lots, heat gain mitigation requirements for new parking lots (through the use

[35] The nationwide ASTI program is a collaborative initiative to increase solar adoption by agencies and utilities throughout the nation by targeting market conditions. The program is part of the U.S. Department of Energy's Rooftop Solar Challenge and Sunshot Initiative.

[36] American Council for an Energy-Efficient Economy, Unlocking Ultra-Low Energy Performance in Existing Buildings. – Accessed September, 2018. http://eecoordinator.info/wp-content/uploads/2017/08/Unlocking-Ultra-Low-Energy-Performance-in-Existing-Buildings.pdf

of shade structures, trees or cool pavement, etc.), and cool roofing requirements for new construction. Large shade structures can also accommodate solar panels, thus serving a dual purpose and creating a co-benefit for the community.

CROSS-SECTORAL AND INTER-JURISDICTIONAL PARTNERSHIP

Often in rural areas, a huge barrier to implementation of energy strategies is large up-front capital investment and long travel distances for shipping and industry professionals. One way to mitigate these costs is to foster partnership opportunities with other public and private entities interested in similar energy projects. For instance, partnering with multiple organizations to schedule free energy audits from the local utility will make it much more feasible for the utility to send out an audit team. Moreover, bulk purchasing of solar panels, LED lights, and other high-cost energy efficient appliances and systems can cut costs by a large margin.

The Working Group can facilitate the partnerships between public agencies and special districts in Nevada County to reach the broader public that these agencies serve. For example, assisting the school district with the development of an energy efficiency education program, which can include educational presentations, hands-on learning activities, and energy fair events.

The Working Group should also partner with PG&E, the Sierra Nevada Energy Watch (SNEW), and RHA to target businesses and special districts to encourage energy-efficiency projects. The program outreach should target specific commercial sectors including restaurants, supermarkets, retail, office, and manufacturing. The information should provide useful energy and cost saving recommendations. The outreach program should encourage residents and businesses to conduct energy use benchmarking, perform building energy audits, and implement cost-effective, energy-efficiency projects.

FINANCING AND ALTERNATIVE FUNDING PROGRAMS

The up-front costs of energy-efficiency improvements can be a considerable barrier for many homeowners and businesses. However there are numerous options to address this challenge, including on-bill financing, low-interest loans, and Property Assessed Clean Energy (PACE) programs.

One example, on-bill financing, works in conjunction with a utility's energy-efficiency rebate and incentive programs to eliminate upfront costs. The cost of energy-efficiency retrofits is amortized on a property's monthly energy bills. The program helps eligible customers pay for energy efficient retrofit projects with zero-interest, zero-penalty loans. Loan payments are included on the customer's monthly utility bills and are set to not exceed the energy savings (in dollars) realized from the energy-efficiency retrofit.

PACE programs are financing tools that allow residential and non-residential property owners to receive financing for energy-efficiency, clean-energy and water-efficiency projects, which are repaid through a voluntary special assessment on property tax bills. There are several organizations in California that provide access to PACE financing programs at no cost to local governments. By opting into multiple programs, the County can help establish a competitive marketplace for PACE financing.

Other examples of creative funding and financing include crowdfunding, feed-in-tariffs, limited liability corporations (LLC's), on-bill financing, revolving loan funds, power purchase agreements, and virtual ownership. The County should partner with utilities, community organizations and local banks to identify and promote existing and potential funding and financing programs through email notices, mailers, public events, and the County's website. Additional funding and financing resources are highlighted in Appendix F.

THE PATH TO SUCCESS

Achieving the goals of the EAP will require collective action by the County, public agencies, residents and business owners. While there are significant costs associated with energy efficiency, renewable energy, and water efficiency projects, the long

term savings and co-benefits to the community greatly outweigh the costs. Additionally, upfront costs can be deferred through financing and incentive programs that can make projects cash flow positive from day one.

In order to complete the actions in the Implementation Plan, it is recommended that the County designate a community Working Group to complete the implementation actions designated for the Working Group. The Working Group should be comprised of representatives from the County, the business community, and residents.

The Local Government Commission's CivicSpark AmeriCorps program can provide assistance for implementation of the Energy Action Plan from a CivicSpark fellow. The City of Grass Valley has opted to take part in this program and will receive assistance from a CivicSpark fellow through August 2019. Nevada County is encouraged to work with the City of Grass Valley and the CivicSpark fellow to coordinate the working group, provide capacity for County staff to complete implementation actions, and connect the County with outside agencies and regional organizations to leverage existing activities to assist with implementation.

APPENDICES

APPENDIX A: NEVADA COUNTY 2005 BASELINE AND 2017 RE-INVENTORY ENERGY USE

Appendix A summarizes the 2005 baseline and 2017 re-inventory energy use data used in the development of the Energy Action Plan.

PG&E provided the majority of electricity used in unincorporated Nevada County in 2005 and 2017. The 2005 and 2017 aggregated electricity consumption data was provided by PG&E for all accounts within Nevada County. Independent energy service providers provided a small percentage as direct-access electricity. Direct-access electricity is energy supplied by a competitive energy service provider other than a utility, but uses a utility's transmission lines to distribute the energy. The 2005 and 2017 direct-access electricity consumed in County was estimated from county-level, direct-access electricity data provided by the California Energy Commission (CEC). Additionally, a small percentage of electricity is supplied by Liberty Utilities (formerly NV Energy) which was not included in this analysis because accurate data from 2005 was not available.

The 2005 and 2017 aggregated natural gas consumption data was provided by PG&E for all accounts within unincorporated Nevada County. Industrial natural gas use was excluded from PG&E non-residential total for 2014-2017 because the use did not meet the current privacy rules for aggregation. For 2017, the industrial natural gas use was estimated based on the difference between non-residential use in 2013 and the average of the use between 2014 and 2017.

Potable water and wastewater electricity use for 2005 and 2017 was estimated by scaling electricity use data provided by the County and NID for Nevada County wastewater and potable water facilities to the County based on population. The potable water and wastewater electricity use was subtracted from each utility's reported non-residential electricity use in order to provide additional context and develop potable water and wastewater electricity specific reduction strategies.

Table A-1: Nevada County Community-Wide Residential Energy Use

Energy Source	Electricity Use (kWh)		Data Source
	2005	2017	
Electricity Use - PG&E	280,242,926	281,439,840	Pacific Gas and Electric Company
Electricity Use - Direct Access	448,389	100,750	California Energy Commission
Total Electricity Use	280,691,315	281,540,590	
Energy Source	**Natural Gas Use (therms)**		**Data Source**
	2005	**2017**	
Total Natural Gas Use	2,578,107	2,399,588	Pacific Gas and Electric Company

Table A-2: Nevada County Community-Wide Non-Residential Energy Use

Energy Source	Electricity Use (kWh)		Data Source
	2005	2017	
Electricity Use - PG&E	61,658,241	53,393,272	Pacific Gas and Electric Company
Electricity Use - Direct Access	2,975,527	3,272,230	California Energy Commission
Total Electricity Use	64,633,768	56,665,502	
Energy Source	**Natural Gas Use (therms)**		**Data Source**
	2005	**2017**	
Total Natural Gas Use	855,767	544,044	Pacific Gas and Electric Company

Table A-3: Nevada County Community Wide Potable Water and Wastewater Operations Electricity Use

Energy Source	Electricity Use (kWh)		Data Source
	2005	2017	
NID Potable Water Operations	2,133,657	1,954,964	Nevada Irrigation District
Other Small Water Agencies	270,413	186,313	SBC Estimation
Total Potable Water Operations	2,404,070	2,141,278	
Nevada County Wastewater Operations	2,025,602	3,644,405	Nevada County
Other Small Wastewater Agencies	34,908	54,200	SBC Estimation
Total Wastewater Operations	2,060,510	3,698,605	
Total Electricity Consumption	4,464,580	5,839,883	

Table A-4: Nevada County Municipal-Operations Energy Use

Facility	Electricity Use (kWh)		Natural Gas Use (therms)		Data Source
	2005	2017	2005	2017	
Eric Rood Administrative Center	1,549,320	747,183	9,558	15,376	Pacific Gas and Electric Company
Nevada County Jail - Nevada City	955,872	625,428	81,080	47,143	Pacific Gas and Electric Company
Nevada County Juvenile Hall	356,800	191,180	11,587	9,798	Pacific Gas and Electric Company
Nevada Courthouse / Jail Annex	640,160	451,135	29,692	20,426	Pacific Gas and Electric Company
Truckee Buildings	410,800	355,200	8,873	12,116	Pacific Gas and Electric Company
Other Minor Facilities	1,176,313	1,130,631	56,526	20,640	Pacific Gas and Electric Company
Public Lighting	171,917	152,395	0	0	Pacific Gas and Electric Company
Total Municipal Facilities Energy Use	5,261,182	3,653,152	197,316	125,499	Includes PG&E Owned Street Lights
Nevada County Wastewater Operations	2,025,602	3,644,405	0	0	Pacific Gas and Electric Company

Table A-5: Nevada County Municipal-Operations Solar PV Electricity Generation and Use

Facility	Electricity Use (kWh)		Data Source
	2005	2017	
Eric Rood Administrative Center	0	424,969	SBC Estimation
Nevada County Jail - Nevada City	0	293,526	SBC Estimation
Nevada County Juvenile Hall	0	40,076	SBC Estimation
Total Solar Generation	0	758,571	SBC Estimation

APPENDIX B: NEVADA COUNTY BUSINESS-AS-USUAL (BAU) ENERGY USE FORECAST

Appendix B summarizes the 2035 business-as-usual energy use forecast used in the development of the Energy Action Plan to determine projected energy use if no measures are taken.

Business-as-usual (BAU) community-wide energy usage was forecast using the Statewide Energy Efficiency Collaborative ClearPath California forecasting tool. Municipal energy use is included in non-residential energy use, thus was not forecasted separately. Residential energy use was forecast using the California Department of Transportation (CALTrans Long-Term Socio-Economic Forecast of households for Nevada County.[37] Non-residential energy use was forecast using the estimated and projected 2005 to 2035 employment in Nevada County from the CALTrans Long-Term Socio-Economic Forecast.[38] Potable water and wastewater energy use were forecasted using a combination the residential and non-residential growth rates. Annualized growth rates for each time period were calculated using the standard formula below.

Annualized Growth Rate = (X / Y)^(1 / Z) – 1	
Where:	X = Forecast End Year Energy Use
	Y = Baseline Year Energy Use
	Z = Number of Years in the Forecast

Table B-1: BAU Residential Energy Use Forecast Growth Indicators and Annualized Growth Rates

Year	Occupied Households	Growth Indicator Source
2005	39,852	CALTrans Household Projections
2010	41,527	CALTrans Household Projections
2015	40,150	CALTrans Household Projections
2020	41,030	CALTrans Household Projections
2025	42,273	CALTrans Household Projections
2030	43,621	CALTrans Household Projections
2035	44,944	CALTrans Household Projections
Time Period	**Annualized Growth Rate**	
2005-2010	0.83%	CalTrans Household Projections
2010-2015	-0.67%	CALTrans Household Projections
2015-2020	0.43%	CALTrans Household Projections
2020-2025	0.60%	CALTrans Household Projections
2025-2030	0.63%	CALTrans Household Projections
2030-2035	0.60%	CALTrans Household Projections

[37] Caltrans Long-Term Socio-Economic Forecasts by County – Nevada County 2017. http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html, Households. (Accessed April 19, 2018).

[38] Caltrans Long-Term Socio-Economic Forecasts by County – Nevada County 2017, http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html In-County Total Employment, All Industries. (Accessed April 19, 2018).

Table B-2: BAU Non-Residential Energy Use Forecast Growth Indicators and Annualized Growth Rates

Year	Employment	Growth Indicator Source
2005	29,810	CALTrans Employment Projections
2010	28,270	CALTrans Employment Projections
2015	30,830	CALTrans Employment Projections
2020	32,664	CALTrans Employment Projections
2025	33,594	CALTrans Employment Projections
2030	34,603	CALTrans Employment Projections
2035	35,563	CALTrans Employment Projections
Time Period	**Annualized Growth Rate**	
2005-2010	-1.06%	CALTrans Employment Projections
2010-2015	1.75%	CALTrans Employment Projections
2015-2020	1.16%	CALTrans Employment Projections
2020-2025	0.56%	CALTrans Employment Projections
2025-2030	0.59%	CALTrans Employment Projections
2030-2035	0.55%	CALTrans Employment Projections

Table B-3: BAU Composite Energy Use Forecast Growth Indicators and Annualized Growth Rates

Year	Households and Business Establishments	Growth Indicator Source
2005	28,509	CALTrans Employment Projections
2010	29,247	CALTrans Employment Projections
2015	29,001	CALTrans Employment Projections
2020	29,495	CALTrans Employment Projections
2025	30,365	CALTrans Employment Projections
2030	31,314	CALTrans Employment Projections
2035	32,238	CALTrans Employment Projections
Time Period	**Annualized Growth Rate**	
2005-2010	0.51%	CALTrans Employment Projections
2010-2015	-0.17%	CALTrans Employment Projections
2015-2020	0.34%	CALTrans Employment Projections
2020-2025	0.58%	CALTrans Employment Projections
2025-2030	0.62%	CALTrans Employment Projections
2030-2035	0.58%	CALTrans Employment Projections

Table B-4: ClearPath California BAU Energy Use Forecast Annualized Growth Rates.

Growth Indicator	2005-2009	2010-2014	2015-2019	2020-2024	2025-2029	2030-2034	2035-2039
Occupied Households	0.008268	-0.003742	0.002122	0.005657	0.006237	0.006054	0.005139
Employment	-0.010552	0.011818	0.012797	0.006825	0.005873	0.005578	0.003989
Households and Business Establishments	0.005126	-0.000330	0.002371	0.005341	0.006106	0.005900	0.005217

Annualized growth rates for Nevada County occupied households, employment and combined households and business establishments are recalculated for the time periods required for forecasting in ClearPath California.

Table B-5: BAU Energy Use Forecast by Energy Source

Energy Source	2005 Energy Use	2035 Energy Use	2005-2035 Change
Residential Electricity Use (kWh)	280,691,315	316,285,003	35,593,688
Residential Natural Gas Use (therms)	2,578,107	2,905,030	326,923
Non-Residential Electricity Use (kWh)	64,633,768	76,992,489	12,358,721
Non-Residential Natural Gas Use (therms)	855,767	1,019,400	163,633
Wastewater Electricity Use (kWh)	2,060,510	2,328,764	268,254
Potable Water Electricity Use (kWh)	2,404,070	2,716,989	312,919

APPENDIX C: POTENTIAL ENERGY REDUCTION CALCULATIONS

Appendix C shows the calculations for potential energy reductions resulting from implementation of each quantifiable EAP strategy. For each strategy, calculation inputs are highlighted in green and results are highlighted in blue.

Table C-1.1: Expand outreach and education on existing energy efficiency practices, programs, and financing options for residential and non-residential utility customers

Strategy 1.1: Expand outreach and education on existing energy efficiency practices, programs, and financing options for residential and non-residential utility customers		
Target: 50% of Existing Households and Businesses Reduce Energy Use 30% by 2035		
Baseline Year	2005	
Target Year	2035	
Baseline Annual Residential Energy Use	280,691,315	kWh - Electricity
	2,578,107	Therms - Natural Gas
Baseline Annual Non-Residential Energy Use (excludes municipal energy use)	59,372,586	kWh - Electricity
	658,451	Therms - Natural Gas
Baseline Number of Households	26,735	Housing Units
Target Percent of Households and Businesses Participating	50%	of existing homes and businesses
Target Percent Energy Reduction From Baseline Year	30%	of energy use
2035 Participating Households = Baseline Households x Percent Participating =	13,368	Housing Units
2035 Residential Electricity Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	42,103,697	kWh - Electricity
2035 Residential Natural Gas Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	386,716	Therms - Natural Gas
2035 Non-Residential Electricity Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	8,905,888	kWh - Electricity
2035 Non-Residential Natural Gas Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	98,768	Therms - Natural Gas

Table C-1.2: Improve the compliance with current California Building Energy Efficiency Standards (Title 24, Part 6) by providing information materials when available.

Strategy 1.2: Improve compliance with current California Building Energy Efficiency Standards (Title 24, Part 6) by providing informational materials when available.		
Target: 100% of New Construction meets Title 24 Green Building and Energy Efficiency Standards		
Baseline Year	2005	
Target Year	2035	
Residential		
Forecasted Energy Use Increase Without Title-24 Compliance	Electricity (kWh)	Natural Gas (therms)
2005-2016	5,221,308	47,953
2017-2019	1,823,925	16,760
2020-2035	28,548,455	262,210
Non-Residential		
Forecasted Energy Use Increase Without Title-24 Compliance	Electricity (kWh)	Natural Gas (therms)
2005-2016	2,755,060	36,483
2017-2019	2,620,299	34,690
2020-2022	1,443,318	19,110
2022-2024	1,404,056	18,590
2025-2027		
2028-2030	1,291,251	17,090
2031-2035	1,269,862	16,820
2005 Housing Stock (DOF)	98.67%	Single Family
	1.33%	Multi-Family
2010 Percent of Residential Energy Use Associated with Space Heating, Cooling, Indoor Lighting and Water Heating (2010 CEC)	Electricity	Natural Gas
	32%	86%
2013 Title 24 Energy Savings Associated with Space Heating, Cooling, Indoor Lighting and Water Heating (2013 CEC)	Electricity	Natural Gas
Single Family (SF)	36.4%	6.5%
Multi-Family (MF)	23.3%	3.8%
Non-Residential (Non-Res)	21.8%	16.8%
Residential	Electricity (kWh)	Natural Gas (therms)
2035 Residential Energy Savings from 2013 Title 24	605,277	2,666
2035 Residential Energy Savings from 2016 Title 24	274,869	1,211
2035 Residential Energy Savings from 2019 Title 24	5,592,991	24,635
Non-Residential	Electricity (kWh)	Natural Gas (therms)
2035 Non-Residential Energy Savings from 2013 Title 24	600,603	6,129
2035 Non-Residential Energy Savings from 2016 Title 24	656,909	6,702
2035 Non-Residential Energy Savings from 2019 Title 24	416,116	4,246
2035 Non-Residential Energy Savings from 2022 Title 24	465,516	4,750
2035 Non-Residential Energy Savings from 2025 Title 24	492,333	5,022
2035 Non-Residential Energy Savings from 2028 Title 24	556,804	5,684
2035 Non-Residential Energy Savings from 2031 Title 24	794,126	8,102

Table C-1.3: Improve the energy efficiency of County buildings, facilities, and operations

Strategy 1.3: Improve the energy efficiency of County buildings, facilities, and operations		
Target: Reduce Energy Use in County Buildings and Public Lighting by 50% by 2035		
Baseline Year	2005	
Target Year	2035	
Baseline Annual Municipal Buildings Energy Use	5,089,265	kWh - Electricity
	197,316	Therms - Natural Gas
2035 Target Municipal Buildings Percent Energy Reduction	50%	of energy use
Baseline Annual Public Lighting Energy Use	171,917	kWh - Electricity
2035 Target Public Lighting Percent Energy Reduction	50%	of energy use
2035 Electricity Savings = Baseline Energy Use x Percent Reduction =	2,544,633	kWh - Electricity
2035 Natural Gas Savings = Baseline Energy Use x Percent Reduction =	98,658	Therms - Natural Gas
2035 Public Lighting Savings = Baseline Energy Use x Percent Reduction =	85,959	kWh - Electricity

Table C-2.1: Prepare for inclusion of renewable energy systems in new construction and large retrofit projects to meet California Zero Net Energy Goals by providing informational materials when available.

Strategy 2.1: Prepare for inclusion of renewable energy systems in new construction and large retrofit projects to meet California Zero Net Energy Goals by providing informational materials when available.		
Target: 100% of New Developments Meet Required Zero-Net-Energy Standards by 2035		
Baseline Year	2005	
Target Year	2035	
Residential	Electricity (kWh)	Natural Gas (therms)
Forecasted Energy Use Increase after meeting Title 24	22,955,464	237,575
Non-Residential	Electricity (kWh)	Natural Gas (therms)
Forecasted Energy Use Increase after meeting Title 24	1,013,551	16,393
2035 Target Percent Participation of new construction after Zero Net Energy standard implementation	100%	Residential
	100%	Non-Residential
Residential	Electricity (kWh)	Natural Gas (therms)
2035 Energy Savings Meeting Zero Net Energy Goals: = Forecasted Energy Use after meeting Title 24 x Percent Participation =	22,955,464	237,575
Non-Residential	Electricity (kWh)	Natural Gas (therms)
2035 Energy Savings Meeting Zero Net Energy Goals: = Forecasted Energy Use after meeting Title 24 x Percent Participation =	1,013,551	16,393

Table C-2.2: Encourage renewable energy projects through education, outreach, and local leadership

Strategy 2.2: Encourage renewable energy projects through education, outreach, and local leadership		
Target: 29% of Existing Households and 17% Businesses Install Solar PV by 2035, 15% of Households and 5% of Businesses Install other form of renewable energy		
Baseline Year	2005	
Target Year	2035	
2035 Target Potential Installations	26,735	Residential Households (2005)
	1,774	Non-Residential Establishments (2005)
Number Solar Systems Installed 2005 - 2017	2,115	Residential
	102	Non-Residential
Total kW of Solar Installed 2005 - 2017	12,904	kW - Residential
	2,998	kW - Non-Residential
Target Participating Solar Installations per Year (2 x the 2005-2017 Residential Average, 2 x 2005-2017 Non - Residential Average)	325	Residential Households per Year
	12	Non-Residential Installations per Year
2035 Number of Solar Participants = Target Participation Installations per Year x 17 years + Number of Existing Installations 2005-2017 =	7,640	Residential Participants
	306	Non-Residential Participants
2035 kW Solar Installed = Number of Participants x Total Size of Existing Installations / Number of Existing Installations =	46,620	kW - Residential Installed
	8,966	kW - Non-Residential Installed
2035 Solar-Produced Electricity Calculated using PVWatts Calculator[39]	66,991,101	kWh - Residential Electricity Produced
	14,958,432	kWh - Non-Res Electricity Produced
2035 Wind-Produced Electricity = 4,010 Residential and 89 Non-Residential Participants x 7,444 kWh Estimated Average Annual Power Output of 90' Rotor Hub Calculated using Open EI[40] =	29,852,301	kWh - Residential Electricity
	660,134	kWh - Non-Res Electricity
2035 Natural Gas Offset by geothermal heating = 2,005 Participants x Baseline Average Natural Gas Use x 0.625 average energy savings offset =	120,849	therms - Residential Natural Gas
	10,288	therms - Non-Res Natural Gas
2035 Natural Gas Offset by solar water heating = 2,005 Participants x Baseline Average Natural Gas Use x 0.625 average energy savings offset[41] =	120,849	therms - Residential Natural Gas
	10,288	therms - Non-Res Natural Gas

[39] PV Watts. National Renewable Energy Laboratory. – Accessed September 22, 2017. http://pvwatts.nrel.gov/

[40] Open EI. – Accessed September 22, 2017. http://en.openei.org/wiki/Small_Wind_Guidebook/How_Much_Energy_Will_My_System_Generate

[41] U.S. EPA. – Accessed September 22, 2017. https://energy.gov/energysaver/solar-water-heaters

Table C-3.1: Improve and increase the County's outreach and education efforts in collaboration with Nevada Irrigation District by providing information on existing and future programs.

Strategy 3.1: Improve and increase the County's outreach and education efforts in collaboration with Nevada Irrigation District by providing information on existing and future programs.		
Target: 100% of Households and Businesses Reduce Indoor Water Use by 50% by 2035		
Baseline Year	2005	
Target Year	2035	
Baseline Year Population served by Water Systems	39,305	People
2035 Estimated Population served by Water Systems	44,446	People
2005 Average Gallons Per Capita Per Day (GPCD)	214	Gallons / Capita / Day
Percent of Urban Water Demand (2013 CA WPU[42])	31%	Residential Indoor
	44%	Landscape Irrigation
	20%	Non-Residential Indoor
	5%	Water Losses
2035 Target Percent Reduction in Indoor and Outdoor Water Use	50%	of water use
2035 Estimated Reduced Indoor Water Use = 2005 GPCD * (Percent Res + Percent Non-Res) * Percent Reduction * 2035 Estimated Population * 365.25 Days Per Year / 1,000,000 =	885	Million Gallons
2035 Estimated Reduced Outdoor Water Use = 2005 GPCD * Percent Landscaping * Percent Reduction * 2035 Estimated Population * 365.25 Days Per Year / 1,000,000 =	763	Million Gallons
2035 Potable Water Energy Savings = Target Year Reduced Indoor and Outdoor Water Use * 2035 Estimated Potable Water Energy Use Intensity =	903,911	kWh - Electricity
2035 Wastewater Energy Savings = Target Year Reduced Indoor Water Use * 2035 Estimated Wastewater Energy Use Intensity =	721,179	kWh - Electricity

[42] 2013 California Water Plan Update.- Accessed September 22,2017. http://www.waterplan.water.ca.gov/docs/cwpu2013/2013-prd/Vol3_Ch03_UrbanWUE_PubReviewDraft_Final_PDFed_co.pdf

Table C-3.2: Encourage Nevada Utilities District to reduce water losses through proactive leak detection programs.

Strategy 3.2: Encourage Nevada Utilities District to reduce water losses through proactive leak detection programs.		
Target: 100% of Potable Water Systems Reduce Water Losses by 50% by 2035		
Baseline Year	2005	
Target Year	2035	
Baseline Year Population served by Water Systems	39,305	People
2035 Estimated Population served by Water Systems	44,446	People
2005 Average Gallons Per Capita Per Day (GPCD)	214	Gallons / Capita / Day
Percent of Urban Water Demand (2013 CA WPU)	31%	Residential Indoor
	44%	Landscape Irrigation
	20%	Non-Residential Indoor
	5%	Water Losses
2035 Target Percent Reduction in Water Losses	50%	of water losses
2035 Estimated Reduction in Water Losses = 2005 GPCD * Percent Water Losses * Percent Reduction * 2035 Population * 365.25 Days Per Year / 1,000,000 =	87	Million Gallons
2035 Potable Water Energy Savings from Reduced Water Losses = 2035 Reduced Water Losses * 2035 Estimated Potable Water Energy Use Intensity =	47,574	kWh - Electricity

Table C-3.3: Continue to improve the efficiency of County Wastewater Treatment operations and encourage and collaborate with Nevada Irrigation District and other water agencies to improve the efficiency of agency water operations.

3.3: Continue to improve the efficiency of County Wastewater Treatment operations and encourage and collaborate with Nevada Irrigation District and other water agencies to improve the efficiency of agency water operations.		
Target: Reduce Energy Intensity at Potable Water and Wastewater Facilities by 30% by 2035		
Baseline Year	2005	
Target Year	2035	
Baseline Annual Potable Water Energy Use	2,404,070	kWh - Electricity
Baseline Annual Potable Water Energy Intensity	784	kWh / Million Gallons
Baseline Annual Wastewater Energy Use	2,060,510	kWh - Electricity
Baseline Annual Wastewater Energy Intensity	6,319	kWh / Million Gallons
2035 Target Percent Energy Intensity Reduction	30%	of energy intensity
2035 Reduction in Potable Water Energy Intensity	235	kWh / Million Gallons
2035 Reduction in Wastewater Energy Intensity	1,896	kWh / Million Gallons
2035 Estimated Potable Water Use	1,821	Million Gallons
2035 Estimated Wastewater Generation	163	Million Gallons
2035 Potable Water Electricity Savings = 2035 Potable Water Use * 2035 Reduction in Potable Water Energy Intensity =	428,168	kWh - Electricity
2035 Wastewater Electricity Savings = 2035 Wastewater Use * 2035 Reduction in Wastewater Energy Intensity =	309,077	kWh - Electricity

APPENDIX D: EXISTING ENERGY EFFICIENCY PROGRAM ADMINISTRATORS

Appendix D documents the existing energy efficiency program administrators in Nevada County with relevant links.

Table D-1: Existing Energy Efficiency Program Administrators

EXISTING PROGRAM ADMINISTRATORS	DESCRIPTION
Pacific Gas & Electric Company (PG&E)	PG&E offers incentives, rebates, financing options, and educational resources to residents, businesses, and non-profits in Nevada County. http://www.pge.com/
Sierra Business Council (SBC)	SBC administers the Sierra Nevada Energy Watch (SNEW) program, delivering cost effective energy-efficiency projects and benchmarking services to businesses and non-profits in Nevada County. SBC also offers consulting services to governments on energy and climate planning. http://sierrabusiness.org/
GRID Alternatives	GRID Alternatives is a nonprofit organization that brings the benefits of solar technology to communities that would not otherwise have access, providing needed savings for families and preparing workers for jobs in the fast-growing solar industry. GRID Alternatives can also provide energy-efficiency education and help mission-aligned non-profits and multi-family communities reach their solar technology goals. http://www.gridalternatives.org/
TRC Energy Services	TRC Energy Services administers the California Advanced Homes program, which highlights best practices in energy efficiency, green building and sustainability, and offers generous financial incentives to help builders and architects create environmentally friendly, energy-efficient communities for potential home buyers. http://cahp-pge.com/
U.S. Environmental Protection Agency	The U.S. EPA provides grants to support environmental education projects that promote environmental awareness and stewardship and help provide people with the skills to take responsible actions to protect the environment. This grant program provides financial support for projects that design, demonstrate, and/or disseminate environmental education practices, methods, or techniques. To see current grant opportunities, please check the EPA website for more information. https://www.epa.gov/
U.S. Department of Energy (DOE)	The U.S. DOE provides formula grant funding and technical assistance for state and local governments to manage weatherization and clean energy programs including the Weatherization Assistance Program, State Energy Program and the Energy Efficiency and Conservation Block Grant Program. https://energy.gov/
California Energy Commission (CEC)	As the state's primary energy policy and planning agency, the California Energy Commission is committed to reducing energy costs and environmental impacts of energy use - such as greenhouse gas emissions - while ensuring a safe, resilient, and reliable supply of energy. The CEC offers financing to public institutions to help fund energy-efficiency and energy generation projects at attractive low interest rates. The CEC also manages other useful programs such as the Energy Partnership Program, Energy Upgrade California, and other technical assistance resources. http://www.energy.ca.gov/
Energy Upgrade California	Energy Upgrade California is a statewide initiative committed to uniting Californians to strive toward reaching the state's energy goals, and help increase energy efficiency for the future of California. Energy Upgrade California provides tools and knowledge to

EXISTING PROGRAM ADMINISTRATORS	DESCRIPTION
	residents and small businesses for energy management. https://www.energyupgradeca.org/
California Statewide Communities Development Authority (CSCDA)	The CSCDA is a joint powers authority with more than 500 cities, counties, and special districts as Program Participants. CSCDA provides California's local governments with an effective tool for the timely financing of community-based public benefit projects. CSCDA was created by and for local governments in California, and is sponsored by the California State Association of Counties and the League of California Cities. CSCDA helps local governments build community infrastructure, provide affordable housing, create jobs, and make access available to quality healthcare and education. CSCDA programs include Total Road Improvement Program, Water & Wastewater Bond Program, GO SAVERS, and OPEN PACE program. http://cscda.org/
California Infrastructure and Economic Development Bank (IBANK)	The IBank finances public infrastructure and private development that promotes opportunities for local jobs, contributes to a strong economy, and improves the quality of life in California communities. IBank has broad authority to issue tax-exempt and taxable revenue bonds, provide financing to public agencies, provide credit enhancements, acquire or lease facilities, and leverage State and Federal funds. IBank's current programs include the Infrastructure State Revolving Fund (ISRF) Loan Program, California Lending for Energy and Environmental Needs (CLEEN) Center, Small Business Finance Center and the Bond Financing Program. http://www.ibank.ca.gov/
School Project for Utility Rate Reduction (SPURR)	SPURR can manage the complex procurement process for utility services and equipment by leveraging its expertise in public utility procurement to help ensure that clients can quickly implement the right solution at the best price. http://spurr.org/
ICLEI (International Council for Local Environmental Initiatives) Local Governments for Sustainability	ICLEI Local Governments for Sustainability is the leading global network of local governments dedicated to sustainability, resilience, and climate action. Creating connections between leaders to share solutions and accelerate progress through cutting-edge tools and technical guidance helps local governments to reach their goals of deep reductions in carbon pollution and tangible improvements in sustainability. http://icleiusa.org/
Statewide Energy Efficiency Collaborative (SEEC)	The Statewide Energy Efficiency Collaborative (SEEC) provides support to cities and counties to help them reduce greenhouse gas (GHG) emissions and save energy. SEEC is an alliance between three statewide non-profit organizations (ICLEI - Local Governments for Sustainability, USA, the Institute for Local Government, and the Local Government Commission) and California's four Investor-Owned Utilities. It builds upon the unique resources, expertise and local agency relationships of each partner. http://californiaseec.org/about-seec/
Municipal Sustainability and Energy Forum (MSEF)	Municipal Sustainability & Energy Forum is designed as a venue that brings experts together to facilitate the most effective renewable energy and energy efficiency solutions for communities, municipalities, states, and utilities. http://mseforum.com/
New Buildings Institute (NBI)	The New Buildings Institute takes leading-edge practices and technology applications for high performance buildings and translates them into innovative and practical solutions for the energy efficiency and commercial building industries. NBI works collaboratively with industry market players, such as governments, utilities, energy efficiency advocates and building professionals. https://newbuildings.org/

APPENDIX E: EXISTING ENERGY EFFICIENCY PROGRAMS IN NEVADA COUNTY

Appendix E documents the existing energy-efficiency programs in Nevada County with links to relevant programs.

Table E-1: Existing Residential Energy Efficiency Programs

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
PG&E Home Upgrade & Advanced Home Upgrade	PG&E's Home Upgrade program offers rebates of up to $2,500 to help homeowners focus on their building shell to maintain a warmer or cooler indoor environment while lowering energy bills. Improvements may include attic, wall and floor insulation, duct sealing, furnace and AC replacements, and more. PG&E's Advanced Home Upgrade program offers rebates up to $5,500 to go beyond building shell upgrades and is typically more complex, involving deep improvements. A Home Upgrade Professional will conduct a comprehensive energy assessment using energy-modeling software to create a customized energy-saving plan for your home. https://www.pge.com/en_US/residential/save-energy-money/savings-programs/home-upgrade/home-upgrade.page
HomeIntel Residential Energy Efficiency Program	HomeIntel helps customers with a unique and customized energy reduction plan based on how energy is used in their home. HomeIntel starts by creating an energy profile of the home using Smart Audit, which automatically accesses the resident's PG&E account for energy data. Next, the customer is guided through an interactive tutorial on how energy is currently being used and how to plan to save energy and money while reducing GHG emissions. Smart Audit sends the customer a month report show the progress through this program. This PG&E program is available to PG&E customers at no cost who have lived in their residence for a year or more, and do not have any solar PV installed. http://corp.hea.com/hintel/
PG&E SmartAC™	PG&E's SmartAC program offers the opportunity to help prevent summer energy supply emergencies from disrupting day to day activities. Upon joining, SmartAC will install their free SmartAC device. Once installed, the customer will receive a SmartAC reward check. http://www.pge.com/smartac
PG&E SmartRate™	The SmartRate™ Plan is a financial energy-saving incentive for customers to help offset peak energy consumption in California. With SmartRate, electric rates are lower June 1st through September 30th, except on SmartDays™, which PG&E notifies customers of the day before in order to better plan shifting electricity use to avoid the higher rate period (2-7pm on a SmartDay™). PG&E customers who add the SmartRate program to their account will pay a reduced rate in exchange for minimizing their electricity usage for 9 to 15 SmartDay™ days a year. Customers are encouraged to lower usage and collectively help conserve energy resources. With SmartRate automatic bill protection, the first summer is risk free. http://www.pge.com/smartrate
PG&E Energy-Efficiency Products Home Appliances Rebate	PG&E offers rebates in order to save energy, costs, and time through several programs. The PG&E Marketplace allows customers to search for and compare the most energy efficient products on the market, and easily apply for product rebates. The Multifamily property owners and managers rebate program targets energy efficient products that serve units and common areas of apartment buildings, mobile home parks, and condominium complexes. The program also highlights the energy savings and rebate incentives of upgrading to Energy Star® certified pool pumps and motors, and replacing manual or programmable thermostat with a new qualifying Energy Star® smart thermostat. https://marketplace.pge.com/
Federal Renewable Energy Tax Credit	A taxpayer may claim a credit of 30% of qualified expenditures for a renewable energy system that serves a dwelling unit located in the United States that is owned and used as a residence by the taxpayer. Expenditures include labor costs for on-site

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
	preparation, assembly, or original system installation, and piping or wiring to interconnect a system to the home. http://energy.gov/savings/residential-renewable-energy-tax-credit
California Advanced Homes	California Advanced Homes Program™, administered by PG&E and TRC Energy Services, highlights best practices in energy efficiency, green building and sustainability, and offers generous financial incentives to help builders and architects create environmentally friendly, energy-efficient communities for potential home buyers. https://cahp-pge.com/
PG&E Solar Water Heating	PG&E's Solar Water Heating program saves energy and money for customers by up to an 80% reduction in water-heating bill, and almost 75% savings for solar water heating system with the PG&E rebate and tax credit. http://www.pge.com/csithermal
Go Solar California Campaign Programs	The Go Solar California! Campaign provides California consumers with information on solar programs, rebates, tax credits, and information on installing and interconnecting solar electric and solar thermal systems. The programs include California Solar Initiative (CSI), New Solar Homes Partnership (NSHP), and other various programs under Publicly Owned Utilities (POUs). The CSI program funds solar on existing homes, existing or new commercial, agricultural, government, and non-profit buildings. The program funds both solar photovoltaics (PV), as well as other solar thermal generating technologies. The NSHP provides homebuilders financial incentives and support by encouraging the construction of new, energy efficient solar homes that will save homeowners money on their electric bills while protecting the environment. Both the California Solar Initiative and the New Solar Homes Partnership can help affordable housing customers through partial or full funding for solar energy and solar thermal systems. http://www.gosolarcalifornia.org/about/index.php

Table E-2: Existing Targeted Income-Qualified Residential Energy Efficiency Programs

INCOME-QUALIFIED ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
PG&E Energy Savings Assistance Program (ESAP)	PG&E's Energy Savings Assistance Program provides income-qualified customers with energy-saving improvements at no charge. https://www.pge.com/en_US/residential/save-energy-money/help-paying-your-bill/energy-reduction-and-weatherization/energy-savings-assistance-program/energy-savings-assistance-program.page
PG&E Multi-Family Program	PG&E's Multi-Family Program is for property owners and managers of existing residential dwellings or mobile home parks with five or more units. The program encourages owners to install qualifying energy-efficient products in individual tenant units and common areas of residential apartments, mobile home parks and condominium complexes. A full list of available rebates and incentives is available online. http://www.pge.com/multifamily/
Relief for Energy Assistance through Community Help (REACH)	REACH provides solutions for projects that reduce energy vulnerability such as PG&E's one-time emergency financial assistance. REACH provides an energy credit for up to $300 to help low-income families keep their PG&E services turned on in times of hardship. http://www.pge.com/reach/

INCOME-QUALIFIED ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
PG&E California Alternate Rates for Energy (CARE) Program	Qualified low-income customers that are enrolled in the CARE program receive a 30-35 percent discount on their electric and natural gas bills. The CARE program is administered by PG&E. http://www.pge.com/care/
PG&E Family Electric Rate Assistance (FERA)	The FERA program provides a monthly discount on electric bills for income-qualified households of three or more persons. FERA is administered by PG&E. http://www.pge.com/fera
PG&E Medical Baseline Allowance	Residential customers with a qualified physician certified medical condition can receive additional quantities of energy at the lowest (baseline) price. The program is administered by PG&E. http://www.pge.com/medicalbaseline
Single Family Affordable Solar Housing (SASH)	The Go Solar California SASH program provides qualifying low-income homeowners up-front rebates to defray the costs of installing a solar electric system. Depending on the income level, homeowners may be eligible for an entirely free system, or a highly subsidized one. The SASH program is structured to provide access to solar technology while also providing green jobs training, employment, and community engagement opportunities. The SASH program is administered by GRID Alternatives. http://www.gridalternatives.org/learn/sash

Table E-3: Existing Non-Residential Energy Efficiency Programs

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
PG&E Rebates and Incentives for Businesses	PG&E offers non-residential customers rebates and incentives for power management software, occupancy sensors on lights, steam traps, HVAC motors and pumps, electric water heaters, process cooling, data center airflow management, boiler economizers, refrigeration, boiler heat recovery, refrigeration control, VSD pumps, boilers and fans. A full list of current rebates can be found using the PG&E money back tool. www.pge.com/businessrebates
PG&E Commercial HVAC Optimization Program	PG&E's Commercial HVAC Optimization Program offers generous incentives for enrolling in a three-year air conditioning quality maintenance service agreement and installing optional unit retrofits. The business owner will lower their operating, repair and replacement costs; optimize unit performance and efficiency; improve the indoor air quality and thermal comfort for employees and customers; help prevent HVAC unit failures that can threaten business operations; and reduce their carbon footprint. http://www.commercialhvacqm.com/
PG&E Lighting Rebates	PG&E offers rebates for high-efficient replacement lights as well as rebates to help cover the costs of qualifying fixtures and retrofit kits. http://www.pge.com/en/mybusiness/save/rebates/lighting/index.page
PG&E Solar Water Heating	PG&E's Solar Water Heating program saves energy and money for customers by up to an 80% reduction in water-heating bill, and almost 75% savings for solar water heating system with the PG&E rebate and tax credit. http://www.pge.com/csithermal

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
PG&E Retrocommissioning (RCx) Program	RCx is a systematic process for identifying less-than-optimal performance in your facility's equipment, lighting, and control systems, and making the necessary adjustments. While retrofitting involves replacing outdated equipment, RCx focuses on improving the efficiency of what's already in place. PG&E's RCx Program provides incentives and connects businesses with experts to make sure their facilities — and the equipment and systems within them — are running in peak condition for optimal energy savings. RCx projects can improve a facility's work environment and extend the service life of equipment. http://www.pge.com/en/mybusiness/save/rebates/retrocommissioning/index.page
PG&E Savings By Design (SBD) Program	SBD is a statewide program offered by PG&E to encourage high-performance new building design and construction for non-residential (commercial, school, facility, etc.) buildings. The program offers building owners and their design teams a wide range of services, such as design assistance, design team incentives, owner incentives, business solutions, and educational resources. SBD can help exceed California's Title 24 energy-efficiency standards, and engineers can analyze your building's energy design to help it rise above the standard and you can earn financial incentives for doing so. www.pge.com/savingsbydesign
PG&E and Ecology Action Hospitality Program	The Hospitality Program provides energy efficiency recommendations, project oversight, and rebates at no cost to customers in PG&E territory including hotels and motels, dining and restaurants, casinos, health clubs and more. Free services provided include: facility audit, project proposal, installation oversight, and rebate fulfillment. Energy specialists will conduct a free assessment of your facility and identify site specific opportunities to save you energy and money. Projects include upgrading old inefficient lighting to LEDs and replacing old refrigeration motors. http://ecoact.org/thehospitalityprogram/
PG&E LED Accelerator Program (LEDA)	The LED Accelerator Program (LEDA) incentivizes high performance LED retrofit and new installations in conjunction with networked controls or a new lighting design layout for multi-site commercial businesses. LEDA's Implementation Team helps businesses through every step of the project, and provides audits, application support, economic analysis, product demonstration, and product selection assistance. http://ledaccelerator.com/
PG&E Food Service Technology Center	The PG&E Food Service Technology Center (FSTC) provides nationally-recognized energy efficiency consulting services to the commercial food service industry. The program includes kitchen equipment testing, design consultation, on-site facility surveys for energy efficiency, educational seminars for energy performance in commercial kitchens, and equipment testing services to determine the energy and performance characteristics of food service equipment. https://www.pge.com/en_US/business/services/training/training-centers/food-service-technology-center/food-service-technology-center.page
PG&E Advanced Pumping and Efficiency Program (APEP)	PG&E's Advanced Pumping Efficiency Program (APEP) is an educational and incentive program intended to improve overall pump and booster efficiency and encourage energy conservation. The program subsidizes pump tests and provides cash-back incentives for pump overhaul above 25/hp. http://www.pumpefficiency.org/
PG&E K-12 Schools Programs and Rebate Catalog	There are a couple programs for K-12 schools including the Solar Energy Efficiency (SEE) Program which helps public school districts identify, evaluate, and process incentives on energy efficiency retrofit measures and CLEAResult analytics enabled

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
	RCs for school facilities. The rebates, discounts, and expert advice can help make it easier for K-12 schools to save energy and money. http://schoolenergyefficiency.com/
Bright Schools Program	The Bright Schools Program offers services to help identify the most cost-effective energy saving opportunities for your facilities. Eligible applicants include: K-12 Public School Districts, Charter Schools, State Special Schools, County Offices of Education, and Community Colleges. The Program provides technical assistance to schools for improving building energy efficiency and clean energy generation. Up to $20,000 available to successful applicants to fund professionally-prepared feasibility study for the most effective energy efficiency measures. http://www.energy.ca.gov/efficiency/brightschools/
Energy Partnership Program	The Energy Partnership Program offers services to help identify the most cost-effective energy saving opportunities for facilities. The California Energy Commission (CEC) Provides up to $20,000 in technical assistance to public agencies, which includes cities, counties, special districts, public hospitals, and public care facilities, in identifying the most cost effective energy efficient upgrades. The program targets existing facilities with energy audits, and new construction with energy efficient design reviews. http://www.energy.ca.gov/efficiency/partnership/
Energy Efficiency Financing	The California Energy Commission (CEC) provides 0-1% interest loans to public entities for projects with proven energy and/or demand cost savings. http://www.energy.ca.gov/efficiency/financing/index.html
Federal Business Energy Investment Tax Credit (ITC)	A taxpayer may claim an investment tax credit of 30% of qualified expenditures for solar, fuel cells, small wind systems; or 10% of qualified expenditures for geothermal, microturbines, and combined heat and power systems (CHP), aka co-generation systems. Expenditures include labor costs for on-site preparation, assembly or original system installation, and for piping or wiring to interconnect a system. http://energy.gov/savings/business-energy-investment-tax-credit-itc
Tax Exemption for Farm Equipment and Machinery	In November 2012, The California State Board of Equalization determined the partial exemption from state sales and use tax applies to solar photovoltaic systems that are primarily used to power farm equipment and machinery. The system does not need to be directly connected to the equipment to qualify--it can be connected to the local electricity grid and used to offset the farm's electricity use via a net metering agreement with the local utility. Applicants will need to demonstrate that at least 50% of the electricity generated by the solar PV system is used by farm equipment annually. This tax exemption is also applicable to wind machines and could apply to other energy efficient farm equipment. http://www.boe.ca.gov/sutax/exemptfem.htm http://www.boe.ca.gov/news/pdf/l330.pdf

Table E-4: Existing Educational Programs

EDUCATIONAL PROGRAMS	DESCRIPTION
PG&E Energenius® Educational Series	The PG&E Energenius® Educational Series program offers interactive, engaging programs for pre-kindergarten through eighth grade (pre K-8). These programs correlate to Common Core State Standards and include lesson plans, activity books, and take-home materials. https://www.pge.com/en_US/residential/in-your-

EDUCATIONAL PROGRAMS	DESCRIPTION
	community/education-programs/education-programs/educational-resources/energenius-program/energenius-program.page
PG&E Educational Resources for Teachers	PG&E offers resources for educators, including free curriculum materials to use in the classroom in order to help students to understand energy efficiency, conservation, safety, and more. https://www.pge.com/en_US/residential/in-your-community/education-programs/education-programs/educational-resources/for-students/for-teachers.page
PG&E Educational Resources for Students (K-12)	Students can learn more about energy, conservation and other important information through the activities and resources PG&E has compiled and organized for students. https://www.pge.com/en_US/residential/in-your-community/education-programs/education-programs/educational-resources/for-students/for-students.page
PG&E Training	Learn about energy efficiency for your business through classes on renewable energy, food service technology, and other resources to keep businesses competitive. https://www.pge.com/en_US/business/services/training/training-centers/training-centers.page
PG&E Solar Education and Workshops	PG&E offers free classes, workshops, and webinars from PG&E to learn about selecting renewable energy systems to use for business, and benefits of running a green business. Find in-person classes and workshops, or download presentations created by PG&E instructors. https://www.pge.com/en_US/business/services/training/solar-education/solar-education.page or see Energy Education Class schedule: http://usi.pge.com/
PG&E Business Resource Center	PG&E offers articles and resources to help business owners make energy-efficiency decisions and plans for innovating, implementing best practices, increasing profitability, and creating a greener profile. https://www.pge.com/en_US/business/resources/tips-trends-and-incentives/energy-insights/business-resource-center.page
NEED Project (National Energy Education Development)	The National Energy Education Development Project is dedicated to promoting an energy conscious and educated society by creating effective networks of students, educators, business, government and community leaders to design and deliver objective, multi-sided energy education programs. http://www.need.org/
PEAK Energy (The Energy Coalition)	PEAK is a comprehensive standards-based educational program designed to empower elementary and middle school students with the knowledge to manage energy use in their homes, schools and communities. Through hands-on learning, students are inspired to pursue green careers and motivate themselves and others to take action to create a more sustainable world. http://www.peakstudents.org/
PowerSave Schools (Alliance to Save Energy)	The Alliance to Save Energy believes that students have the power to create a culture of energy efficiency in their schools and communities. PowerSave Schools reduce consumption an average of 5-15% in one year through no-cost operations and behavior changes. Empowered with STEM-based efficiency training, hands-on experience, and result to show for their work, students become ambassadors for energy conservation in the classroom and at home. http://www.powersaveschools.org/about.html
Strategic Energy Innovations (SEI) Eco Smart Education Curriculum	SEI partners with K-12 schools and universities on a variety of greening approaches to help them save money by making their buildings more energy efficient while fostering a culture of conservation and resource efficiency among students and teachers. By developing curriculum, empowering students and staff to make sustainable changes

EDUCATIONAL PROGRAMS	DESCRIPTION
	and implementing innovative and measurable initiatives, SEI creates environmental stewards and community leaders of tomorrow. SEI provides curriculum and teacher training in the areas of energy and resource efficiency, climate change science, renewable energy, green transportation and green careers. https://www.seiinc.org/programs/eco-smart-schools
Energy Literacy (Office of Energy Efficiency & Renewable Energy)	Energy Literacy is an interdisciplinary approach to teaching and learning about energy and understanding the role of energy. It presents energy concepts that will help individuals and communities make informed energy decisions. The Framework for Energy Education is an educational resource for learners of all ages and is meant to guide formal and informal energy education, standards development, curriculum design, assessment development, and educator trainings. https://energy.gov/eere/education/energy-literacy-essential-principles-and-fundamental-concepts-energy-education
Alliance for Climate Education (ACE)	The Alliance for Climate Education's mission is to educate young people on the science of climate change and empower them to take action. Through several education outlets including the ACE Assembly, online signature multimedia resources, and teacher classroom resources, the ACE program seeks to reach as many students and teachers as possible with climate science information and opportunities for action. https://acespace.org/

Table E-5: Water Efficiency Programs

WATER EFFICIENCY PROGRAMS	DESCRIPTION
Water Energy Grant Program	This program funds residential, commercial and municipal water efficiency projects that reduce GHG emissions and reduce water and energy use. Eligible applicants include local agencies, JPA's, and non-profits. Eligible projects include residential and commercial water efficiency, municipal water efficiency programs, or projects that reduce greenhouse gas, reduce water and reduce energy use. Available funding is currently $19 million. The program is funded through the Cap and Trade legislation (specifically SB 103, Sec.11) and administered by California Department of Water Resources. https://www.water.ca.gov/Programs/Water-Use-And-Efficiency
Electric Program Investment Charge (EPIC) Program Funding Opportunities	The Energy Commission's electricity innovation investments follow an energy innovation pipeline program design, funding applied research and development, technology demonstration and deployment, and market facilitation to create new energy solutions, foster regional innovation, and bring clean energy ideas to the marketplace. Water efficiency projects, including research and technology, can be found on EPIC's website, check regularly for new water program offerings. http://www.energy.ca.gov/contracts/epic.html
Nevada Irrigation District Water Conservation and Efficiency	Nevada Irrigation District encourages water conservation and water use efficiency through information, resources, and programs that are provided on their website. These include: tips for water conservation, leak detection, water-use measurement calculator, landscape and irrigation resources, demonstration garden, seminars and workshops, and information on incentives and rebates. https://nidwater.com/conservation/

APPENDIX F: ENERGY EFFICIENCY FINANCING PROGRAMS

Appendix F documents available financing programs for specific sectors (community-wide, residential, non-residential and municipal).

Table F-1: Community-Wide Financing Programs

FUNDING SOURCE	DESCRIPTION
Go Green Financing	Go Green Financing allows California residents and businesses browse the GGF database of financing solutions to find a lender that fits the unique needs and preferences of each energy efficiency project. http://www.gogreenfinancing.com/
Open PACE: Property Assessed Clean Energy	The Open PACE program provides local governments with a turnkey resource for residential and commercial property owners to finance energy efficiency, renewable energy and water conservation. Open PACE provides local governments with a competitive marketplace for PACE Program Administrators that meet specific qualifications. Program Administrators will develop managed contractor networks within the community, provide 100% financing and file repayment obligations through property tax bills. http://cscda.org/Open-PACE
mPOWER	mPOWER provides fixed-rate, no money down financing to residential, commercial, industrial, agricultural, multifamily, and non-profit property owners for energy efficiency upgrades, water conservation measures, and energy generation systems. Their goals are to lower energy bills, increase energy and water efficiency, reduce reliance on foreign fuels, stimulate the local economy, and reduce GHG emissions. mPOWER currently serves Placer and Nevada Counties, and the cities of Auburn, Colfax, Nevada County, Lincoln, Nevada County, Rocklin and Roseville. It also serves the Towns of Loomis and Truckee, as well as the County of Folsom in Sacramento County. http://www.mpowerca.org/
Solar Power Purchase Agreement (PPA)	A solar power purchase agreement (PPA) is a financial agreement where a developer arranges for the design, permitting, financing and installation of a solar energy system on a customer's property at little to no cost. The developer sells energy to the host customer at a fixed rate that is typically lower than the local utility's retail rate. The lower price offsets the purchase of grid electricity while the developer receives the income from these sales of electricity as well as any tax credits and other incentives generated from the system.

Table F-2: Residential Financing Programs

FUNDING SOURCE	DESCRIPTION
Energy Efficiency Mortgages	An Energy Efficient Mortgage (EEM) is a mortgage that credits a home's energy efficiency in the mortgage itself. EEMs give borrowers the opportunity to finance cost-effective, energy-saving measures as part of a single mortgage and stretch debt-to-income qualifying ratios on loans thereby allowing borrowers to qualify for a larger loan amount and a better, more energy-efficient home. https://www.energystar.gov/index.cfm?c=mortgages.energy_efficient_mortgages http://portal.hud.gov/hudportal/HUD?src=/program_offices/housing/sfh/eem/eemhog96
GSFA Residential Energy Retrofit Program	Through the Golden State Finance Authority (GSFA) Residential Energy Retrofit Program, eligible homeowners can finance energy efficiency and renewable energy measures, up to $50,000, with a 6.5% fixed interest rate 15-year loan. 100% financing is available with no income limits ore equity requirements. http://www.gsfahome.org/programs/energy/overview.shtml

Table F-3: Non-Residential Financing Programs

FUNDING SOURCE	DESCRIPTION
PG&E Energy Efficiency Financing	PG&E offers 0% interest loans ranging from $5,000 to $100,000. Government agencies may qualify for loans of up to $250,000. Loans can be used to replace old and inefficient equipment with no up-front out-of-pocket investment. The program allows 5 years for repayment; however, the energy savings continue to accrue after the loan is paid off. http://www.pge.com/en/mybusiness/save/rebates/onbill/index.page
Energy Savings Agreement	An Energy Savings Agreement involves a financing contract with a private energy services company that packages energy efficiency as a service paid through the energy savings. It allows for 100% financing and is an off-balance sheet financing solution.
Rural Energy for America Program (REAP)	The United States Department of Agriculture (USDA) provides guaranteed loan financing and grant funding for to agricultural producers and rural small businesses to purchase or install renewable energy systems or make energy efficiency improvements. http://www.rd.usda.gov/programs-services/rural-energy-america-program-renewable-energy-systems-energy-efficiency
Infrastructure State Revolving Fund (ISRF) Loan Program	The Infrastructure State Revolving Fund (ISRF) Loan Program provides financing to public agencies and non-profit corporations sponsored by public agencies for a wide variety of infrastructure and economic development projects. ISRF Program funding is available in amounts ranging from $50,000 to $25 million, with loan terms for the useful life of the project up to a maximum of 30 years. http://www.ibank.ca.gov/infrastructure-state-revolving-fund-isrf-program/
California Lending for Energy and Environmental Needs (CLEEN) Center	The CLEEN Center provides direct public financing to Municipalities, Universities, Schools and Hospitals (MUSH borrowers) to help meet the State's goals for greenhouse gas reduction, water conservation and environmental preservation. The CLEEN Center offers two programs, the Statewide Energy Efficiency Program (SWEEP) and the Light Emitting Diode Street Lighting Program (LED). Financing can be through a direct loan from IBank or publicly offered tax-exempt bonds in amounts from $500 thousand to $30 million. http://www.ibank.ca.gov/cleen-center/

Table F-4: Municipal Financing Programs

FUNDING SOURCE	DESCRIPTION
California Energy Commission (CEC) Energy Efficiency Financing	The CEC offers school districts, charter schools, County offices of education, state special schools, and community college districts 0% loans for energy efficiency and energy generation projects. CEC offers cities, counties, special districts, public colleges, universities and public care institutions/hospitals 1% loans for energy efficiency and energy generation projects. http://www.energy.ca.gov/efficiency/financing/
PG&E Energy Efficiency Financing	PG&E offers 0% interest loans of up to $250,000. Loans can be used to replace old and inefficient equipment with no up-front out-of-pocket investment. The program allows 10 years for repayment; however, the energy savings continue to accrue after the loan is paid off. http://www.pge.com/en/mybusiness/save/rebates/onbill/index.page

FUNDING SOURCE	DESCRIPTION
Energy Savings Agreement (ESA)	An ESA involves a financing contract with a private energy services company that packages energy efficiency as a service paid through the energy savings. It allows for 100% financing and is an off-balance sheet financing solution.
IBank Clean Energy Finance Center	The CLEEN Center provides direct public financing to Municipalities, Universities, Schools and Hospitals (MUSH borrowers) through two programs, the Statewide Energy Efficiency Program (SWEEP) and the Light Emitting Diode Street Lighting Program (LED). Financing can be through a direct loan from IBank or publicly offered tax-exempt bonds in amounts from $500 thousand to $30 million. http://www.ibank.ca.gov/cleen-center/
USDA's Rural Utilities Service (RUS)	The Rural Utilities Service administers programs that provide infrastructure or infrastructure improvements to rural communities, including water and waste treatment (Water and Environmental Programs – WEP), electric power (Electric Programs), and telecommunications services (Telecommunications Programs). The programs provide loans, grants, loan guarantees, capital and leadership. http://www.rd.usda.gov/about-rd/agencies/rural-utilities-service

APPENDIX G: IMPLEMENTATION RESOURCES

Appendix G documents implementation resources, programs, and tools.

Table G-1: Programs that cover energy efficiency, renewable energy, and water efficiency

ENERGY EFFICIENCY, RENEWABLE ENERGY, AND WATER EFFICIENCY	DESCRIPTION
PG&E Utility Marketplace for Energy Efficient Products	Utility Marketplaces for Energy Efficient Products: As part of the implementation of AB793, the CPUC has mandated all regulated utilities to have energy management technology marketplaces online for their customers by the end of 2017. Local governments can leverage existing marketplaces to help engage their citizens. These marketplaces are a great resource to transform markets and help residents shop energy smart. The sites have many categories including electronics, heating and cooling, kitchen appliances, and laundry appliances. They provide shoppers with full market coverage across retailers, brands and models; a daily updated, relative energy efficiency score on a zero to 100 scale; energy bill savings and total cost of ownership implications of product choices – combined with price drop alerts, online rebate sign-up, local store information and other modern tools that make the energy efficient choice the easy choice. PG&E's Marketplace: https://marketplace.pge.com/
PG&E Tool Lending Library	Tool Lending Library: PG&E provides a library of tools that can be borrowed without purchase. The library includes data loggers, infrared cameras, and much more testing equipment for building energy efficiency. PG&E's Tool Lending Library: https://pge.myturn.com/library/
SmarterHouse	The American Council for an Energy-Efficient Economy (ACEEE) and Enervee have partnered to help consumers make energy-smart choices for household products by creating SmarterHouse. The SmarterHouse website contains energy-saving tips and buying guidance all based on ACEEE's efficiency expertise and Enervee's data, analytics, and marketing capabilities. Shoppers will find detailed product information, pricing, and incentives offered by their utility in a streamlined, integrated process, making it easier for consumers to find quality products that reduce their energy bills. https://smarterhouse.org/
Statewide Energy Efficiency Collaborative (SEEC)	SEEC provides no-cost resources to support the energy and climate initiatives of California Local Governments. SEEC provides the following at no cost: education and tools for climate action planning and reducing energy use, opportunities for peer-to-peer networking, technical assistance and recognition for local agencies that reduce GHG emissions, save energy and adopt policies and programs that promote sustainability, and demonstration that "the whole is greater than the sum of its parts" through leveraging resources and expertise from seven partners, to help local agencies. SEEC trainings and resources are tailored to the needs of California local governments and are available to representatives of local governments within California, as well as state and reginal government agencies, districts, and school districts. http://californiaseec.org/
Municipal Sustainability and Energy Forum (MSEF)	Municipal Sustainability Forum connects communities, governments, utilities, universities, organizations and experts together to explore today's most effective energy efficiency and renewable energy-related solutions. The goal of Municipal Sustainability Forum is to create a collaborative environment that facilitates problem solving, economic growth and a sustainable energy future. Each month, webinars are hosted at no cost for anyone who is involved in advancing energy-related sustainability in their areas or states. In addition, conference calls are held on a variety of topics in which top

ENERGY EFFICIENCY, RENEWABLE ENERGY, AND WATER EFFICIENCY	DESCRIPTION
	experts can interact, discuss important issues and possibly connect later for collaboration. http://mseforum.com/
California's Local Government Energy Efficiency Portal (EE Coordinator)	This site serves as a hub for energy efficiency and sustainability news, information, best practices and resources relevant to California's local governments. http://eecoordinator.info/
Smart Growth America	Smart growth is a way to build cities, towns, and neighborhoods that are economically prosperous, socially equitable, and environmentally sustainable. Smart Growth America works with everyone involved in the process of urban planning and development to think strategically about building better towns and cities. Smart Growth America is dedicated to researching, advocating for and leading coalitions to bring smart growth practices to communities. https://smartgrowthamerica.org/
Institute for Local Government's Beacon Program	The Beacon Program provides a framework for local governments to share best practices that create healthier, more vibrant and sustainable communities. The program honors voluntary efforts by local governments to reduce greenhouse gas emissions, save energy and adopt policies that promote sustainability. http://www.ca-ilg.org/beacon-award-program
New Buildings Institute – Zero Net Energy Support	Zero net energy (ZNE) buildings are ultra-efficient new construction and deep energy retrofit projects that consume only as much energy as they produce from clean, renewable resources. NBI's Zero Energy Market Development and Leadership Program efforts include thought leadership, research, project tracking, education, communications, convening and networking, and represents one of the most extensive portfolios of expertise and resources on zero energy buildings in the world. https://newbuildings.org/hubs/zero-net-energy/
California Codes and Standards (C&S) Reach Codes Program	The California Codes and Standards (C&S) Reach Codes program provides technical support to local governments considering adopting a local ordinance (reach code) intended to support meeting local and/or statewide energy and greenhouse gas reduction goals. The program facilitates adoption and implementation of the code, by providing resources such as cost-effectiveness studies, model language, sample findings, and other supporting documentation. Key resources available on the site include cost-effectiveness studies, ordinance summaries for internal communications, model language, and document templates. http://www.localenergycodes.com/
Building Operator Certification (BOC)	BOC is a competency-based training and credentialing program for building operators providing skill sets to reduce energy consumption in their facilities through operational and maintenance practices for HVAC, lighting, and controls systems. Facility Personnel earn an industry-recognized, professional credential after completing technical training and testing, and by performing energy efficiency project assignments in their facilities. The Northwest Energy Efficiency Council (NEEC) is the national administrator of BOC, NEEC partners with California utilities throughout the state to bring this valuable training to you. http://www.theboc.info/
EnergySage Solar Marketplace	EnergySage is an online marketplace that helps consumers research and shop for solar energy systems. ICLEI and EnergySage have developed a solution that makes it fun and easy for municipalities to promote solar in their community. The Marketplace offers a comparison of solar options, educational and cost-saving resources, promotes the

ENERGY EFFICIENCY, RENEWABLE ENERGY, AND WATER EFFICIENCY	DESCRIPTION
	growth of solar companies and programs, and other tools to assist the transition to renewable energy. http://www.energysage.com/
School Project for Utility Rate's (SPURR) Renewable Energy Aggregated Procurement (REAP) Program	An innovative aggregated solar buying program that leverages the collective purchasing power of SPURR's very large membership to secure pre-negotiated "piggy-backable" solar project pricing and terms for California public agencies. The goals of the REAP Program are as follows: streamline the solar buying process for California public agencies, drive down solar project pricing for California public agencies, and improve solar project terms and conditions for California public agencies. Any public agency in California can participate in SPURR's REAP Program. To date, sixteen California public agencies have utilized the REAP Program to contract over 40 MW-DC of solar projects. The REAP Program issued a new RFP for solar and solar + storage in 2017. Public agencies interested in the REAP Program can receive, at no cost or obligation, a solar project feasibility study for their potential solar projects. Please contact solar@spurr.org for more information. http://spurr.org/Services/Solar-Services
SolarResilient	This first-of-its-kind solar and storage sizing tool enables building managers, energy managers, architects, sustainability, and energy professionals to size their buildings for solar PV and battery storage systems nationwide. This tool estimates the required rating and physical size of grid-connected PV and battery energy storage to provide power for extended periods during a large-scale grid power outage. SolarResilient is designed for buildings that form part of a cities resilience strategy - it allows building owners and County departments to develop equipment sizing before embarking on more detailed studies. When used on a portfolio of buildings, optimum performing scenarios can be selected to provide a holistic energy security strategy for a County or county. https://solarresilient.org/
HelioScope	HelioScope is a solar design software that simplifies the process of designing, engineering, and selling solar arrays. By combining streamlined layout tools with bankable energy simulations, HelioScope helps solar installers improve their design speeds by 5x-10x. Helioscope services are available for both residential and commercial solar design. https://www.helioscope.com/
Alliance for Water Efficiency: Commercial Kitchens Guide	The Commercial Kitchens Guide: Water Use Efficiency and Best Practices Guide is meant to help improve water efficiency in commercial kitchen operations. It covers day-to-day best practices, case study summaries, and strategies for efficient management of the most common high-use equipment. The guide also includes specially developed elements that aim to encourage continued action among commercial kitchen industry users, and between industry users and water utilities. http://www.allianceforwaterefficiency.org/commercial-kitchens-guide-library.aspx
Bureau of Reclamation: WaterSMART Program	2018 WaterSMART Program funding opportunities for water and energy efficiency, small-scale water efficiency, and water marketing strategy projects. https://www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=61828

APPENDIX H: OUTREACH AND PUBLIC ENGAGEMENT SUMMARY

Appendix H documents public input collected at the Planning Commission Study Session and Online Survey.

PUBLIC OUTREACH EFFORTS

Public outreach was a key part of the process during the development of the Energy Action Plan (EAP). To this effort, the public outreach strategy included an online survey and a community workshop hosted in the Board of Supervisors' Chambers on October 22nd, 2018. The online survey was released to collect public input on the EAP and proposed Goals, Strategies, and Actions from community members who were unable to attend the study session. The online survey was open from October 8th, 2018 to November 5th, 2018 and received 36 responses. Both the survey and community workshop were publicized at County offices, County libraries, various business locations, and Sierra College campuses in both Grass Valley and Truckee. It was also sent out as an email-blast by SBC and Nevada County to residents and business owners. The publicity was featured on the two local radio stations (KVMR and KNCO), posted on community calendars, and displayed on the SBC website and Facebook page, as well as the County website and Facebook page.

The public input collected at the study session and from the online survey was incorporated into the development of the goals and strategies highlighted in Chapter 3 and used to prioritize the implementation actions Chapter 4. A summary of this input is detailed below.

OCTOBER 22ND, 2018 COMMUNITY WORKSHOP

The study session provided a detailed presentation on the development process of the energy action plan, current California regulatory context, case studies detailing what EAP success looks like, and a summary of Residential and Non-Residential energy use, along with questions regarding the potential goals and strategies designed to create discussion and collect input.

Members of the community attended providing a number of excellent comments that helped inform the next phase of the process – development of the goals, strategies, and implementation actions. A summary of the key comments is provided here:

Table H-1: Comments from Community Workshop

TOPIC: Energy Efficiency	
Residential	Financing options - make public at meetings/other outreach Increasing community resiliency with other energy options Upgrades: instant-on hot water savings • looking into shade options to cool house passively - whole house fan Outdoor lighting - reduce light pollution and save money Incentivizing landlords is hard - they do no benefit directly from energy upgrades, how is it possible to overcome this barrier? (look into energy audits, renters and homeowners) Energy savings assistance program could benefit low-income customers w/EE upgrades double-pane windows, insulation upgrades, next step will be solar on roof, optimizing shade trees on house • $35/roll for recycled denim insulation finding creative ways to weatherize and save money
Non-Residential	Building codes - how to go beyond or work with other jurisdictions on building codes Agriculture - suppressing wildfire, carbon sequestration Increasing outdoor lighting contributes to light pollution (losing dark value, key tourism draw) - how can we incorporate EE into street light/outdoor fixtures?

	• change light temperatures from cool white to yellow, lower light, directed, delamping Public transportation to decrease demand for motorized vehicles CCA - community energy independence
New Construction	Upfront costs are challenging for new construction • but building standards will be cost effective Educate potential homebuyers on upfront cost reducing the overall long-term cost of owning the home
TOPIC: Renewable Energy	
Residential	Attendee Deb: added solar, need to increase capacity to accomodate energy usage • wants increased storage options to avoid when grid goes down and solar goes offline Electric car with solar panels on roof Landlord solar installation? Barrier - they don't see the benefits, savings go to tenants while upfront costs go to landlord/homeowner • federal and/or state programs to link tenants and landlords Attendee Don: $10/month bill with solar, also has an electric car
Non-Residential	Solar Farm - feasible in Nevada county County can lead way for renewables in the county Community Choice Aggregation - joining other CCAs? Forming the County's own CCA?
New Construction	[no comments]
TOPIC: Water-Energy Nexus	
Residential	NID customers - raw water is important to energy efficiency Water conservation → toilet buyback program, incentivize installation of water efficient toilets and fixtures Habits - reuse water from dishes to water herb garden awareness of importance to conserve water Energy for well-water -- would be helpful to know how much every resident is using to pump well water, is there a meter? NID meter replacement process - can detect water leaks in system (residential and non-residential application)
Non-Residential	Sites for solar at NID locations? • wastewater from old mines - is there a use for this? repurpose? • encourage greywater reuse, ordinances/codes, etc. • older plumbing need leak detections - find target areas in the County Impervious surface affecting ground water - how it ties into storm water system • allowing water to recharge into ground reduces stormwater runoff water runoff design should be incorporated into building and landscaping standards
New Construction	Impervious surface should allow for more efficient stormwater management Terracing - prevent erosion and manage water runoff

ONLINE SURVEY

In an effort to expand outreach to local residents and businesses, Sierra Business Council developed an online survey to garner input on the proposed goals and strategies. This survey was activated October 4th, 2018 and closed November 5th, 2018. A series of questions about the goals, strategies, and focus of the plan were asked and respondents were provided multiple choices for an answer plus an opportunity to provide additional written comments. A summary of the survey responses follows.

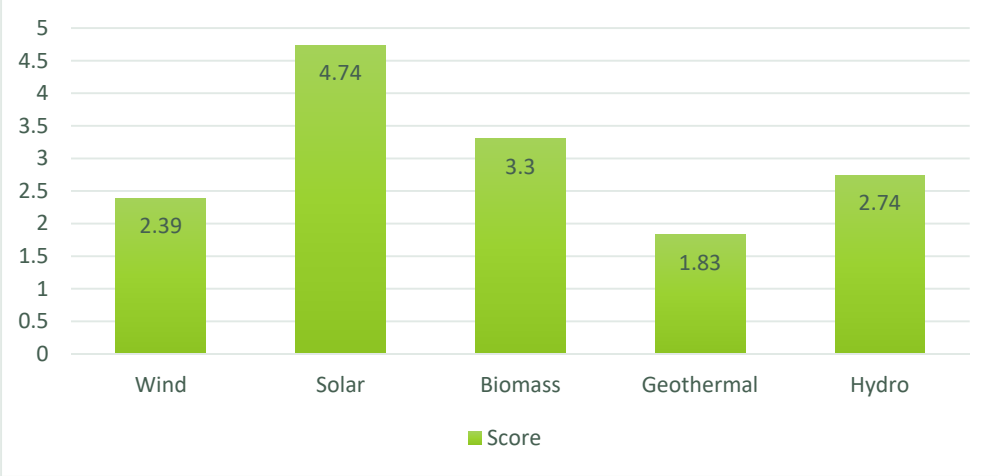
Table H-2: Online Survey Summary for Nevada County

Survey Questions	Responses
Respondent Profile	36 total responses 83% from unincorporated Nevada County 43% aged 65+ 27% aged 55-64 20% aged 45-54 10% aged 35-44 27% own or operate a business in unincorporated Nevada County 93% homeowners
Do you own or lease/rent your business space?	100% Own business space Comments: Work from home / home office
What is the average monthly electricity bill at your business?	29% Under $80 14% $80 - $100 14% $100 - $125 43% Over $125 Comments: • Bill is high because of manufacturing business • Building is very old and inefficient construction • Bill amount is due to large solar array on roof.
What area of your office / business / place of work uses the most energy?	Responses: Heating and cooling; equipment; machinery; workstations
Are you familiar with energy efficiency practices that can reduce energy usage and associated costs for your business?	100% Yes Comments: Investing in the building at this time doesn't make sense, since it would trigger a renovation from the group up.

Survey Questions	Responses
Have you completed an energy efficiency project or participated in an energy efficiency program?	43% Yes, participated
If yes, have you seen cost savings or other benefits from participating in these programs?	33% Unaware of the benefits Comments: Upgrades were part of the recent new construction and since it's a new business we have no comparison.
If you have completed an energy efficiency project, what motivated you to complete the project?	Comments: • Updating lighting • Hoping to build a new unit in the next several years in which case it will be highly energy efficient • Reduce carbon footprint and save money • Part of new construction
Are you interested in a free energy audit for your business?	43% Yes
As a business owner, what barriers, if any, do you see when reducing energy usage and costs for your business?	Comments: • Nature and size of business • Cost/Expense • With no decent connectivity, we have to use boosters, MicroCells etc which increase energy usage • How this would work, when your place of business is your home? • Adding solar in the snow belt is problematic
What is your average monthly home electrical bill?	33% Under $80 20% $80 to $100 8% $100-125 29% Over $125 8% Not sure
What area of your home do you think uses the most energy?	Comments: • Heating and cooling (furnace and HVAC) • Appliances that use propane and natural gas • Electricity • Business office, Airbnb rental space in home • Air conditioner, fridge, hot water heater, and other appliances • Electric car/hybrid charging
Are you familiar with energy efficiency practices that can	70% Yes 30% No

Survey Questions	Responses
reduce energy usage and associated costs for your home?	
Have you seen cost savings or other benefits from participating in these programs?	8% No 33% Unaware of my benefits 25% N/A/ 33% Yes – how much? Comments: • 20% • Don't need to burn as much wood for heating in winter • All recommendations were in place when I bought the home • I didn't do the math on extra attic insulation, solar is a great investment and I would love to be able to offer a reduced sales price for my home when it comes time to sell and keep ownership of the system. • Before retrofit and sale of diesel car: combined annual cost of electricity, propane, and diesel = $2538. After (and switching to electric car) combined cost = $1368 • $40-$50 • 90% reduction in electricity use • $10/month after installing LED lights
If applicable, what steps have you taken to lower energy and associated costs?	14% Participated in PG&E / Utility programs 86% Other (specify): • Installed solar panels • Installed insulation, upgraded to double glazed windows • We are careful to keep heat low and on schedule, using LED lighting, etc. • Don't heat the house in winter • Lighting upgrade (LED) and energy-efficient appliances • Cut down on AC use to save energy • Changing habits to be more aware of energy use • Turn down hot water heater setting • Upgrades/changes to our house: LED bulbs, whole-house fan, insulated curtains, solar panels, abandoned the hot tub, purchased plug-in hybrid electric vehicle (Mitsubishi Outlander PHEV) • Low-voltage lighting, high efficiency appliances, electric car • We only do our laundry in the off-peak billing hours. We minimize use of our swamp cooler in the summer. • New double-paned windows, new furnace
If you have completed an energy efficiency project in your home, why did you choose to complete the project?	Comments: • Reduce use and reliance on conventional energy • Installed attic insulation to cut down on electricity usage and to make home more comfortable • Invested time and money, wanted to reduce energy waste and lower bills • Had to upgrade appliances anyway within the last 2 years (refrigerator, washer, and water heater) • I like being as energy independent and comfortable as possible • To reduce CO2 emissions, and lower greenhouse gas emissions into the atmosphere and save the planet for our children

Survey Questions	Responses
	• Wanted solar panels
Are you interested in completing an energy audit of your home?	38% Yes 39% No Comments: • Sounds like a good idea • Not at this time • When I build my new home • Is this available after business hours? • The way our home is designed makes it inefficient. Home design is the most important place to have an effect on energy use. We need drastic changes in permitting and attitudes. We should be creating fire proof energy efficient earthen homes. • Don't need it – I am a pretty savvy energy user • Pretty sure it's not optimal, but wouldn't object to repeating it • We previously had one done.
What challenges, if any, do you face when reducing energy usage and costs in your home?	Comments: • We don't heat and cool our home as much as we'd like. • We have an old home with drafty single pane windows. • There is a higher price of propane in winter • Cost of filling my gas tank. Love the idea of solar but my electric bills aren't that high and I don't get that much direct sun (too many trees), so expense to install not worth it • Cost/Expense • It will be permitting fees and costs of building when I build my new home. • Older home with high ceilings • Our rental home is designed like a solar oven. The summers are excruciating. Eves and awnings would help with homes like this. • Energy warts from electronic devices • No barriers--we're very motivated. • Medical conditions. Need to stay warm in winter, cool in summer. • High labor costs for installing insulation • Ideas, $$$, time • Lack of ceiling insulation. Our home has no attic to add insulation into it. • Room for more insulation, propane heat source • Our home is pretty efficient, and we would love to install solar, but have found the cost prohibitive.

Survey Questions	Responses
Please rank the following forms of renewable energy generation in the order of most viable to least viable in Nevada County, 1 being most viable	
Do you currently employ a renewable energy system on your property?	43% Yes 57% No
If you have completed a renewable energy project, what motivated you to complete the project?	Comments: • Lower use and reliance on conventional energy • Financial payoff over the next 10 years and better for the environment • Lower carbon footprint • Best return on investment out there… I am getting over 10% tax free return on my investment. I was only able to afford up-front costs with my inheritance. • Reduce CO2 emissions and energy consumption • Energy independence • Using renewable energy to save resources as well as costs. • Global warming/Climate change, sufficient funds. • Being responsible to the future
If you currently do not have a renewable energy system but would like to, what barriers do you face?	Comments: • Cost of solar • Lack of money to install, not enough sun to be worth it (location) • Need to build another structure, cost of this building is the barrier. • What to do when system becomes outdated? Maintenance costs? • Not our permanent residence. • Perhaps installation cost issues. Also, we have 9-10 dead pine trees on our property that may prevent us from getting optimum sunlight to our planned solar installation. The cost of removing the very dead trees is high, more than our budget allows at this time. If the County or State could provide financial assistance in the cost of removing the trees, it would be helpful.
Are you interested in a site assessment of your home or business for renewable energy?	43% Yes 57% No Comments: • Already have solar • Soon, but not immediately • Not until I build my new house

Survey Questions	Responses
	• I would love to add more panels and get a better rate for excess energy generation. • It's already been completed. • We have had one for solar, but if there are other options, we're up for it.
Would you be interested in learning more about rebate and incentive programs for renewable energy?	78% Yes 22% No Comments: • Already have solar, and already informed on programs
What is your average monthly water and sewer bill?	17% Under $35 30% $35 to $70 9% $70 to $100 13% Over $100 30% N/A Comments: • Not on municipal service • Water only (no sewer) and NID will be increasing costs soon • N/A – on well and septic • For NID irrigation water • Includes ~$35/month house and $100/month NID ditch irrigation H2O
Are you aware of any programs that exist to help you save water, lower your bill, and/or reduce water consumption?	22% Yes 78% No Comments: • Create incentives for rain catchment systems
If so, have you participated in any utility rebate or incentive programs for water efficiency/conservation?	0% Yes 64% No 36% N/A Comments: • I installed two new low flow toilets but I didn't qualify for the rebate • Create incentives for compost toilets • We have low flow toilets and shower heads
If yes, have you seen any cost savings or other benefits from participating in these programs?	23% Unaware of my benefits 77% N/A

Survey Questions	Responses
If you have completed a water-energy efficiency project, what motivated you to complete the project?	Comments: • Water efficiency is a funny thing on my property since the large trees depend on flow from my septic system • Ensure a source of water • To conserve water consumption from our well and save well water.
If not, would you be interested in learning more about rebate and incentive programs for water-energy efficiency?	64% Yes 36% No Comments: • The drought has made us conserve and we no longer have decorative plants. • I'm very interested in rain water catchment and pond systems. • I am interested in a roof cistern down the road, but hate the fact my neighbor has one and has located the outflow on the corner of my property where it causes flooding
Are you interested in having an assessment of your indoor or outdoor water use?	43% Yes 57% No
What do you think would help you to achieve greater water savings? What barriers are there?	Comments: • Our thirsty plants! Get rid of lawn. Barrier is cost of landscaping. More efficient irrigation. • We have learned to cut out all unnecessary water use • Lowering the summer temp. Fix global warming. • I'm installing more hardscape, cutting back on plants that require water • Getting raw water from NID for landscape purposes. • A fire hydrant • Rain water catchment and pond systems. Code compliance. • Homeowners need better info on ground water availability and use. • Our water use is minimal. • Fewer rodents eating holes in my drip lines • The ditch-pump-filter-sprinkler system is very inefficient--ditch is down a steep hill, ~ 200 ft below us. • Compost toilets. barriers: Building code • Water savings would be pretty challenging for us since we are already very careful. We already have very low water usage since it's new construction. • Our water comes from a spring and is gravity fed to house, so no energy is used and water savings is mostly irrelevant. • We do very well today on conserving our well water. We've installed low-flow faucets, toilets, appliances, etc. • Lack of usage incentives, rebate programs • Better sprinkler system • Low flow faucets and toilets throughout house. Barrier is financial.