

# CITY OF GRASS VALLEY ENERGY ACTION PLAN



ACCEPTED BY CITY COUNCIL 5-0 ON NOVEMBER 13<sup>TH</sup>, 2018



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PREPARED BY SIERRA BUSINESS COUNCIL

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

IN COLLABORATION WITH THE CITY OF GRASS VALLEY AND COMMUNITY MEMBERS

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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.

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# EXECUTIVE SUMMARY

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

The City of Grass Valley Energy Action Plan (EAP) provides an analysis of the energy use within the City limits by the community and City operated facilities as well as a roadmap for accelerating energy efficiency, water efficiency, and renewable energy efforts already underway in Grass Valley. It is designed to assist the City in implementing the energy and water-energy related goals and policies in the City'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 utility-supplied energy used in the entire community by the residential and non-residential sectors, including the City and public agencies. This evaluation found that the community - including residential, non-residential, City, and public agencies - consumed 97,164,942 kilowatt hours (kWh) of utility-supplied electricity and an estimated 4,438,254 therms of natural gas in 2017. This is a decrease of 3% in utility-supplied electricity use and an increase of 4% in natural gas use from the 2005 baseline of 100,509,769 kWh and 4,249,503 therms. Of that energy use, the City's facilities accounted for 462,297 kWh of utility-supplied electricity use and 31,105 therms of natural gas use in buildings and 438,278 kWh of utility-supplied electricity for public lighting in 2017. This is a decrease of 31% in utility-supplied electricity use and a decrease of 20% in natural gas use in City facilities and a decrease of 5% in public lighting utility-supplied electricity use from the 2005 baseline of 673,263 kWh, 39,080 therms, and 462,414 kWh respectively. In addition, the community wide wastewater and potable water services accounted for 1,020,285 kWh of utility-supplied electricity and 347,009 kWh of utility-supplied electricity respectively in 2017. This is a decrease of 48% for wastewater service and a decrease of 57% for potable water service from the 2005 baseline of 1,944,379 kWh and 802,199 kWh respectively.

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

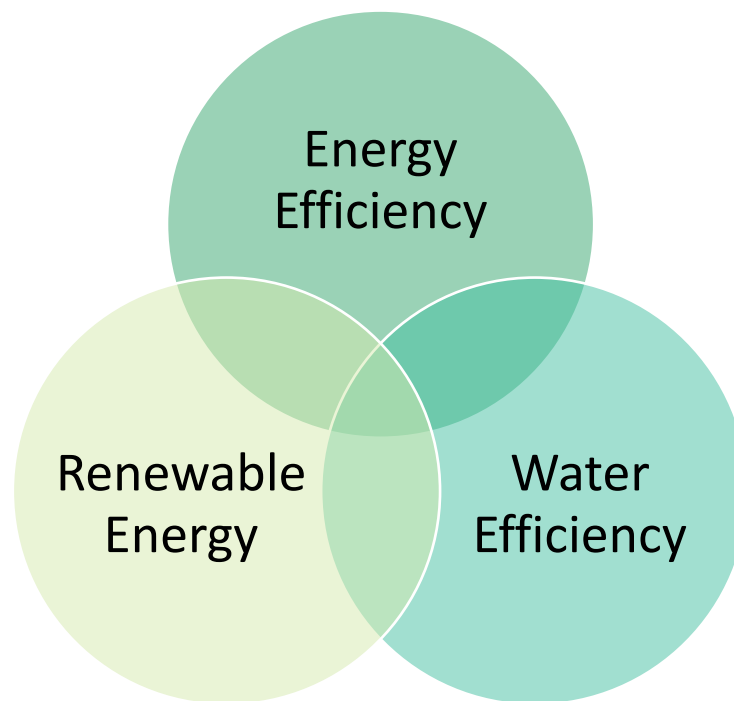
Energy Use Sector	2005 Baseline Electricity Use (kWh)	2005 Baseline Natural Gas Use (therms)	2017 Electricity Use (kWh)	2017 Natural Gas Use (therms)	% Change in Electricity Use (2005-2017)	% Change in Natural Gas Use (2005-2017)
Residential	35,209,787	2,551,827	34,638,392	2,406,757	-2%	-6%
Non-Residential (excludes MO below)	61,417,727	1,658,596	60,258,681	2,000,392	-2%	21%
Municipal Operations (MO)	673,263	39,080	462,297	31,105	-31%	-20%
Public Lighting (MO) (Includes LS-1)	462,414	-	438,278	-	-5%	-
Wastewater Energy	1,944,379	-	1,020,285	-	-48%	-
Potable Water Energy	802,199	-	347,009	-	-57%	-
<b>Total</b>	<b>100,509,769</b>	<b>4,249,503</b>	<b>97,164,942</b>	<b>4,438,254</b>	<b>-3%</b>	<b>4%</b>

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 Grass Valley if no actions were taken to lower energy use or improve the efficiency of current City and community-wide operations. The 2035 "business-as-usual" forecast of annual energy use showed that electricity consumption would increase 4% to 104,820,164 kWh in 2017 and 17% to 116,395,422 kWh in 2035 while natural gas consumption would increase 3% to 4,397,500 therms in 2017 and 15% to 4,891,000 therms in 2035. The primary reasons that community electricity use decreased between 2005 and 2017 were community efforts saving over

3,142,715 kWh of electricity annually from PG&E energy efficiency programs<sup>1</sup> and producing an estimated 3,280,910 kWh of electricity from solar photo voltaic (PV) systems<sup>2</sup>, which underscores the importance of utilizing the available resources and funding. The actions within this plan are voluntary and do not require the City 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 City of Grass Valley to save money and energy by addressing the inefficiencies of current energy-consuming systems, operations, and behaviors. To achieve these savings, the City of Grass Valley EAP was developed to provide a broad view of energy use in the City, 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 utility-supplied electricity use in 2035 by 36% and annual natural gas use by 29%, which translates to annual energy savings of 42,466,551 kWh of electricity and 1,410,586 therms from the projected business as usual forecast. These savings are estimated to result in over \$11.5 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, and water efficiency. Key components include developing and disseminating information on existing programs at community events and on the City's website; energy-related training for City 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.

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<sup>1</sup> Grass Valley 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>

<sup>2</sup> Grass Valley 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/>

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 City staff time. The Working Group should be comprised of representatives from the City, Nevada County, Grass Valley Utilities Department, Nevada County Resource Conservation District, Grass Valley School District, PG&E, Nevada County Association of Realtors, 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 <sup>3</sup>	Percent Difference
<b>Electricity</b>	100,509,769 kWh	117,214,650 kWh	42,466,551 kWh	\$9,615,189	36% reduction from 2035 BAU
<b>Natural Gas</b>	4,249,503 therms	4,891,000 therms	1,410,586 therms	\$1,905,238	29% reduction from 2035 BAU

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

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<sup>3</sup> Forecasted composite rates for 2035 of \$0.226 per kWh and \$1.351 per therm 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 the Grass Valley community and leading energy efficiency efforts that the City 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 the City of Grass Valley.
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, the Grass Valley community - including residential, non-residential, City, and public agencies - consumed 100,509,769 kWh of electricity and an estimated 4,249,503 therms of natural gas, costing an estimated \$20.5 million.<sup>4</sup> The majority of this money leaves the community. Additionally, because of the projected increase in households and employment in Grass Valley, the community's residential energy use is forecast to increase by 13% and non-residential energy use is forecast to increase by 19% by 2035. Grass Valley residents and businesses can reduce 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

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<sup>4</sup> 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

renewable energy projects, which often pay for themselves in 6 to 12 years depending on system size and financing options. By implementing this Energy Action Plan, the community could realize the following benefits:

Energy & Money Savings

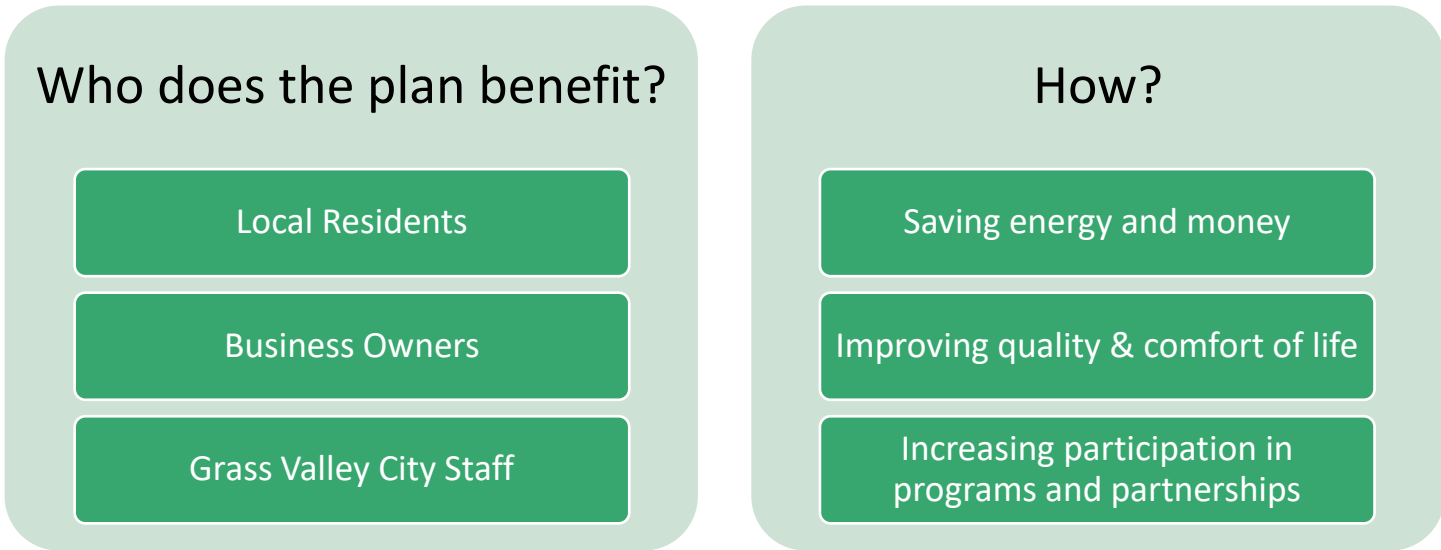
Community Resiliency

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 City'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, 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 City's commitment to energy independence and community resilience. It is also intended to inspire residents, businesses, and other public agencies in Grass Valley to participate in community efforts and maximize energy efficiency, renewable energy, and water efficiency.

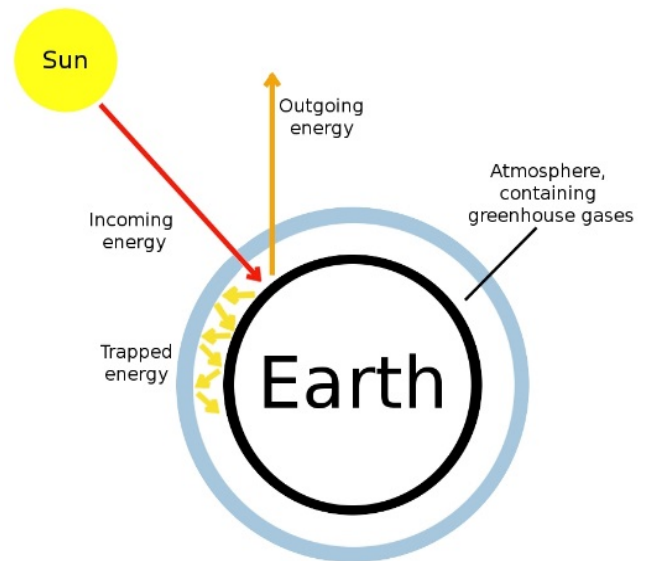


Most energy projects are cost-effective because energy savings are seen immediately, and the money saved offsets the upfront costs over time. Depending on the size and scope of the project, energy projects can pay for themselves in a few months or several years. With financing, projects can be cash flow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

## CLIMATE SCIENCE BASICS

Naturally occurring gases<sup>5</sup> 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.<sup>6</sup>



*Image Credit: simpleclimate.wordpress.com*

## LOCAL CLIMATE CHANGE IMPACTS

The City of Grass Valley, 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. Climate change can impair the ability of ecosystems to provide goods and services, many of which represent cultural, social, and economic benefits that local communities rely on for agriculture, tourism, recreation, and other industries.<sup>7</sup>

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](mailto:ncaravelli@sierrabusiness.org). For more information visit the website at [www.sbcsierracamp.org](http://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:

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

<sup>6</sup> 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.

<sup>7</sup> California Office of Environmental Health Hazard Assessment. 2018 Report: Indicators of Climate Change in California. Accessed July, 2018. <https://oehha.ca.gov/climate-change/document/indicators-climate-change-california>

**Table 1-2: Regulatory Context**

1978	• <b>Title 24, Part 6.</b> 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	• <b>Senate Bill 1078.</b> 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	• <b>Executive Order S-3-05.</b> 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	• <b>Assembly Bill 32.</b> 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	• <b>Senate Bill 97.</b> Requires lead agencies to analyze GHG emissions and climate change impacts under the California Environmental Quality Act.
2011	• <b>CALGreen.</b> 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	• <b>Senate Bill 350.</b> 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	• <b>Senate Bill 32.</b> Expands upon AB 32 and requires the California ARB to develop regulatory and market mechanisms that will ensure that statewide greenhouse gas emissions are reduced to 40% below 1990 levels by 2030.
2017	• <b>Assembly Bill 398.</b> Extends the cap-and-trade program mandated by AB 32 to continue through 2030.
2018	• <b>Senate Bill 100:</b> 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 City 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.<sup>8</sup>

- 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.

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

## RELATIONSHIP TO CEQA

The City of Grass Valley determined the acceptance of the EAP is exempt from the California Environmental Quality Act (CEQA) as it is not a project under section 15398 and per section 15061 (b) (3) of the CEQA guidelines:

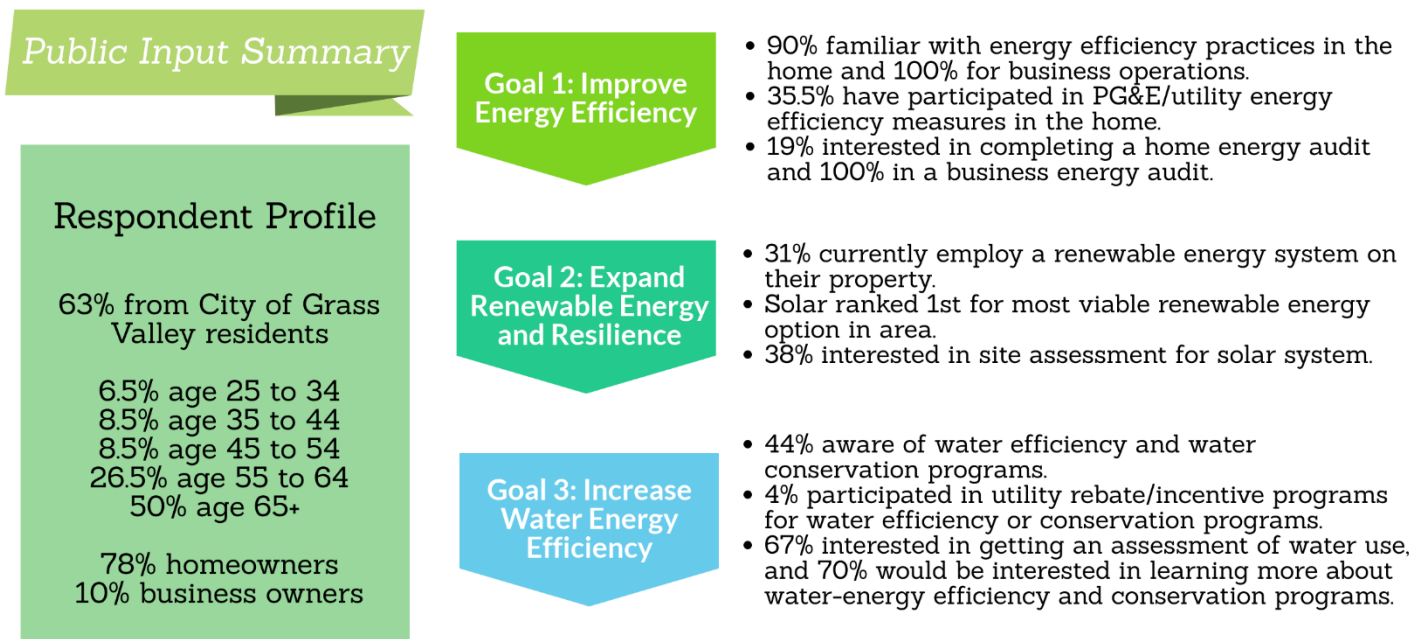
*The activity is covered by the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA.*

## ENERGY ACTION PLAN DEVELOPMENT

The path to the EAP began in spring of 2018 when the City 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 City 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 City and community can undertake to reduce energy use as well as money spent on energy.

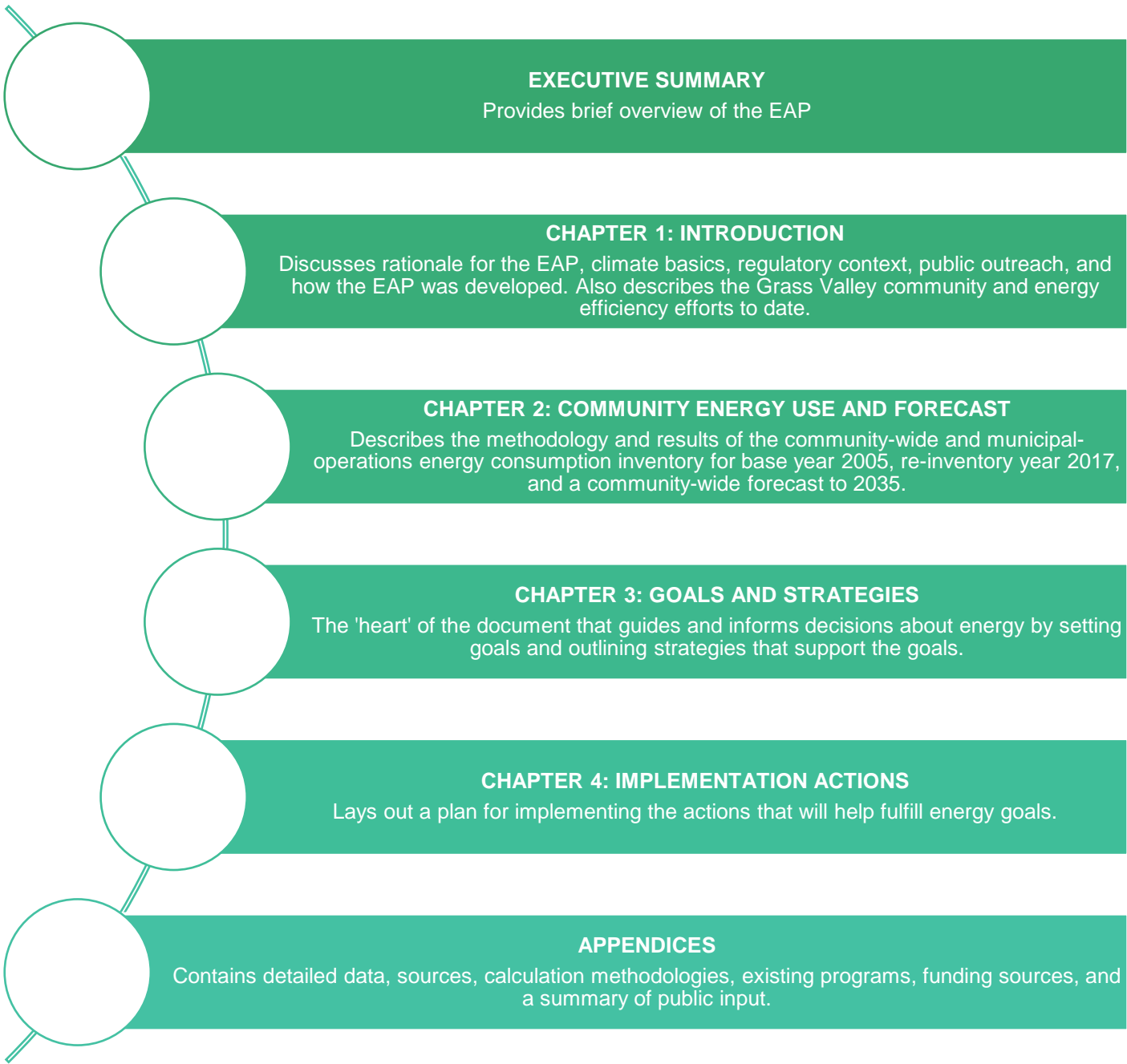
Community involvement is an essential part of successful planning efforts, and input was widely sought throughout the City to ensure the scope of the plan is appropriate, the goals are realistic, and the actions are doable. The public outreach strategy included an online survey and a community study session hosted by the Grass Valley Planning Commission on June 19th, 2018. The online survey was kept open from May 31st, 2018 to July 21st, 2018 and received 46 responses. Both the survey and study session were publicized at the City Hall offices, Chamber of Commerce office, and the Grass Valley Public Library. 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. Additionally, the SBC Climate Planning Team hosted an interactive public input session on July 28th at the City's Thursday Night Market booth where additional community input collected.

**Figure 1-3: Public Input Summary**



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

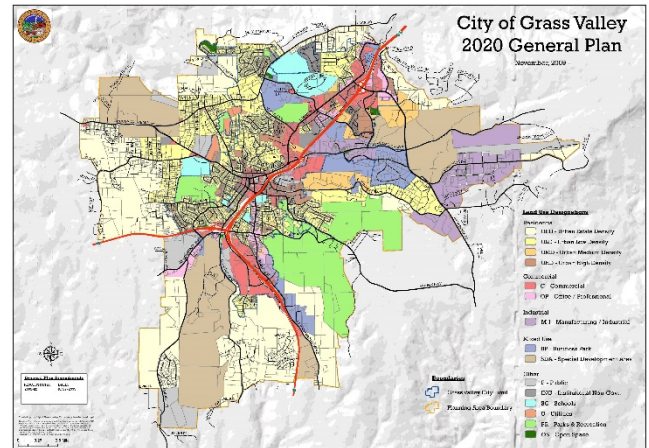




## COMMUNITY PROFILE

The City of Grass Valley is largest city in western Nevada County and is a historic northern California Gold Country city. It was incorporated in 1860 and in March 1893, Grass Valley became a Charter City, and under the California State Constitution, has a large degree of control over local affairs, independent of the State government.

Grass Valley is the location of two of the richest mines in California - the Empire Mine and the North Star mine, both of which are now recreation destinations for tourists and locals alike. The intersection of Mill Street and Main Street downtown retains the historic charm of the Gold Rush, and Grass Valley remains the commercial center of Western Nevada County.



Map of Grass Valley, from City of Grass Valley General Plan

Grass Valley is located on the West side of the Sierra Nevada mountain range in central California. The City has a total area of 5.25 square miles and sits along California Highway 49 and Highway 20. The 2010 United States Census reported that Grass Valley had a population of 12,860. Grass Valley has a hot-summer Mediterranean climate, and experiences warm to hot, dry summers and wet, cool, rainy winters. The winter rains contribute to a heavy fuel-loading of brush and grass, which dry out during the summer, posing a wildfire hazard. Snow occurs at times. Over the course of a year, there are an average of 35 days of 90 °F (32 °C) or hotter and 2 days of 100 °F (38 °C) or hotter, with an average of 70 days of 32 °F (0 °C) or colder.<sup>9</sup>

The City provides a complete suite of services including police and fire protection, highway, street, and infrastructure construction and maintenance, wastewater treatment and disposal, water treatment and distribution, planning, building, economic development, parks and recreation, public transportation services, and cultural activities. Electricity and natural gas services for government operations, businesses, and residents in the City are provided by Pacific Gas and Electric (PG&E). Water services are provided by the City and Nevada Irrigation District.

## LOCAL ENERGY EFFICIENCY EFFORTS

Electricity and natural gas are the two primary forms of energy used in the City and are provided by PG&E. Grass Valley has already implemented programs that have resulted in or will lead to benefits in the form of energy efficiency, renewable energy, and water efficiency. Summarized below are activities and programs the City has initiated to meet their resource and energy efficiency goals:

*The City's Development Code includes the following examples of energy conservation measures: energy efficient exterior lights, landscaping standards and irrigation efficiency for water and energy savings, solar access and expedited and streamlined solar permitting process, and energy conservation in the layout of subdivisions.*

*In August 2016, OpTerra Energy Services (OES) completed construction of the Energy Efficiency and Renewable Power Generation Project for the City of Grass Valley which included solar, lighting retrofits, pump retrofits, and roof replacement.*

*The City Council unanimously approved a cooperative agreement to allow mPOWER to administer the Property Assess Clean Energy Program (PACE Program) in the City of Grass Valley.*

<sup>9</sup> National Oceanic and Atmospheric Administration, National Weather Service Forecast Office, Grass Valley, CA – Accessed April, 2018: <http://w2.weather.gov/climate/xmacis.php?wfo=sto>

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

**Table 1-5: City of Grass Valley General Plan Energy Efficiency Components**

<b>Housing Element</b>	<p>Opportunities for Energy Conservation: While localities are responsible for enforcing energy conservation measures and homebuilders must comply with mandatory energy efficiency requirements, other alternative energy standards to follow are: passive solar construction techniques that require proper solar orientation, appropriate levels of thermal mass, and south facing windows; higher insulation levels in place of thermal mass or energy conserving window orientation; and active solar water heating and/or on-demand water heating system in exchange for less insulation and/or energy conserving window treatments. (General Plan Housing Element Section F)</p> <hr/> <p><i>Program Action 25: Energy Conservation for New Construction and Residential Design</i> – City shall continue to enforce state energy standards for new residential construction (Title 24 of the California Code of Regulations) and shall encourage, through the City's residential design guidelines, additional energy conservation measures such as the siting of buildings, landscaping, and solar access. (General Plan Housing Element Section F)</p> <hr/> <p><i>Program Action 26: Weatherization and Energy Conservation for Existing Dwelling Units</i> – PG&amp;E provides weatherization and energy conservation programs directed towards lower income households. To further assist in the promotion of, and to reduce the costs of, housing rehabilitation, the City shall add information of PG&amp;E's programs in its application forms for housing rehabilitation. (General Plan Housing Element Section F)</p> <hr/>
<b>Conservation and Open Spaces Element</b>	<p>Grass Valley's General Plan contains policies in the Conservation/Open Space Element and the Recreation Element to implement circulation/transportation measures designed to reduce reliance on the automobile and to provide non-motorized linkages between parks and open spaces. By encouraging an emphasis on pedestrian uses in all development within Grass Valley, reduction of the reliance on motorized vehicles will occur, which will also result in reduced energy consumption.</p> <hr/>
<b>Municipal Code</b>	<p><i>Chapter 15.04 Adoption of Building Standards Codes: 15.04.090</i> - California Energy Code Part 6, 2016 Edition. The city council adopts and enacts the 2016 California Energy Code (California Code of Regulations, Title 24, Part 6) as published by the International Code Council (ICC) and as adopted by the California Building Standards Commission.</p> <hr/> <p><i>Chapter 15.08 Solar Energy Systems: 15.08.020</i> – Purpose: The purpose of the chapter is to adopt an expedited, streamlined solar permitting process that complies with the Solar Rights Act and AB 2188 (Chapter 521, Statutes 2014) to achieve timely and cost-effective installations of small residential rooftop solar energy systems. The chapter encourages the use of solar systems by removing unreasonable barriers, minimizing costs to property owners and the city, and expanding the ability of property owners to install solar energy systems.</p> <hr/> <p><i>Chapter 15.12 – Electric Vehicle Charging Station Permitting Process: 15.12.010</i> - Purpose. The purpose of the chapter is to adopt an expedited, streamlined permitting process that complies with AB 1236 codified in Government Code section 65850.7 to achieve timely cost-effective installation of electric vehicle charging stations. This chapter encourages the installation and use of electric vehicle charging stations by removing obstacles to and minimizing the cost of permitting for charging stations, and by expanding the ability of residential, commercial and industrial property owners to install electric vehicle charging stations.</p> <hr/>

## 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 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. Table 2-1 presents the 2005 baseline and 2017 re-inventory energy use.

**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	35,209,787	2,551,827	34,638,392	2,406,757	-2%	-6%
Non-Residential (excludes MO below)	61,417,727	1,658,596	60,258,681	2,000,392	-2%	21%
Municipal Operations (MO)	673,263	39,080	462,297	31,105	-31%	-20%
Public Lighting (MO) (Includes LS-1)	462,414	-	438,278	-	-5%	-
Wastewater Energy	1,944,379	-	1,020,285	-	-48%	-
Potable Water Energy	802,199	-	347,009	-	-57%	-
<b>Total</b>	<b>100,509,769</b>	<b>4,249,503</b>	<b>97,164,942</b>	<b>4,438,254</b>	<b>-3%</b>	<b>4%</b>

### 2005 BASELINE COMMUNITY-WIDE INVENTORY

The City's community-wide utility-supplied energy use data is expressed as aggregated residential and non-residential energy use by energy source. The City's municipal energy use for facilities located within the City is included with the aggregated non-residential energy use. Electricity and natural gas use were the largest energy sources in the City of Grass Valley built environment. As an additional point of insight, electricity used for potable water and wastewater services was analyzed separately from non-residential energy.

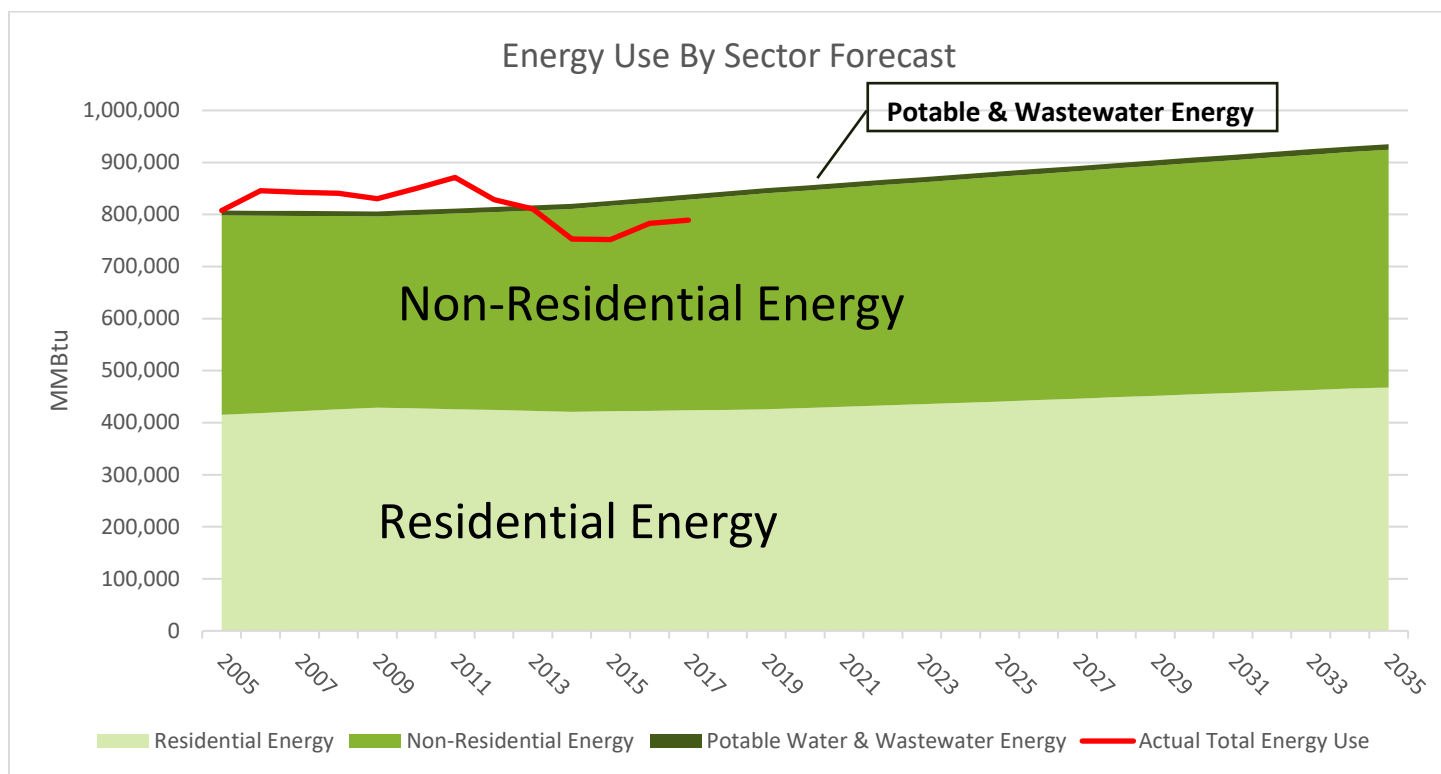
### 2017 COMMUNITY-WIDE RE-INVENTORY

Similarly to the 2005 baseline, the 2017 re-inventory found that electricity and natural gas use were the largest energy sources in the City of Grass Valley built environment. In 2017, the City's community wide residential utility-supplied electricity consumption decreased 2%, and residential natural gas use decreased 6% from the 2005 baseline. Non-residential utility-supplied electricity use decreased 2%, and non-residential natural gas use increased 20%. As an additional point of insight, electricity used by potable water and wastewater services provided for City residents and businesses by the City and NID was again analyzed separately from non-residential energy. In 2017, the City's water and wastewater services used electricity supplied by PG&E, supplemented by electricity generated by photovoltaic solar panels, resulting in reduced utility-supplied electricity. Potable water services used on-site solar panels and wastewater services used off-site solar panels. This resulted in a 48% decrease in wastewater services' PG&E supplied electricity use and a 57% decrease in potable water services' PG&E supplied electricity use. These changes in energy consumption illustrate the progress that has already been made toward achieving the 2035 energy reduction goals in this plan.

## 2035 BUSINESS-AS-USUAL COMMUNITY-WIDE FORECAST

The City's community-wide residential, non-residential energy use, and potable water and wastewater energy use was forecast out to 2035 under a business-as-usual scenario using the Statewide Energy Efficiency Collaborative (SEEC) ClearPath California toolkit (See Figure 2-2). The City's municipal energy use is included with the community-wide energy use, therefore 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. The two required inputs for a forecast — baseline energy consumption data and growth rates — are presented in Appendices A and B, respectively. The baseline electricity and natural gas use data was collected from PG&E. The growth rates were calculated using projections of the number of households and in-City employment prepared by state agencies. The Community's total annual energy usage in 2035 was forecast to increase by 16%. Total electricity use was forecast to increase by 17% to 117,305,773 kWh (a net increase of 16,796,004 kWh). Total natural gas use was forecast to increase by 15% to 4,897,710 therms (a net increase of 648,207 therms).

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



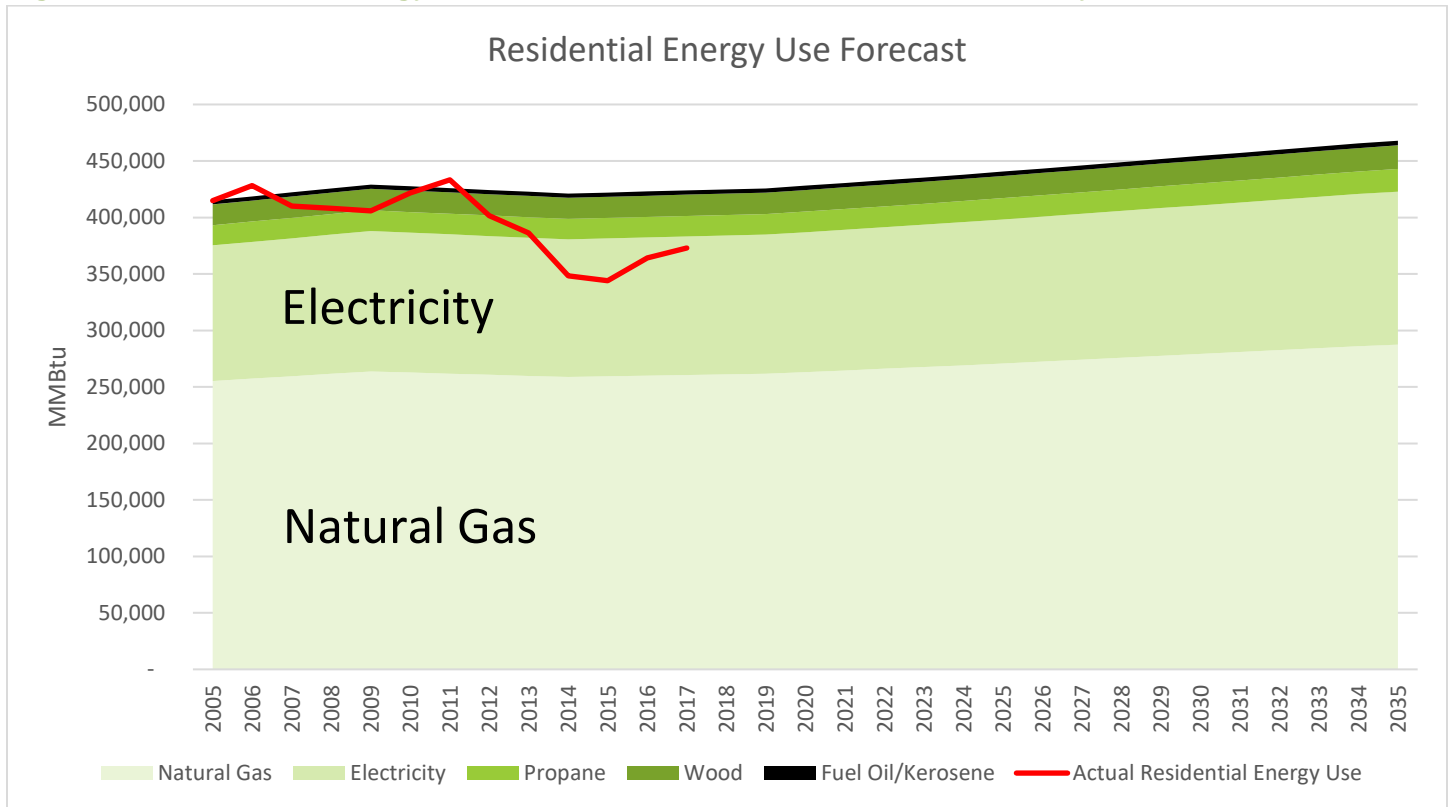
## 2035 BUSINESS-AS-USUAL RESIDENTIAL ENERGY USE FORECAST

The City's 2035 residential annual energy usages were all forecast to increase by 13%, resulting in 39,674,544 kWh of electricity usage (a net increase of 4,464,757 kWh) and 2,875,420 therms of natural gas combustion (a net increase of 323,593 therms) (See Figure 2-3). This forecast is based on the projected change in the number of households in the City of Grass Valley. The annualized growth rates for the number of households in the City were calculated based on the projected change in the number of households in Nevada County from 2005 to 2035 reported by the Caltrans Long-Term Socio-Economic Forecast of households for Nevada County.<sup>10</sup> This projected growth would result in an additional 810 households in the City of Grass Valley based on the 2005 baseline of 6,391 households. The use of Nevada County data as a proxy for the City of Grass Valley for the residential forecast was justified by a comparison of County and City residential population data. Residential population data taken from California's Department of Finance shows that the population of City of Grass Valley composes a slightly increasing percentage of Nevada County's overall population, rising from 12.7%

<sup>10</sup> Caltrans Long-Term Socio-Economic Forecasts by County – Nevada County 2017. [http://www.dot.ca.gov/hq/tpp/offices/eab/socio\\_economic.html](http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html), Households. (Accessed April 19, 2018).

in 2001 to 13.2% in 2018.<sup>11,12</sup> Due to efforts already underway in the community, actual residential energy use is already 12% below the BAU forecast for energy use in 2017.

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



### 2035 BUSINESS-AS-USUAL NON-RESIDENTIAL ENERGY USE FORECAST

The City's annual non-residential energy usages were all forecast to increase by 19%, resulting in 74,514,295 kWh of electricity usage (a net increase of 11,960,891 kWh) and 2,022,290 therms of natural gas usage (a net increase of 324,614 therms) in 2035 (See Figure 2-4). This forecast is based on the projected change of in-City employment in the City of Grass Valley. The annualized growth rates for employment in the City of Grass Valley were calculated based on the actual change from 2005 to 2015 of in-County employment and the projected change from 2015 to 2035 of in-County employment based on the Caltrans economic forecast for Nevada County.<sup>13</sup> This projected growth would result in an additional 2,034 jobs in Grass Valley based on the 2005 baseline of 10,635 according to the US Census Bureau's On the Map Tool.<sup>14</sup> The use of Nevada County data as a proxy for the City of Grass Valley for non-residential forecasts was justified by a comparison of the number of jobs within the County and the City. Employment data taken from the US Census Bureau's On the Map tool shows that the number of jobs in City of Grass Valley has made up between 33.5% and 36.5% of the number of jobs in Nevada County.<sup>15</sup> Between 2005 and 2008, the actual non-residential energy use in Grass Valley increased while employment decreased. Energy use stayed relatively flat between 2009 and 2012 as employment rebounded and then declined between 2013 and 2017 as employment continued to increase.

<sup>11</sup> California Department of Finance E-4 Population Estimates – Nevada County and City of Grass Valley 2000 - 2010. <http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-4/2001-10/>. (Accessed May 30, 2018)

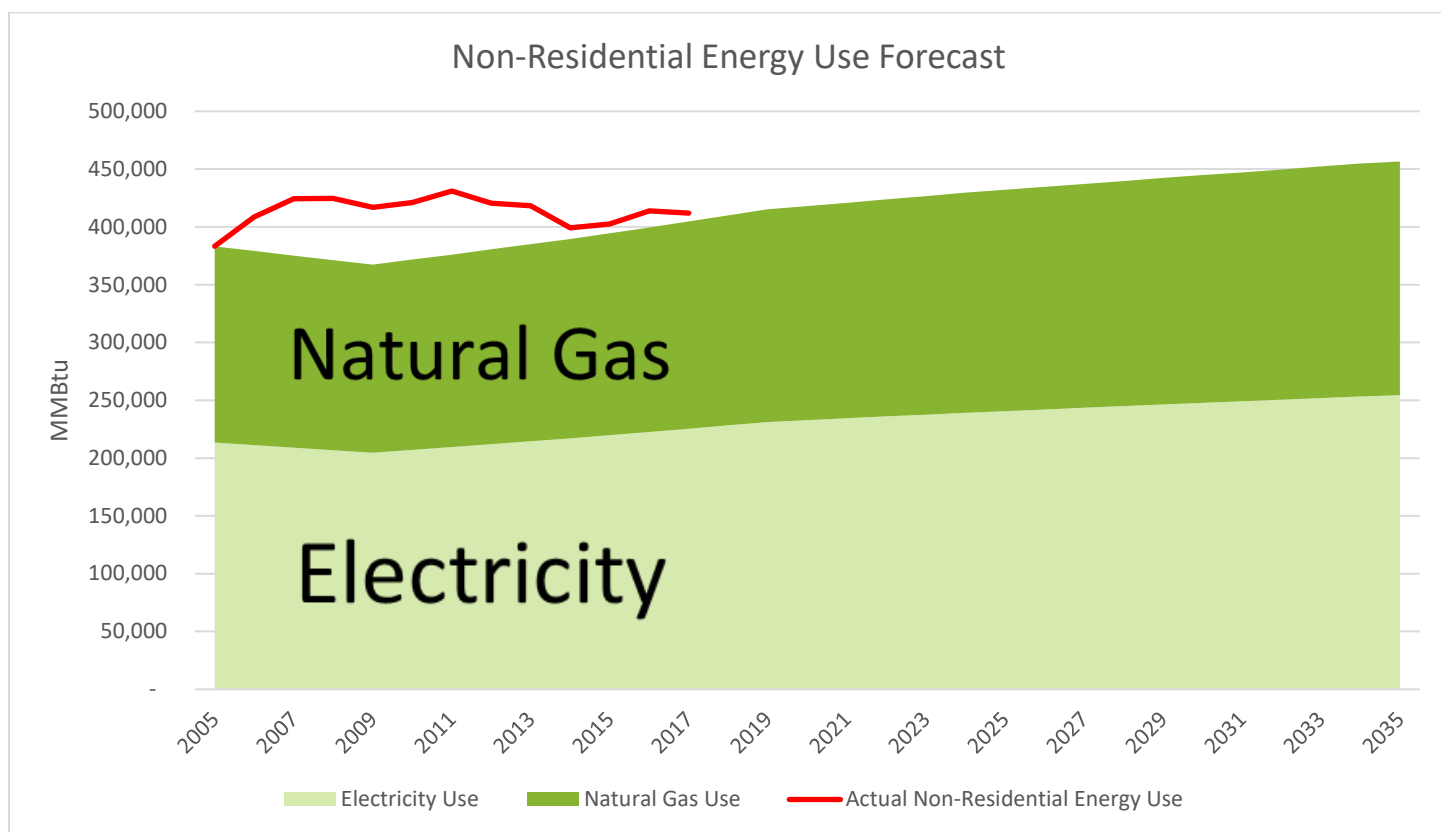
<sup>12</sup> California Department of Finance E-5 Population and Housing Estimates – Nevada County and City of Grass Valley 2011 – 2015. <http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/>. (Accessed May 8, 2018)

<sup>13</sup> Caltrans Long-Term Socio-Economic Forecasts by County – Nevada County 2017, [http://www.dot.ca.gov/hq/tpp/offices/eab/socio\\_economic.html](http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html) In-County Total Employment, All Industries. (Accessed April 19, 2018).

<sup>14</sup> US Census Bureau On the Map Web Tool - Nevada County and City of Grass Valley 2001-2015. <https://onthemap.ces.census.gov/>. (Accessed June 12, 2018)

<sup>15</sup> US Census Bureau On the Map Web Tool – Nevada County and City of Grass Valley 2002 -2015. <https://onthemap.ces.census.gov/>. (Accessed June 12, 2018)

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

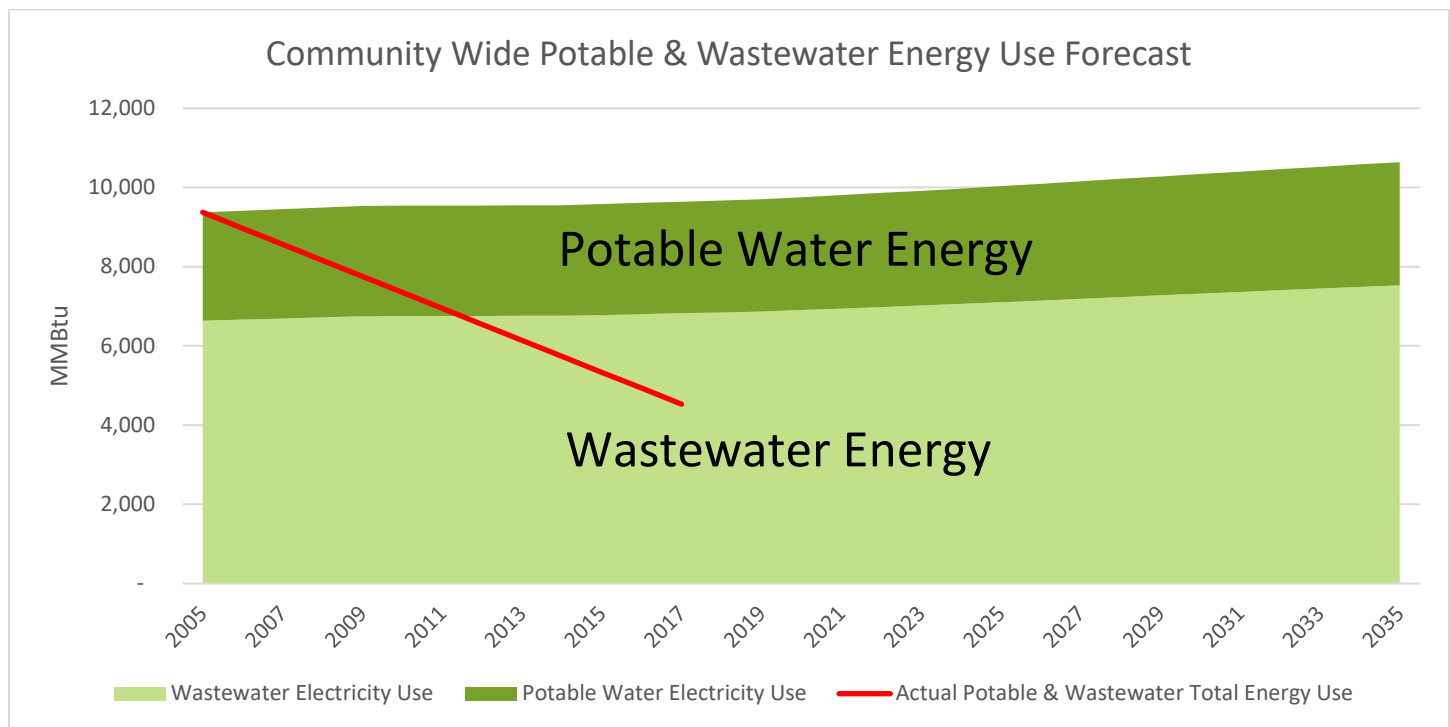


#### 2035 BUSINESS-AS-USUAL WASTEWATER AND POTABLE WATER ENERGY USE FORECAST

The City's wastewater and potable water services annual electricity use were forecast to increase 13% based on the projected change in the number of household and business establishments in the City. This increase would result in 2035 annual wastewater service electricity use of 2,206,583 kWh (a net increase of 262,204 kWh) and 2035 annual potable water service electricity use of 910,351 kWh (a net increase of 108,152 kWh). The annualized growth rates for the number of households and business establishments in the City were calculated based on the projected change in the number of households from 2005 to 2035 reported by the Caltrans Long-Term Socio-Economic Forecast of households for Nevada County and the projected change in employment reported by the Caltrans Economic Forecast of Nevada County. Between 2005 and 2017, the actual utility-generated energy used for wastewater treatment decreased 48%, primarily due to 1,122,408 kWh of electricity generated by solar. Potable water utility-generated electricity use decreased 57% primarily due to a 33% decrease in potable water use, a 15% decrease in kWh-per-gallons delivered, and substantial solar-generated electricity.



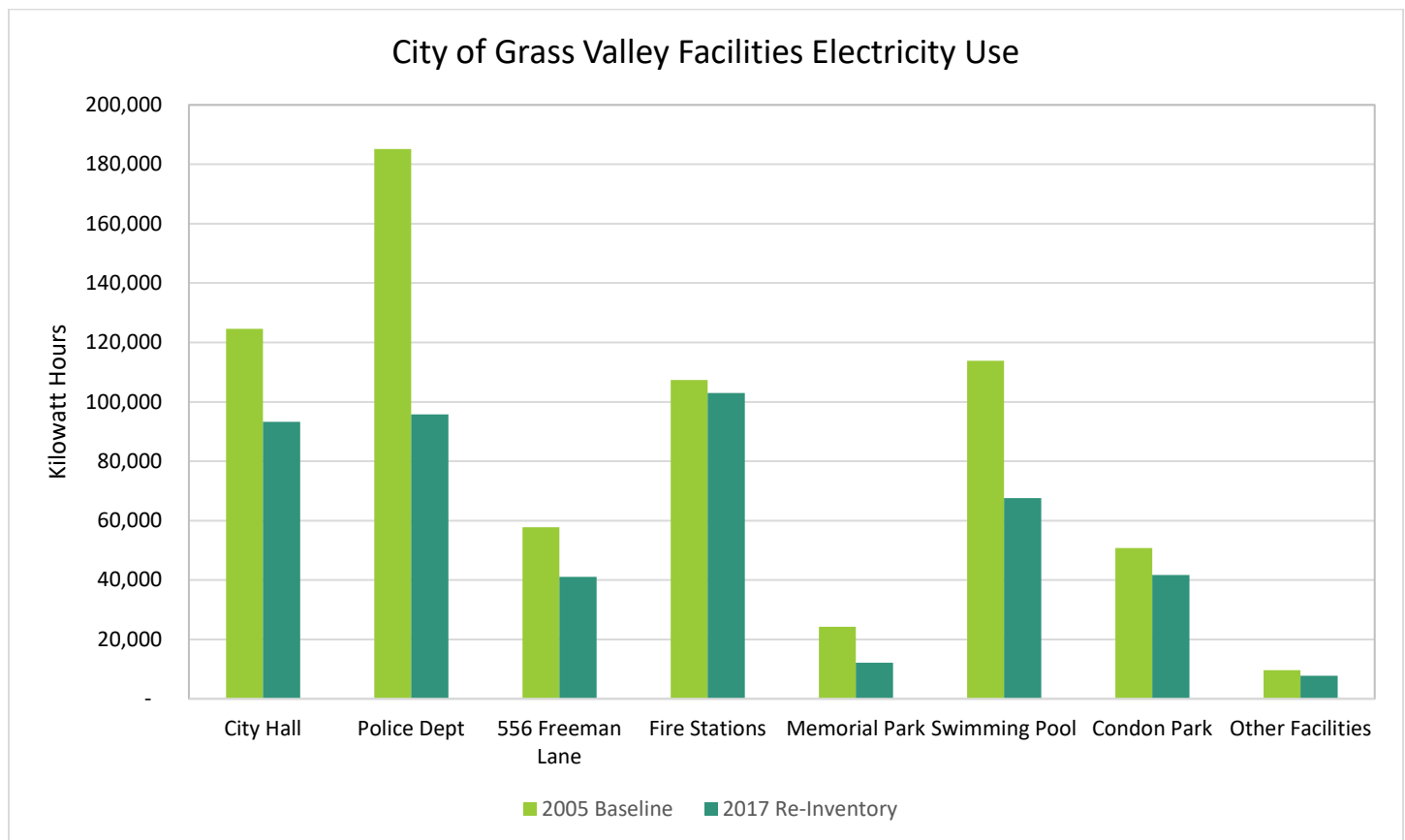
**Figure 2-5: Wastewater and Potable Water Energy Use Forecast to 2035 Under a BAU Scenario**



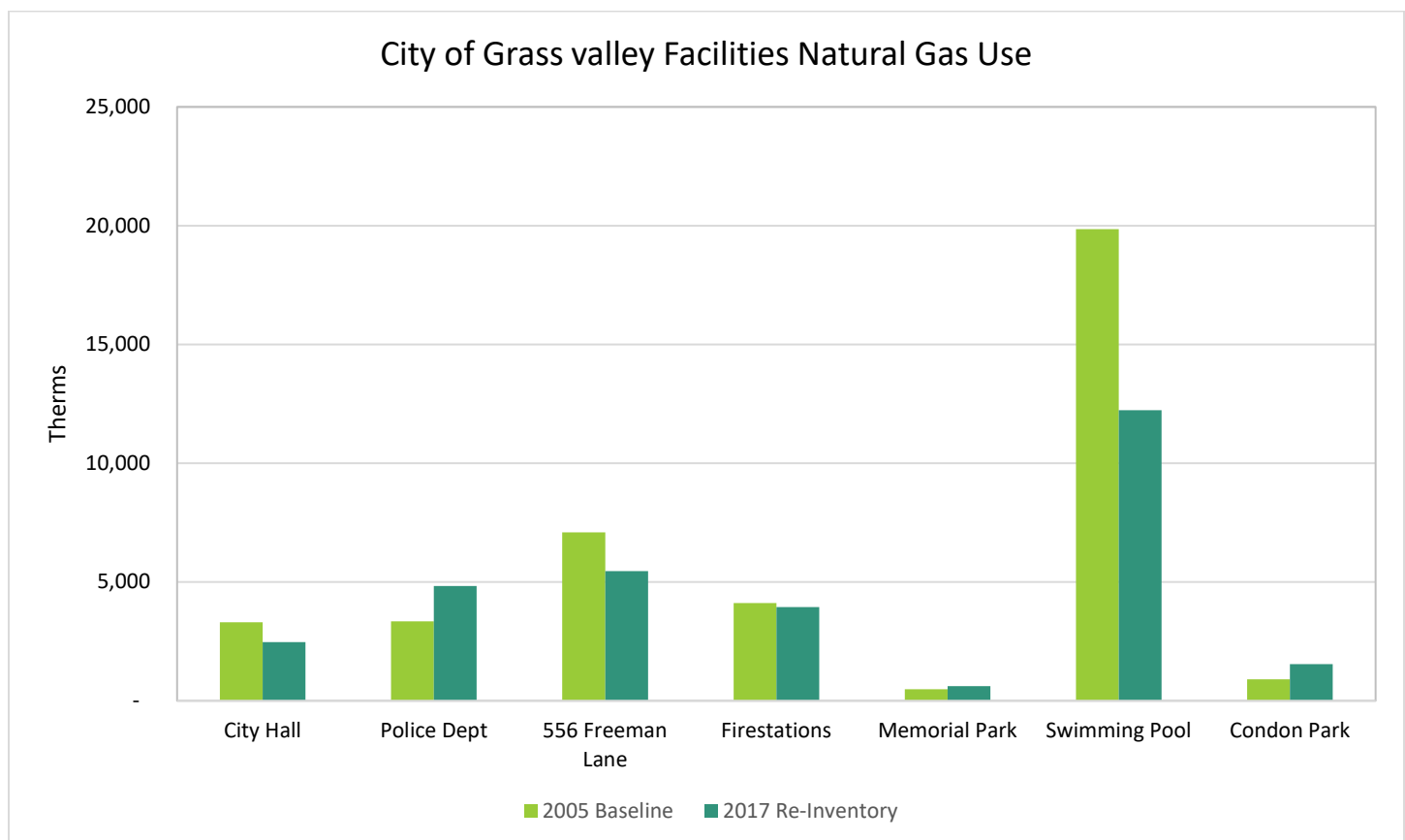
**2005 BASELINE AND 2017 RE-INVENTORY OF CITY OF GRASS VALLEY'S FACILITIES ENERGY USE**

The City of Grass Valley's facilities' primarily use electricity and natural gas, as presented in Figure 2-6 and 2-7. The Police Department, City Hall, Grass Valley Fire Stations, and the Memorial Park swimming pool used the most electricity of City facilities. The Memorial Park swimming pool, the Freeman Lane facility, Grass Valley Fire Stations, and the Police Department used the most natural gas. While overall city-operations utility-supplied energy use decreased between 2005 and 2017, there were increases in natural gas use at several facilities including the Police Station, Condon Park and Memorial Park. Possible causes include changes in equipment, changes in building or equipment use, or a weather related increase in heating. In 2005, the City of Grass Valley's facilities' electricity use totaled 673,263 kWh and natural gas use totaled 39,080 therms. Between 2005 and 2017, utility-supplied electricity use decreased 31% kWh and natural gas use decreased 20%. These decreases in energy consumption reflect progress that has already been made toward meeting the energy reduction goals in this report. In 2005, energy use at the City facilities cost an estimated \$142,489. In 2017, City facilities' energy costs decreased by 32% to \$97,448, saving \$45,041 annually. Additionally, electricity used for public lighting decreased 5%. Energy use is summarized in Table 2-1 and detailed in Appendix A.

**Figure 2-6: 2005 Baseline & 2017 Re-Inventory of City Facilities Electricity Use**



**Figure 2-7: 2005 Baseline & 2017 Re-Inventory City Facilities Natural Gas Use**



# CHAPTER 3: GOALS & STRATEGIES

*Chapter 3 identifies three big-picture energy reduction goals, and details strategies that will help the City and community reduce their energy need 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 the City of Grass Valley the following documents and resources were reviewed:

- City of Grass Valley General Plan 2020<sup>16</sup>
- City of Grass Valley Municipal Code<sup>17</sup>
- 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 City staff
- Public input received from community members and Planning Commission

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

1. Potential of actions to reduce energy use
2. Availability of other organizations to implement 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 usage, 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<sup>18</sup> to estimate energy savings achievable in 2035 by meeting the associated 2035 targets. Calculations are documented in Appendix C. The estimated 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 City, the community can potentially reduce utility-supplied energy use by 42,466,551 kWh of electricity (36% reduction) and 1,410,586 therms (29% reduction) from the 2035 BAU forecast. 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 Grass Valley saw a 2% decrease in residential electricity use, 6% decrease in residential natural gas use, 2% decrease in non-residential electricity use, 20% increase in non-residential natural gas use, 48% decrease in wastewater services (PG&E supplied) electricity use and 57% decrease in potable water services (PG&E supplied) electricity use, resulting in a total reduction of 3,344,827 kWh of utility-supplied electricity and a total increase of 188,751 therms of natural gas.

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<sup>16</sup> City of Grass Valley 2020 General Plan <https://www.GrassValleyca.com/cityservices/commdevelop/generalplandocs/GrassValleyGeneralPlan2020.pdf>

<sup>17</sup> Municipal Code. City of Grass Valley. <https://www.GrassValleyca.com/cityservices/commdevelop/municipalcode.htm>

<sup>18</sup> 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 the City of Grass Valley'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 City, 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 City 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 and 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. The Working Group assisted by the Local Government Commission's CivicSpark AmeriCorps fellow can help alleviate the demand on City staff time needed to implement the plan. The Working Group should be comprised of representatives from the City, Nevada County, Grass Valley Utilities Department, Nevada County Resource Conservation District, Grass Valley School District, PG&E, Nevada County Association of Realtors, 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 <sup>19</sup>	Percent Difference
Electricity	100,509,769 kWh	117,214,650 kWh	42,466,551 kWh	\$9,615,189	36% reduction from 2035 BAU
Natural Gas	4,249,503 therms	4,891,000 therms	1,410,586 therms	\$1,905,238	29% reduction from 2035 BAU

<sup>19</sup> Forecasted 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: City of Grass Valley Energy Action Plan Goals and Strategies

CITY OF GRASS VALLEY ENERGY ACTION PLAN GOALS AND STRATEGIES	
<u>Goal 1:</u>  <b>Energy Efficiency</b>	<b>Improve Energy Efficiency in Buildings, Facilities, and City Operations</b>
	<p><b>Strategy 1.1:</b> Expand outreach and education on existing energy efficiency practices, programs, and financing options for residential and non-residential utility customers.</p> <p><b>Strategy 1.2:</b> Improve compliance with current California Building Energy Efficiency Standards (Title 24, Part 6) by providing informational materials when available.</p> <p><b>Strategy 1.3:</b> Continue to increase the energy efficiency of City buildings, facilities, and operations.</p>
<u>Goal 2:</u>  <b>Renewable Energy</b>	<b>Expand the Utilization of Renewable Energy and Resilience Measures</b>
	<p><b>Strategy 2.1:</b> 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.</p> <p><b>Strategy 2.2:</b> Encourage renewable energy projects through education, outreach, and local leadership.</p> <p><b>Strategy 2.3:</b> Encourage energy storage and grid optimization infrastructure projects that support local renewable energy systems and community resilience.</p>
<u>Goal 3:</u>  <b>Water Energy</b>	<b>Encourage the Efficient and Safe Transportation and Use of Water Resources</b>
	<p><b>Strategy 3.1:</b> Improve and increase the City's outreach and education efforts in collaboration with Nevada Irrigation District by providing information on existing and future programs.</p> <p><b>Strategy 3.2:</b> Participate in and encourage Nevada Irrigation District to participate in proactive leak detection programs in order to reduce water losses.</p> <p><b>Strategy 3.3:</b> Continue to improve the efficiency of City water utility operations, and encourage and collaborate with Nevada Irrigation District to improve efficiency of district water operations.</p>

# GOAL 1: IMPROVE ENERGY EFFICIENCY IN BUILDINGS, FACILITIES, AND CITY OPERATIONS

## Target Audience

Residents  
Businesses  
Public Agencies

## Projected Energy Savings

19,855,591 kWh of electricity  
760,465 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 City 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 will pay for themselves in a few months to several years, depending on the size and scale of the project. Incentives and financing programs can offset some or all 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 2005, City of Grass Valley residents and businesses have saved 3,142,715 kWh of electricity through PG&E rebate and incentive programs. 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 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 to them. 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, upgrading windows and insulation to maintain comfort while reducing energy use, and controlling equipment to use less energy with, for example, set back thermostats and photo-sensors on lighting. Additionally, PG&E offers Time-of-Use rate plans, which help support energy management by incentivizing energy use during times of low demand with lower energy costs and discouraging energy use during times of high demand with higher costs. By shifting energy use to periods of low demand, residents and businesses can save money.

## 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 improve 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.<sup>20</sup>

In Grass Valley, nearly 59% of the housing stock, almost 4,000 houses, were built prior to the adoption of the state's first Title 24 Energy Efficiency Standards in 1978. The non-residential building stock is likely similarly dated.<sup>21</sup> While there are certain challenges to renovating historic buildings, energy reduction for these buildings is feasible with well-planned 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 Grass Valley's housing and building

<sup>20</sup> Energy Efficiency Standards. California Energy Commission. Accessed August, 2018. <http://www.energy.ca.gov/efficiency/savings.html>

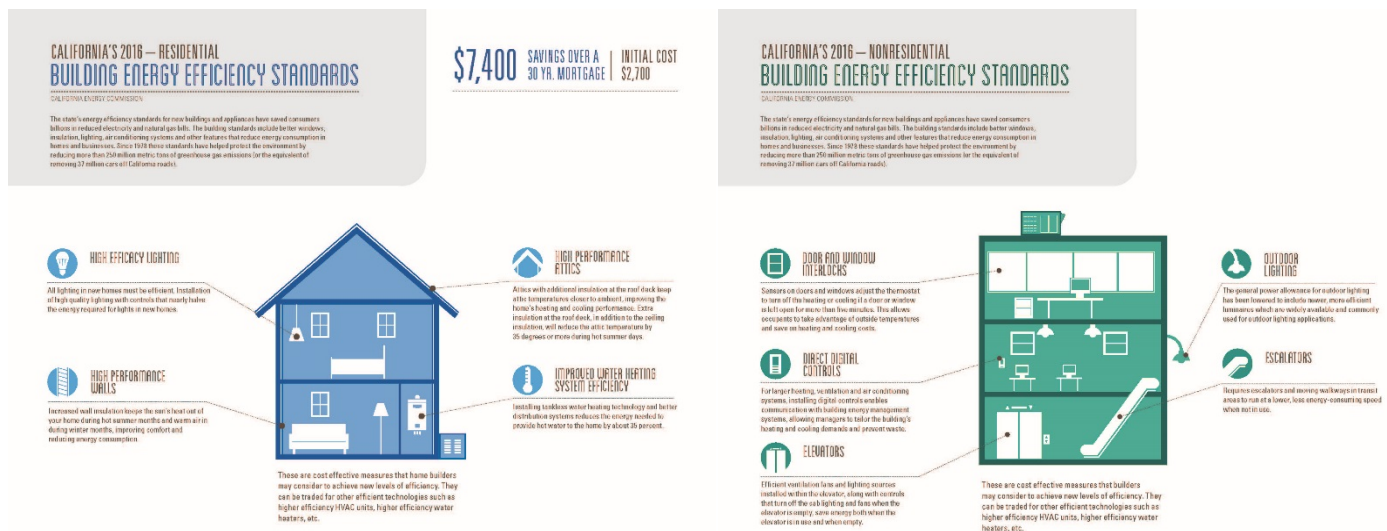
<sup>21</sup> U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates, Selected Housing Characteristics, City of Grass Valley, CA. [https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_15\\_5YR\\_DP04&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_DP04&prodType=table)



stock presents a unique opportunity for energy efficiency renovations. Historic buildings can take advantage of the Federal Historic Preservation Tax Incentive program.<sup>22</sup> 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.<sup>23</sup> The City of Grass Valley General Plan includes a Historic Element to ensure the preservation of historically significant structures and identifies a historical district encompassing downtown Grass Valley. The Historic Element includes goals, policies and objectives to address the preservation and promotion of cultural heritage of the City. Energy efficiency improvements can be incorporated into preservation efforts to reduce operational costs and help the City meet historic preservation goals.<sup>24</sup>

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 CITY BUILDINGS, FACILITIES, AND OPERATIONS.

The 2005 baseline municipal operations inventory indicated that the City consumed 673,263 kWh of electricity for City facilities and 462,414 kWh of electricity for public lighting. Additionally, the City consumed 39,080 therms of natural gas. Measures taken to improve the energy efficiency of these facilities will improve staff workspaces and reduce operational costs, thus allowing the City and public agencies to allocate money from savings elsewhere. The City has begun increasing the energy efficiency of public facilities through a contract to Opterra to retrofit facilities and public lighting. Since 2005, the City has reduced electricity use in City facilities by 31%, reduced natural gas in City facilities by 20%, and reduced electricity for public lighting by 5%. 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<sup>25</sup> to optimize energy performance and identify opportunities for energy efficiency projects.

<sup>22</sup> U.S. Department of the Interior, National Park Service, Federal Historic Preservation Tax Incentives. <https://www.nps.gov/tps/tax-incentives.htm>

<sup>23</sup> U.S. Department of the Interior, National Park Service, Preservation Brief: Improving Energy Efficiency in Historic Buildings. <https://www.nps.gov/tps/how-to-preserve/briefs/3-improve-energy-efficiency.htm>

<sup>24</sup> Grass Valley General Plan 2020, Chapter 9: Historical Element, and Housing Element: iii: Historic Preservation

<sup>25</sup> Retro-commissioning is a systematic process to improve an existing building's energy performance and occupants' comfort through a whole-building systems approach.

# Foothill Mercantile

## Gift Shop

121 Mill Street | Grass Valley, CA 95945  
(530) 272-8304 | [www.foothillmercantile.com](http://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."*

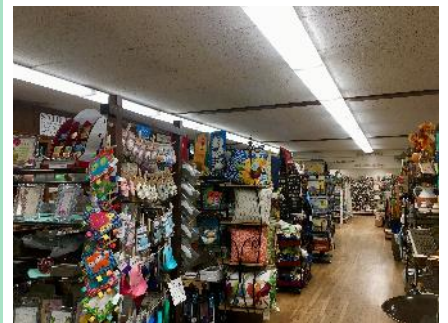
*- Susan Amick, owner*

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

21,347,194 kWh of electricity  
650,121 therms of natural gas

### Benefits

Reduced Energy Costs  
Increased Resiliency  
Improved Air Quality

Local renewable-energy projects benefit the City's economy by creating jobs, educating a new and emerging workforce, and reducing energy costs. In Grass Valley, 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, solar should have minimal impact on the buildings' integrity and keep with the City'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 is solar roof shingles.

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 City and community of Grass Valley 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 require 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.<sup>26</sup> 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 Grass Valley 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.<sup>27</sup> The City 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, 196 residential and 10 non-residential solar PV systems have been installed in the City of Grass Valley producing an estimated 2,188,606 kWh of electricity annually. The City 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 and Property Assessed Clean Energy (PACE) programs. REEL provides subsidized loans for energy efficiency projects and other home improvement projects and PACE programs allow property owners to finance energy efficiency, water efficiency, and renewable energy upgrades through low interest loans that are paid back through property

<sup>26</sup> California ZNE Communications Toolkit. July 2013. Energy Upgrade California. Accessed August, 2018.  
[http://newbuildings.org/sites/default/files/ZNE\\_MessagePlatform.pdf](http://newbuildings.org/sites/default/files/ZNE_MessagePlatform.pdf)

<sup>27</sup> California Energy Commission, Local PV Ordinance Cost Effectiveness Study, <https://efiling.energy.ca.gov/getdocument.aspx?tn=217290> - Accessed August, 2018.



tax assessment. 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 make information on evaluating renewable energy systems and financing programs available to community members through the City's website and at City Hall. It should also provide information on community solar programs to renters and property owners with site obstacles, in order for them to benefit from available local renewable energy resources. 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.

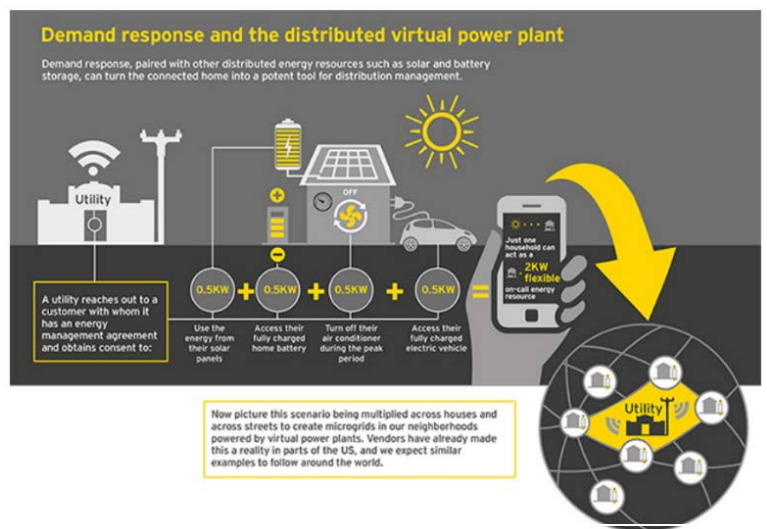
The City should encourage other public agencies in the community to show leadership by continuing to expand solar installations at public facilities to offset utility electricity use and by providing sites for community solar projects. Public agencies in Grass Valley could benefit from local solar projects that would have guaranteed electricity costs for up to 30 years, stimulate the local economy by contracting with local businesses, and remind 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 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 using 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 and running high energy use appliances like dishwashers and dryers overnight. Energy storage systems include batteries that collect and store energy generated from a renewable energy system, and hot water heaters that use grid electricity to pre-heat water at times of lowest cost. Stored hot water or electricity can 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.

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 City 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.



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

## 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](http://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*

The Woolman House is a 3,040 square foot 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<sub>2</sub> 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  
[www.ldapartners.com/portfolio-content/2015/3/18/wine-roses-spa-axtj2-bypgj-9n9w4-hrcw3](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 square foot 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 using 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

1,263,765 kWh

### Benefits

Reduced Energy Costs  
Improved Drought  
Resiliency

Water agencies and utilities, residents, and businesses can save money and resources by improving the efficiency of water systems and facility operations. The amount of energy needed to source, treat, and deliver water can be reduced by improving the efficiency of operations. The volume of water required can also be reduced, through efficiency and conservation programs in the community and 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%).<sup>28</sup> Given that indoor water is delivered to a small number of readily identifiable appliances, it is easy to target those that use the most water. There is a significant amount of energy used in sourcing, treating, and delivering water, and the City

should work to improve the efficiency of their processes and encourage Nevada Irrigation District (NID) to do so as well. Water efficiency measures taken at any point along the sourcing, treatment, delivery, and use of water will 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 CITY'S OUTREACH AND EDUCATION EFFORTS IN COLLABORATION WITH NEVADA IRRIGATION DISTRICT BY PROVIDING INFORMATION ON EXISTING AND FUTURE PROGRAMS.

Reducing water use by fixing leaks and improving the efficiency of appliances, showers, and faucets can help the community and the City reduce costs for water and sewer service, and increase community resiliency in drought years. Water efficiency information can be effectively shared on the City's website, at City Hall, and through the City's ability to lead by example. To do this, the City should benchmark their facilities' current water use, both indoor and outdoor, to identify how much water is used by the City, and the cost of their water and sewer service. After baseline use has been determined, the City 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 City should provide information and resources that residents and businesses can employ to save water and money, including NID programs that increase water conservation, highlight strategies including toilet and shower head rebates, water conservation information, and free advice from Master Gardeners in Nevada County.<sup>29,30</sup>

Additional water can be saved outdoors through improved irrigation, rain sensors, and the use of native landscaping that does not require irrigation. The City 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.

### STRATEGY 3.2: PARTICIPATE IN AND ENCOURAGE NEVADA IRRIGATION DISTRICT 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 of the water used in

<sup>28</sup> 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>

<sup>29</sup> Nevada Irrigation District, Water Conservation Programs. <https://nidwater.com/conservation/water-efficiency/> - Accessed September, 2018.

<sup>30</sup> Nevada County Master Gardeners. <http://ncmg.ucanr.org/> - Accessed September, 2018.



the United States.<sup>31</sup> A survey of California water agencies found water losses in California to range from 5% to 30%.<sup>32</sup> When systems are leaky, they 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 City, 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 locate customer side leaks and faulty meters. Typically water losses of greater than 5% can be reduced cost effectively through a proactive leak detection program.

In order to understand the scale of water losses, the City and NID should 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.<sup>33</sup>

### **STRATEGY 3.3: CONTINUE TO IMPROVE THE EFFICIENCY OF CITY WATER UTILITY OPERATIONS, AND ENCOURAGE AND COLLABORATE WITH NEVADA IRRIGATION DISTRICT TO IMPROVE EFFICIENCY OF DISTRICT WATER OPERATIONS.**

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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 treatment processes to generate electricity for the facilities' operations. Water and wastewater facilities can improve operational efficiencies through 3 main channels: increasing treatment and distribution efficiency, reducing demand for water, and producing electricity through wastewater operations energy capture.

As water sourcing and water treatment technology improves, water agencies should look into funding for retrofits of old, inefficient equipment. Improving the efficiency of high energy consuming water and wastewater facility equipment can decrease the energy required to source, treat, and deliver water as well as to collect, treat, and dispose of wastewater. Improving the agencies water use efficiency can be done with automatic meter reading to increase water efficiency monitoring, and by reusing treated wastewater (for appropriate applications) to avoid energy use associated with traditional water treatment and distribution. 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.<sup>34</sup>

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<sup>31</sup> "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](http://www.cnt.org/sites/default/files/publications/CNT_CaseforFixingtheLeaks.pdf)

<sup>32</sup> California Department of Water Resources, Leak Detection Resources. <https://water.ca.gov/Programs/Water-Use-And-Efficiency>

<sup>33</sup> Resources & Tools. American Water Works Association. Accessed August, 2018. <http://www.awwa.org/resources-tools.aspx>

<sup>34</sup> Energy Efficiency in Water and Wastewater Facilities. U.S. EPA. Accessed October 26, 2017. <https://www.epa.gov/sites/production/files/2015-08/documents/wastewater-guide.pdf>

# Briar Patch Co-op

*Local Sustainable Food and Grocery Store*

290 Sierra College Drive | Grass Valley, CA 95945

(530) 272-5333 | [www.briarpatch.coop](http://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 Grass Valley. 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 kWh 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 city 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 City staff or the community Working Group, 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 Working Group 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 City 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 City 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 the City of Grass Valley 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 City should look into the available options to evaluate which resources would be most appropriate. To successfully improve energy and water efficiency in Grass Valley, the City, 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 City 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 City 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 June 19th, 2018 community meeting, and the July 28<sup>th</sup>, 2018 local market event. 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, 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 City and for the Working Group to take over the 3 year timeline.

**Table 4-1: EAP Implementation Timeline**

City Actions	
2019	<ul style="list-style-type: none"> <li>❑ Continue to promote existing energy-efficiency, water-efficiency, and renewable-energy programs and best practices by providing information when available at City offices and on the City website. (1.1, 3.1, 2.2)</li> <li>❑ Develop a public recognition system for businesses that audit and retrofit their facilities and business practices. (1.1)</li> <li>❑ 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)</li> <li>❑ Continue to provide information regarding no-cost Title 24, Part 6 trainings for plans examiners, building inspectors, architects, designers, and contractors at City offices and on the City website. (1.2)</li> <li>❑ Continue to conduct building audits to benchmark energy and water use in facilities, and identify cost-effective retrofit projects. (1.3, 3.1)</li> </ul>
2020	<ul style="list-style-type: none"> <li>❑ 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)</li> <li>❑ 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)</li> <li>❑ Retro-commission facilities to maximize energy performance and complete cost-effective retrofit projects. (1.3)</li> <li>❑ 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)</li> </ul>
2021+	<ul style="list-style-type: none"> <li>❑ Consider adopting purchasing guidelines and energy-efficiency analysis requirements in RFPs. (1.3)</li> <li>❑ Continue expanding on-site renewable energy at feasible City facilities and sites. Further renewable energy procurement efforts by evaluating additional sites for renewable energy on City facilities and property. (2.2)</li> <li>❑ Encourage and participate in bulk purchasing of energy storage systems to support grid reliability and community resilience. (2.3)</li> <li>❑ Encourage broadband infrastructure in new development proposals to ensure optimal connectivity for IT controls and networks of operating systems. (2.3)</li> </ul>

## Working Group Actions

2019	<ul style="list-style-type: none"> <li>❑ Promote existing energy-efficiency, water-efficiency, and renewable-energy programs and best practices through outreach events in the community. (All Strategies)</li> <li>❑ Assist Grass Valley schools in offering an educational energy event, curriculum, or workforce training. (1.1)</li> <li>❑ Assist Project Go with specific outreach targeting low income and older homes for upgrades. (1.1)</li> <li>❑ Provide information to tenants and landlords on energy efficiency practices and programs. (1.1)</li> <li>❑ Promote no-cost Title 24 trainings and resources available (1.2)</li> <li>❑ Provide guidance and information to realtors on the benefits to homeowners and commercial property owners to audit and retrofit their homes and commercial buildings to increase selling prices, comfort, and energy performance. (1.1)</li> <li>❑ Encourage hotels and tourist organizations to educate visitors about water and energy efficiency. (1.1, 3.1)</li> <li>❑ Cooperate with Nevada Irrigation District to complete Leak Loss detections on City wide water systems and operations. (3.2)</li> <li>❑ Work with Nevada Irrigation District on water audits and promote leak loss detection trainings for City and Nevada Irrigation District staff. (3.2)</li> </ul>
2020	<ul style="list-style-type: none"> <li>❑ Encourage multi-family property owners to explore community renewable energy projects. (2.2)</li> <li>❑ Work with property owners to consider projects that utilize renewable energy and incorporate storage. (2.2)</li> <li>❑ Assist Grass Valley schools and Nevada Irrigation District to coordinate a water wise student education program. (3.1)</li> <li>❑ Coordinate with Nevada Irrigation District on respective water bills to provide information on ways to reduce water waste, utilize demonstration gardens, and develop new water-efficiency programs and market programs. (3.1)</li> </ul>
2021+	<ul style="list-style-type: none"> <li>❑ Partner with local organizations, other jurisdictions, and businesses to coordinate energy audits and bulk purchasing of energy efficient equipment &amp; appliances. (1.3)</li> <li>❑ Encourage businesses to participate in PG&amp;E's Demand Response Program to reduce energy use during peak demand. (2.3)</li> <li>❑ Work with internet service providers to support and expand broadband infrastructure projects. (2.3)</li> <li>❑ Promote energy audits of potable water and wastewater systems. (3.3)</li> <li>❑ Coordinate with Nevada Irrigation District to implement cost-effective energy-efficiency projects of water systems. (3.3)</li> </ul>



## 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.

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### TRACK ENERGY ACTION PLAN PROGRESS

Successfully implementing an effective energy action plan to improve the quality of life in the community 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 City 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 and 2017 re-inventory 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 City should 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 the program honors voluntary efforts by local governments to reduce greenhouse gas emissions, save energy, and adopt policies that promote sustainability. Participants in this program 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 City should coordinate strategy evaluation on the same schedule as the community-wide inventories and summarize progress toward meeting the identified performance targets. For the EAP to remain relevant, the City 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 City must be ready to take advantage of these opportunities.

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### 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 City, 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 AmeriCorp fellow.

The CivicSpark fellow can provide support to the City with public outreach, facilitation of the Working Group, and preparation of materials and resources for presentation at City offices and the City's website. The City 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 City website should also house information developed by the Working Group to mark progress made with implementation of the plan and keep the community engaged and aware.

The City 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 City 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 City can install solar arrays on or over parking lots, invest in energy efficient appliances, and maintain water-efficient landscaping in areas managed by the City 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.

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## 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 City should provide information from Energy Code Ace, which offers free tools, trainings and resources on Title 24, Part 6 to assist the building industry, related 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 energy efficiency and green building trainings.

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## 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 1<sup>st</sup> 2020 (and looking beyond, the goal is for all new commercial construction to be ZNE by January 1<sup>st</sup> 2030). In order to assist the local building industry with compliance, it is essential that the City provide resources to contractors as the code updates occur. The City should provide information through their website and directly to contractors and developers at the plan check counter on available incentives and education resources related to energy efficiency and green building. The City 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, encourages developers to explore incorporating energy-efficient and green-building features into their projects, which can save the property owners and tenants money over the life of the building, improve the health of tenants, and increase the value of buildings. Reduced permitting time can be an effective incentive because it can translate to significant savings for developers that are paying interest on construction or bridge loans during the permit approval process. Recognition by the City can also be an effective incentive for developers to pursue green building certification or exceed the Energy Efficiency Standards. According to the

Appraisal Institute<sup>35</sup>, green building certifications significantly increase the value of buildings through improved rental income, higher occupancy, lower operating costs, and lower risks.

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## STREETLIGHTS

Upgrading streetlights is one of the easiest, most cost-effective energy efficiency actions a municipality can take. The City of Grass Valley has already begun this process by upgrading 167 streetlight fixtures, park lighting, and traffic signals. In 2005, the City used 462,414 kWh for public lighting. Typically, traditional street lights can be upgraded to LEDs and achieve savings between 50-70% of energy use – which could equate to more than 230,000 kWh saved in Grass Valley. Replacing traditional street lights to energy efficient LEDs greatly reduces electricity and maintenance costs while improving light quality, night visibility and reducing urban night glow.

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## ZERO NET ENERGY

To make compliance with the above discussed changes in California's building and energy code easier, the City 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 City 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)<sup>36</sup> and other DOE programs; (4) evaluate the potential for residential and non-residential sectors of the City to incorporate renewable energy; (5) create an awards-based recognition for achieving ZNE; and finally (6) the City 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).<sup>37</sup>

**Table 4-2: Ultra-low energy performance in existing buildings: Design Steps & 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.

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<sup>35</sup> Green Building Resources. The Appraisal Institute. Accessed August, 2018. <http://www.appraisalinstitute.org/education/education-resources/green-building-resources/>

<sup>36</sup> 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.

<sup>37</sup> American Council for an Energy-Efficient Economy, Unlocking Ultra-Low Energy Performance in Existing Buildings. – Accessed September 22, 2017. <http://eecoordinator.info/wp-content/uploads/2017/08/Unlocking-Ultra-Low-Energy-Performance-in-Existing-Buildings.pdf>

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## 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 City 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 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.

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## 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 Grass Valley that are not under the jurisdiction of the City 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.

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## 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 City 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 City 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 City'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 City, 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 City 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 City, the business community, and residents.

The City has opted to take part in the Local Government Commission's CivicSpark AmeriCorps program and will receive assistance on implementation from a CivicSpark fellow through August 2019. The CivicSpark fellow will be able to coordinate the Working Group, provide capacity for City staff to complete implementation actions, and connect the City with outside agencies and regional organizations to leverage existing activities to assist with implementation.

# APPENDICES

## APPENDIX A: CITY OF GRASS VALLEY 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 the City of Grass Valley in 2005 and 2017. The 2005 and 2017 aggregated electricity consumption data was provided by PG&E for all accounts within the City of Grass Valley. 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 city was estimated from county-level, direct-access electricity data provided by the California Energy Commission (CEC).

The 2005 and 2017 aggregated natural gas consumption data was provided by PG&E for all accounts within the City of Grass Valley. Wood, propane and fuel oil/kerosene use was estimated from state level average use per household from the U.S. Energy Information Agency (EIA) and U.S. Census Bureau American Community Survey.

Potable water and wastewater electricity use for 2005 and 2017 was estimated by scaling electricity use data provided by the City and NID for Nevada County wastewater and potable water facilities to the city based on population. The potable water and wastewater electricity use within the City limits 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: City of Grass Valley Community-Wide Residential Energy Use**

Energy Source	Electricity Use (kWh)		Data Source
	2005	2017	
Electricity Use - PG&E	35,153,541	34,625,997	Pacific Gas and Electric Company
Electricity Use - Direct Access	56,246	12,395	California Energy Commission
Total Electricity Use	35,209,787	34,638,392	
Energy Source	Natural Gas Use (therms)		Data Source
	2005	2017	
Total Natural Gas Use	2,551,827	2,406,757	Pacific Gas and Electric Company
Energy Source	Other Fuel Use		Data Source
	2005	2017	
Total Propane Use (gallons)	192,966	31,715	U.S. EIA and U.S. Census Bureau
Total Kerosene/Fuel Oil Use (gallons)	26,916	9,189	
Total Wood Use (MMBtu)	18,513	9,989	

**Table A-2: City of Grass Valley Community-Wide Non-Residential Energy Use**

Energy Source	Electricity Use (kWh)		Data Source
	2005	2017	
Electricity Use - PG&E	59,779,765	57,846,765	Pacific Gas and Electric Company
Electricity Use - Direct Access	2,773,639	3,312,491	California Energy Commission
Total Electricity Use	62,553,404	61,159,256	
Energy Source	Natural Gas Use (therms)		Data Source
	2005	2017	
Total Natural Gas Use	1,697,676	2,031,497	Pacific Gas and Electric Company

**Table A-3: City of Grass Valley Community Wide Potable Water and Wastewater Electricity Use**

Energy Source	Electricity Use (kWh)		Data Source
	2005	2017	
NID Potable Water Operations	643,839	316,014	Nevada Irrigation District (NID)
City of Grass Valley Potable Water Operations	158,360	30,995	Pacific Gas and Electric Company and City of Grass Valley
City of Grass Valley Water Treatment Solar	N/A	109,593	City of Grass Valley
Total Potable Water Operations	802,199	456,602	
Wastewater Operations	1,944,379	1,020,285	Pacific Gas and Electric Company and City of Grass Valley
Wastewater Operations Solar	N/A	1,122,408	City of Grass Valley
Total Wastewater Operations	1,944,379	2,142,693	



**Table A-4: City of Grass Valley Municipal-Operations Energy Use**

Facility	Electricity Use (kWh)		Natural Gas Use (therms)		Data Source
	2005	2017	2005	2017	
Grass Valley City Hall	124,560	93,245	3,302	2,474	Pacific Gas and Electric Company
Grass Valley Police Department	185,120	95,819	3,337	4,833	Pacific Gas and Electric Company
Grass Valley 556 Freeman Lane	57,783	41,011	7,088	5,464	Pacific Gas and Electric Company
Grass Valley Fire Stations	107,363	102,974	4,112	3,949	Pacific Gas and Electric Company
Grass Valley Memorial Park	24,226	12,129	479	614	Pacific Gas and Electric Company
Grass Valley Swimming Pool	113,812	67,632	19,853	12,235	Pacific Gas and Electric Company
Grass Valley Condon Park	50,777	41,727	909	1,536	Pacific Gas and Electric Company
Grass Valley Other Facilities	9,622	7,760	-	-	Pacific Gas and Electric Company
<b>Total Municipal Facilities Energy Use</b>	<b>673,263</b>	<b>462,297</b>	<b>39,080</b>	<b>31,105</b>	
Traffic Signals and Outdoor Lighting	113,744	127,957	-	-	Pacific Gas and Electric Company
LS-1 Street and Highway Lighting	348,670	310,321	-	-	Pacific Gas and Electric Company
<b>Total Public Lighting Energy Use</b>	<b>462,414</b>	<b>438,278</b>	<b>-</b>	<b>-</b>	<b>Includes PG&amp;E Owned Street Lights</b>

## APPENDIX B: CITY OF GRASS VALLEY 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 new energy efficiency 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 forecast separately. Residential energy use was forecast using the California Department of Transportation (Caltrans Long-Term Socio-Economic Forecast of households for Nevada County.<sup>38</sup> 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.<sup>39</sup> Potable water and wastewater energy use were forecast using a combination the residential and non-residential growth rates. Annualized growth rates for each time period were calculated using the standard formula below.

<b>Annualized Growth Rate = <math>(X / Y)^{(1 / Z)} - 1</math></b>	
<b>Where:</b>	<b>X = Forecast End Year Energy Use</b>
	<b>Y = Baseline Year Energy Use</b>
	<b>Z = Number of Years in the Forecast</b>

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

<b>Year</b>	<b>Occupied Households</b>	<b>Growth Indicator Source</b>
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
<b>Time Period</b>	<b>Annualized Growth Rate</b>	
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

<sup>38</sup> Caltrans Long-Term Socio-Economic Forecasts by County – Nevada County 2017.

[http://www.dot.ca.gov/hq/tpp/offices/eab/socio\\_economic.html](http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html), Households. (Accessed April 19, 2018).

<sup>39</sup> Caltrans Long-Term Socio-Economic Forecasts by County – Nevada County 2017,

[http://www.dot.ca.gov/hq/tpp/offices/eab/socio\\_economic.html](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	7,400	Caltrans Employment Projections
2010	7,559	Caltrans Employment Projections
2015	7,535	Caltrans Employment Projections
2020	7,689	Caltrans Employment Projections
2025	7,919	Caltrans Employment Projections
2030	8,165	Caltrans Employment Projections
2035	8,404	Caltrans Employment Projections
Time Period	Annualized Growth Rate	
2005-2010	0.43%	Caltrans Employment Projections
2010-2015	-0.06%	Caltrans Employment Projections
2015-2020	0.41%	Caltrans Employment Projections
2020-2025	0.59%	Caltrans Employment Projections
2025-2030	0.61%	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	0.8268%	-0.3742%	0.2122%	0.5657%	0.6237%	0.6054%	0.5139%
Employment	-1.0552%	1.1818%	1.2797%	0.6825%	0.5873%	0.5578%	0.3989%
Households and Business Establishments	0.4255%	0.0342%	0.3116%	0.5528%	0.6095%	0.5856%	0.5136%

Annualized growth rates for City of Grass Valley 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)	35,209,787	39,674,544	4,464,757
Residential Natural Gas Use (therms)	2,551,827	2,875,420	323,593
Non-Residential Electricity Use (kWh)	62,553,404	74,514,295	11,960,891
Non-Residential Natural Gas Use (therms)	1,697,676	2,022,290	324,614
Potable Water Electricity Use (kWh)	802,199	910,351	108,152
Wastewater Electricity Use (kWh)	1,944,379	2,206,583	262,204

## 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 yellow and results are highlighted in green.

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

<b>Strategy 1.1: Expand outreach and education on existing energy efficiency Practices, programs, and financing options for residential and non-residential utility customers</b>		
<b>Target: 50% of Existing Households Reduce Energy Use 30% by 2035</b>		
Baseline Year	2005	
Target Year	2035	
Baseline Annual Residential Energy Use	35,209,787	kWh - Electricity
	2,551,827	Therms - Natural Gas
Baseline Number of Households	5,971	Housing Units
Target Percent of Households Participating	50%	of existing homes
Target Percent Energy Reduction From Baseline Year	30%	of energy use
2035 Participating Households = Baseline Households x Percent Participating =	2,986	Housing Units
2035 Electricity Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	5,281,468	kWh - Electricity
2035 Natural Gas Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	382,774	Therms - Natural Gas
<b>Target: 50% of Existing Businesses Reduce Energy Use 30% by 2035</b>		
Baseline Year	2005	
Target Year	2035	
Baseline Annual Non-Residential Energy Use	61,417,727	kWh - Electricity
	1,658,596	Therms - Natural Gas
2035 Target Percent Participating	50%	of existing
2035 Target Percent Energy Reduction From Baseline	30%	of energy use
2035 Electricity Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	9,212,659	kWh - Electricity
2035 Natural Gas Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	248,789	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.**

<b>Strategy 1.2: Improve compliance with current California Building Energy Efficiency Standards (Title 24, Part 6) by providing informational materials when available.</b>		
<b>Target: 100% of New Construction meets Title 24 Green Building and Energy Efficiency Standards</b>		
Baseline Year	2005	
Target Year	2035	
<b>Residential</b>		
Forecast Energy Use Increase Without Title-24 Compliance	Electricity (kWh)	Natural Gas (therms)
2005-2016	654,878	47,463
2017-2019	228,833	16,590
2020-2035	3,581,046	259,540
<b>Non-Residential</b>		
Forecast Energy Use Increase Without Title-24 Compliance	Electricity (kWh)	Natural Gas (therms)
2005-2016	3,802,022	105,574
2017-2019	2,536,208	68,600
2020-2022	1,396,731	37,780
2022-2024	1,358,934	36,750
2025-2027	1,249,645	33,810
2028-2030	1,228,842	33,240
2031-2035	1,524,186	41,230
2010 Housing Stock (DOF)	57.77%	Single Family
	42.23%	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	Propane
	Single Family (SF)	6.5%
	Multi-Family (MF)	3.8%
	Non-Residential (Non-Res)	16.8%
2035 Target Percent Participation	50%	Residential
	50%	Non-Residential
2035 Target Percent Energy Savings	30%	Residential
	15%	Non-Residential
<b>Residential</b>	Electricity (kWh)	Natural Gas (therms)
2035 Residential Energy Savings from 2013 Title 24	64,687	2,188
2035 Residential Energy Savings from 2016 Title 24	29,384	994
2035 Residential Energy Savings from 2019 Title 24	597,793	20,218
<b>Total 2035 Residential Energy Savings from Title 24</b>	<b>691,864</b>	<b>23,400</b>
<b>Non-Residential</b>	Electricity (kWh)	Natural Gas (therms)
2035 Non-Residential Energy Savings from 2013 Title 24	828,841	17,736
2035 Non-Residential Energy Savings from 2016 Title 24	635,827	13,254

2035 Non-Residential Energy Savings from 2019 Title 24	402,685	8,394
2035 Non-Residential Energy Savings from 2022 Title 24	450,556	9,390
2035 Non-Residential Energy Savings from 2025 Title 24	476,469	9,934
2035 Non-Residential Energy Savings from 2028 Title 24	538,818	11,232
2035 Non-Residential Energy Savings from 2031 Title 24	768,567	16,022
<b>Total 2035 Non-Residential Energy Savings from Title 24</b>	<b>4,101,761</b>	<b>85,962</b>

**Table C-1.3: Continue to improve the energy efficiency of City buildings, facilities, and operations**

<b>Strategy 1.3: Continue to improve the energy efficiency of public buildings, facilities, and operations</b>		
<b>Target: Reduce Energy Use in Municipal Buildings by 50% by 2035</b>		
Baseline Year	2005	
Target Year	2035	
Baseline Annual Municipal-Operations Energy Use	673,263	kWh - Electricity
	39,080	Therms - Natural Gas
Baseline Number of Municipal Facilities	8	Facilities
2035 Target Percent Energy Reduction	50%	of energy use
2035 Electricity Savings = Baseline Energy Use x Percent Reduction =	336,632	kWh - Electricity
2035 Natural Gas Savings = Baseline Energy Use x Percent Reduction =	19,540	Therms - Natural Gas
<b>Target: Reduce Energy Used for Public Lighting by 50% by 2035</b>		
Baseline Year	2005	
Target Year	2035	
Baseline Annual Municipal-Operations Energy Use Street Lights and Other Lighting	462,414	kWh - Electricity
2035 Target Percent Energy Reduction	50%	of energy use
2035 Street and Other Lighting Savings = Baseline Energy Use x Percent Reduction =	231,207	kWh - Electricity

**Table C-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 materials when available.**

<b>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 materials when available.</b>		
<b>Target: 100% of New Developments Meet State Required Zero-Net-Energy Goals by 2035</b>		
Baseline Year	2005	
Target Year	2035	
<b>Residential</b>	Electricity (kWh)	Natural Gas (therms)
Forecast Energy Use Increase after meeting Title 24	2,983,253	239,322
<b>Non-Residential</b>	Electricity (kWh)	Natural Gas (therms)
Forecast Energy Use Increase after meeting Title 24	980,940	32,414
2035 Target Percent Participation of new construction after Zero Net Energy standard implementation	100%	Residential
	100%	Non-Residential
<b>Residential</b>	Electricity (kWh)	Natural Gas (therms)
2035 Energy Savings Meeting Zero Net Energy Goals: = Forecast Energy Use after meeting Title 24 x Percent Participation =	2,983,253	239,322
<b>Non-Residential</b>	Electricity (kWh)	Natural Gas (therms)
2035 Energy Savings Meeting Zero Net Energy Goals: = Forecast Energy Use after meeting Title 24 x Percent Participation =	980,940	32,414

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

<b>Strategy 2.2: Encourage renewable energy projects through education, outreach, and local leadership.</b>		
<b>Target: 16% of Existing Households and 6% Businesses Install Solar PV by 2035</b>		
Baseline Year	2005	
Target Year	2035	
2035 Target Potential Installations	5,971	Residential HH 2005
	693	Non-Residential 2005
Number Systems Installed 2005 - 2017	196	Residential
	10	Non-Residential
Total kW Installed 2005 - 2017	1,210	kW Residential
	327	kW Non-Residential
Target Participating Installations per Year (% participating x the 2005 HH - Total Residential Systems installed / 17, % participating x 2005 Non-Residential Establishments - Total Non-Res Systems installed / 17)	45	Residential Households per Year
	2	Non-Residential Installations per Year
2035 Number of Participants = Target Participation Installations per Year x 17 years + Number of Existing Installations 2005-2017 =	961	Residential Participants
	44	Non-Residential Participants
2035 kW Solar Installed = Number of Participants x Total Size of Existing Installations / Number of Existing Installations =	5,940	kW Residential Installed
	1,403	kW Non-Residential Installed
<a href="#">2035 Solar-Produced Electricity Calculated using PVWatts Calculator</a>	8,467,502	kWh - Residential Electricity
	1,990,346	kWh Non-Res Electricity
<b>Target: 15% of Households and 5% of Businesses Install other form of renewable energy</b>		
Baseline Year	2005	
Target Year	2035	
Baseline Annual Natural Gas Use	2,551,827	therms - Residential
	1,658,596	therms - Non- Residential
2035 Target Potential Installations	5,971	Residential
	693	Non-Residential
Number of Existing Installations 2005-2016	NA	Residential
	NA	Non-Residential
Total kW of Existing Installations 2005-2016	NA	kW Residential
	NA	kW Non-Residential
2035 Target Participating Installations per Year	53	Residential Households per Year
	2	Non-Residential Installations per Year
Average Solar Water Heating Energy offset	63%	
Average Size of Small Wind System in PG&E service territory (CEC ERP)	7.968	kW
Average Height of Rotor Hub	90	Feet
Estiamted Average Annual Power Output (Open EI)	7,444	kWh
2035 Number of Participants = Target Participation Installations per Year x # years + Number of Existing Installations 2005-2016 =	896	Residential
	35	Non-Residential
2035 kW Wind Installed = Number of Participants x Average Size of Small Wind Systems =	7,137	kW Residential
	276	kW Non-Residential
	6,667,219	kWh - Residential Electricity

2035 Wind-Produced Electricity = Number of Participants x Estimated Average Annual Poer Output =	257,935	kWh - Non-Res Electricity
2035 Natural gas Offset by geothermal heating =0.5 x Number of Participants x Baseline Natural Gas Use/ Baseline Population =	191,387	therms - Residential Natural Gas
	41,465	therms - Non-Res Natural Gas
2035 Natural Gas Offset by solar heating =0.5 x Number of Participants x Baseline Natural Gas Use/ Baseline Population =	119,617	therms - Residential Natural Gas
	25,916	therms - Non-Res Natural Gas

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

<b>Strategy 3.1: Improve and increase the City's outreach and education efforts in collaboration with Nevada Irrigation District by providing information on existing and future programs.</b>		
<b>Target: 100% of Households and Businesses Reduce Indoor Water Use by 50% by 2035</b>		
Baseline Year	2005	
Target Year	2035	
Baseline Year Population served by Water Systems	12,864	People
2035 Estimated Population	13,866	People
2005 Average Gallons Per Capita Per Day (GPCD)	213	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 Indoor Water Use	50%	of water use
2035 Estimated Reduced Indoor Water Use = 2010 GPCD * (Percent Res + Percent Non-Res) * Percent Reduction * 2035 Estimated Population * 365.25 Days Per Year / 1,000,000 =	275	Million Gallons
2035 Estimated Reduced Outdoor Water Use = 2010 GPCD * Percent Landscaping * Percent Reduction * 2035 Estimated Population * 365.25 Days Per Year / 1,000,000 =	237	Million Gallons
2035 Potable Water Energy Savings = Target Year Reduced Indoor and Outdoor Water Use * 2035 Estimated Potable Water Energy Use Intensity =	287,499	kWh / Year
2035 Wastewater Energy Savings = Target Year Reduced Indoor Water Use * 2035 Estimated Wastewater Energy Use Intensity =	455,657	kWh / Year



**Table C-3.2: Participate in and encourage Nevada Irrigation District to participate in proactive leak detection programs in order to reduce water losses.**

<b>Strategy 3.2: Participate in and encourage Nevada Irrigation District to participate in proactive leak detection programs in order to reduce water losses.</b>		
<b>Target: 100% of Potable Water Systems Reduce Water Losses by 50% by 2035</b>		
Baseline Year	2005	
Target Year	2035	
Baseline Year Population served by Water Systems	12,864	People
2035 Estimated Population	13,866	People
2005 Average Gallons Per Capita Per Day (GPCD)	213	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
<b>2035 Estimated Reduction in Water Losses</b> = 2005 GPCD * Percent Water Losses * Percent Reduction * 2035 Population * 365.25 Days Per Year / 1,000,000 =	27	Million Gallons
<b>2035 Potable Water Energy Savings from Reduced Water Losses</b> = 2035 Reduced Water Losses * 2035 Estimated Potable Water Energy Use Intensity =	15,132	kWh / Year

**Table C-3.3: Continue to improve the efficiency of City water utility operations, and encourage and collaborate with Nevada Irrigation District to improve efficiency of district water operations.**

<b>Strategy 3.3: Continue to improve the efficiency of City water utility operations, and encourage and collaborate with Nevada Irrigation District to improve efficiency of district water operations.</b>		
<b>Target: Reduce Energy Intensity at Potable Water and Wastewater Facilities by 30% by 2035</b>		
Baseline Year	2005	
Target Year	2035	
Baseline Annual Potable Water Energy Use	802,199	kWh - Electricity
Baseline Annual Potable Water Energy Intensity	803	kWh / Million Gallons
Baseline Annual Wastewater Energy Use	1,944,379	kWh - Electricity
Baseline Annual Wastewater Energy Intensity	2,371	kWh / Million Gallons
2035 Target Percent Energy Intensity Reduction	30%	of energy intensity
2035 Reduction in Potable Water Energy Intensity	241	kWh / Million Gallons
2035 Reduction in Wastewater Energy Intensity	711	kWh / Million Gallons
2035 Estimated Potable Water Use	487	Million Gallons
2035 Estimated Wastewater Generation	546	Million Gallons
2035 Potable Water Electricity Savings = 2035 Potable Water Use * 2035 Reduction in Potable Water Energy Intensity =	117,446	kWh - Electricity
2035 Wastewater Electricity Savings = 2035 Wastewater Use * 2035 Reduction in Wastewater Energy Intensity =	388,032	kWh - Electricity

## APPENDIX D: EXISTING ENERGY EFFICIENCY PROGRAM ADMINISTRATORS

Appendix D documents the existing energy efficiency program administrators in City of Grass Valley 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 the City of Grass Valley. <a href="http://www.pge.com/">http://www.pge.com/</a>
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 City of Grass Valley. SBC also offers consulting services to governments on energy and climate planning. <a href="http://sierrabusiness.org/">http://sierrabusiness.org/</a>
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. <a href="http://www.gridalternatives.org/">http://www.gridalternatives.org/</a>
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. <a href="http://cahp-pge.com/">http://cahp-pge.com/</a>
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. <a href="https://www.epa.gov/">https://www.epa.gov/</a>
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. <a href="https://energy.gov/">https://energy.gov/</a>
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. <a href="http://www.energy.ca.gov/">http://www.energy.ca.gov/</a>
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 residents and small businesses for energy management. <a href="https://www.energyupgradeca.org/">https://www.energyupgradeca.org/</a>
California Statewide Communities	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

EXISTING PROGRAM ADMINISTRATORS	DESCRIPTION
Development Authority (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. <a href="http://cscda.org/">http://cscda.org/</a>
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. <a href="http://www.ibank.ca.gov/">http://www.ibank.ca.gov/</a>
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. <a href="http://spurr.org/">http://spurr.org/</a>
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. <a href="http://icleiusa.org/">http://icleiusa.org/</a>
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. <a href="http://californiaseec.org/about-seec/">http://californiaseec.org/about-seec/</a>
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. <a href="http://mseforum.com/">http://mseforum.com/</a>
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. <a href="https://newbuildings.org/">https://newbuildings.org/</a>

## APPENDIX E: EXISTING ENERGY EFFICIENCY PROGRAMS IN CITY OF GRASS VALLEY

Appendix E documents the existing energy-efficiency programs in City of Grass Valley 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. <a href="https://www.pge.com/en_US/residential/save-energy-money/savings-programs/home-upgrade/home-upgrade.page">https://www.pge.com/en_US/residential/save-energy-money/savings-programs/home-upgrade/home-upgrade.page</a>
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. <a href="http://corp.hea.com/hintel/">http://corp.hea.com/hintel/</a>
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. <a href="http://www.pge.com/smartac">http://www.pge.com/smartac</a>
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. <a href="http://www.pge.com/smartrate">http://www.pge.com/smartrate</a>
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. <a href="https://marketplace.pge.com/">https://marketplace.pge.com/</a>
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 preparation,

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
	assembly, or original system installation, and piping or wiring to interconnect a system to the home. <a href="http://energy.gov/savings/residential-renewable-energy-tax-credit">http://energy.gov/savings/residential-renewable-energy-tax-credit</a>
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. <a href="https://cahp-pge.com/">https://cahp-pge.com/</a>
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. <a href="http://www.pge.com/csithermal">http://www.pge.com/csithermal</a>
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. <a href="http://www.gosolarcalifornia.org/about/index.php">http://www.gosolarcalifornia.org/about/index.php</a>

**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. <a href="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">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</a>
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. <a href="http://www.pge.com/multifamily/">http://www.pge.com/multifamily/</a>
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. <a href="http://www.pge.com/reach/">http://www.pge.com/reach/</a>
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. <a href="http://www.pge.com/care/">http://www.pge.com/care/</a>



INCOME-QUALIFIED ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
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. <a href="http://www.pge.com/fera">http://www.pge.com/fera</a>
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. <a href="http://www.pge.com/medicalbaseline">http://www.pge.com/medicalbaseline</a>
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. <a href="http://www.gridalternatives.org/learn/sash">http://www.gridalternatives.org/learn/sash</a>

**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. <a href="http://www.pge.com/businessrebates">www.pge.com/businessrebates</a>
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. <a href="http://www.commercialhvacqm.com/">http://www.commercialhvacqm.com/</a>
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. <a href="http://www.pge.com/en/mybusiness/save/rebates/lighting/index.page">http://www.pge.com/en/mybusiness/save/rebates/lighting/index.page</a>
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. <a href="http://www.pge.com/csithermal">http://www.pge.com/csithermal</a>
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



ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
	equipment. <a href="http://www.pge.com/en/mybusiness/save/rebates/retrocommissioning/index.page">http://www.pge.com/en/mybusiness/save/rebates/retrocommissioning/index.page</a>
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. <a href="http://www.pge.com/savingsbydesign">www.pge.com/savingsbydesign</a>
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. <a href="http://ecoact.org/thehospitalityprogram/">http://ecoact.org/thehospitalityprogram/</a>
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. <a href="http://ledaccelerator.com/">http://ledaccelerator.com/</a>
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. <a href="https://www.pge.com/en_US/business/services/training/training-centers/food-service-technology-center/food-service-technology-center.page">https://www.pge.com/en_US/business/services/training/training-centers/food-service-technology-center/food-service-technology-center.page</a>
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. <a href="http://www.pumpefficiency.org/">http://www.pumpefficiency.org/</a>
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 RCs for school facilities. The rebates, discounts, and expert advice can help make it easier for K-12 schools to save energy and money. <a href="http://schoolenergyefficiency.com/">http://schoolenergyefficiency.com/</a>
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. <a href="http://www.energy.ca.gov/efficiency/brightschoools/">http://www.energy.ca.gov/efficiency/brightschoools/</a>

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
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. <a href="http://www.energy.ca.gov/efficiency/partnership/">http://www.energy.ca.gov/efficiency/partnership/</a>
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. <a href="http://www.energy.ca.gov/efficiency/financing/index.html">http://www.energy.ca.gov/efficiency/financing/index.html</a>
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. <a href="http://energy.gov/savings/business-energy-investment-tax-credit-itc">http://energy.gov/savings/business-energy-investment-tax-credit-itc</a>
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. <a href="http://www.boe.ca.gov/sutax/exemptfem.htm">http://www.boe.ca.gov/sutax/exemptfem.htm</a> <a href="http://www.boe.ca.gov/news/pdf/l330.pdf">http://www.boe.ca.gov/news/pdf/l330.pdf</a>

**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. <a href="https://www.pge.com/en_US/residential/in-your-community/education-programs/education-programs/educational-resources/energenius-program/energenius-program.page">https://www.pge.com/en_US/residential/in-your-community/education-programs/education-programs/educational-resources/energenius-program/energenius-program.page</a>
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. <a href="https://www.pge.com/en_US/residential/in-your-community/education-programs/education-programs/educational-resources/for-students/for-teachers.page">https://www.pge.com/en_US/residential/in-your-community/education-programs/education-programs/educational-resources/for-students/for-teachers.page</a>
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. <a href="https://www.pge.com/en_US/residential/in-your-community/education-programs/education-programs/educational-resources/for-students/for-students.page">https://www.pge.com/en_US/residential/in-your-community/education-programs/education-programs/educational-resources/for-students/for-students.page</a>

EDUCATIONAL PROGRAMS	DESCRIPTION
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. <a href="https://www.pge.com/en_US/business/services/training/training-centers/training-centers.page">https://www.pge.com/en_US/business/services/training/training-centers/training-centers.page</a>
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. <a href="https://www.pge.com/en_US/business/services/training/solar-education/solar-education.page">https://www.pge.com/en_US/business/services/training/solar-education/solar-education.page</a> or see Energy Education Class schedule: <a href="http://usi.pge.com/">http://usi.pge.com/</a>
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. <a href="https://www.pge.com/en_US/business/resources/tips-trends-and-incentives/energy-insights/business-resource-center.page">https://www.pge.com/en_US/business/resources/tips-trends-and-incentives/energy-insights/business-resource-center.page</a>
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. <a href="http://www.need.org/">http://www.need.org/</a>
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. <a href="http://www.peakstudents.org/">http://www.peakstudents.org/</a>
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. <a href="http://www.powersaveschools.org/about.html">http://www.powersaveschools.org/about.html</a>
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 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. <a href="https://www.seiinc.org/programs/eco-smart-schools">https://www.seiinc.org/programs/eco-smart-schools</a>
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. <a href="https://energy.gov/eere/education/energy-literacy-essential-principles-and-fundamental-concepts-energy-education">https://energy.gov/eere/education/energy-literacy-essential-principles-and-fundamental-concepts-energy-education</a>

EDUCATIONAL PROGRAMS	DESCRIPTION
Alliance for Climate Education (ACE)	<p>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.</p> <p><a href="https://acespace.org/">https://acespace.org/</a></p>

**Table E-5: Water Efficiency Programs**

WATER EFFICIENCY PROGRAMS	DESCRIPTION
Water Energy Grant Program	<p>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.</p> <p><a href="https://www.water.ca.gov/Programs/Water-Use-And-Efficiency">https://www.water.ca.gov/Programs/Water-Use-And-Efficiency</a></p>
Electric Program Investment Charge (EPIC) Program Funding Opportunities	<p>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.</p> <p><a href="http://www.energy.ca.gov/contracts/epic.html">http://www.energy.ca.gov/contracts/epic.html</a></p>
Nevada Irrigation District Water Conservation and Efficiency	<p>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. <a href="https://nidwater.com/conservation/">https://nidwater.com/conservation/</a></p>

## 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. <a href="http://www.gogreenfinancing.com/">http://www.gogreenfinancing.com/</a>
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. <a href="http://cscda.org/Open-PACE">http://cscda.org/Open-PACE</a>
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, Grass Valley, Lincoln, Nevada City, Rocklin and Roseville. It also serves the Towns of Loomis and Truckee, as well as the City of Folsom in Sacramento County. <a href="http://www.mpowerca.org/">http://www.mpowerca.org/</a>
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. <a href="https://www.energystar.gov/index.cfm?c=mortgages.energy_efficient_mortgages">https://www.energystar.gov/index.cfm?c=mortgages.energy_efficient_mortgages</a> <a href="http://portal.hud.gov/hudportal/HUD?src=/program_offices/housing/sfh/eem/eemhog96">http://portal.hud.gov/hudportal/HUD?src=/program_offices/housing/sfh/eem/eemhog96</a>
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 or equity requirements. <a href="http://www.gsfahome.org/programs/energy/overview.shtml">http://www.gsfahome.org/programs/energy/overview.shtml</a>



**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. <a href="http://www.pge.com/en/mybusiness/save/rebates/onbill/index.page">http://www.pge.com/en/mybusiness/save/rebates/onbill/index.page</a>
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. <a href="http://www.rd.usda.gov/programs-services/rural-energy-america-program-renewable-energy-systems-energy-efficiency">http://www.rd.usda.gov/programs-services/rural-energy-america-program-renewable-energy-systems-energy-efficiency</a>
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. <a href="http://www.ibank.ca.gov/infrastructure-state-revolving-fund-isrf-program/">http://www.ibank.ca.gov/infrastructure-state-revolving-fund-isrf-program/</a>
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. <a href="http://www.ibank.ca.gov/cleen-center/">http://www.ibank.ca.gov/cleen-center/</a>

**Table F-4: Municipal Financing Programs**

FUNDING SOURCE	DESCRIPTION
California Energy Commission (CEC) Energy Efficiency Financing	The CEC offers school districts, charter schools, City 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. <a href="http://www.energy.ca.gov/efficiency/financing/">http://www.energy.ca.gov/efficiency/financing/</a>
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. <a href="http://www.pge.com/en/mybusiness/save/rebates/onbill/index.page">http://www.pge.com/en/mybusiness/save/rebates/onbill/index.page</a>



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. <a href="http://www.ibank.ca.gov/cleen-center/">http://www.ibank.ca.gov/cleen-center/</a>
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. <a href="http://www.rd.usda.gov/about-rd/agencies/rural-utilities-service">http://www.rd.usda.gov/about-rd/agencies/rural-utilities-service</a>

## 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: <a href="https://marketplace.pge.com/">https://marketplace.pge.com/</a>
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: <a href="https://pge.myturn.com/library/">https://pge.myturn.com/library/</a>
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. <a href="https://smarterhouse.org/">https://smarterhouse.org/</a>
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 regional government agencies, districts, and school districts. <a href="http://californiaseec.org/">http://californiaseec.org/</a>
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,

ENERGY EFFICIENCY, RENEWABLE ENERGY, AND WATER EFFICIENCY	DESCRIPTION
	conference calls are held on a variety of topics in which top experts can interact, discuss important issues and possibly connect later for collaboration. <a href="http://mseforum.com/">http://mseforum.com/</a>
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. <a href="http://eecoordinator.info/">http://eecoordinator.info/</a>
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. <a href="https://smartgrowthamerica.org/">https://smartgrowthamerica.org/</a>
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. <a href="http://www.ca-ilg.org/beacon-award-program">http://www.ca-ilg.org/beacon-award-program</a>
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. <a href="https://newbuildings.org/hubs/zero-net-energy/">https://newbuildings.org/hubs/zero-net-energy/</a>
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. <a href="http://www.localenergycodes.com/">http://www.localenergycodes.com/</a>
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. <a href="http://www.theboc.info/">http://www.theboc.info/</a>

ENERGY EFFICIENCY, RENEWABLE ENERGY, AND WATER EFFICIENCY	DESCRIPTION
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 growth of solar companies and programs, and other tools to assist the transition to renewable energy. <a href="http://www.energysage.com/">http://www.energysage.com/</a>
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 <a href="mailto:solar@spurr.org">solar@spurr.org</a> for more information. <a href="http://spurr.org/Services/Solar-Services">http://spurr.org/Services/Solar-Services</a>
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 city 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 city or county. <a href="https://solarresilient.org/">https://solarresilient.org/</a>
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. <a href="https://www.helioscope.com/">https://www.helioscope.com/</a>
Go-Biz Guide for Funding of Electric Vehicle Charging Stations	The Governor's Office of Business and Economic Development (GO-Biz) has created a guide to help state agencies navigate the funding options for plug-in electric vehicle charging infrastructure. It is designed to make the procurement of electric vehicle (EV) charging infrastructure on state-owned or leased property as seamless as possible. The guide offers direction for the prioritization of facilities and the process of securing funding for the stations and associated infrastructure costs. It includes a comprehensive list of utility and local incentive programs, all of which are designed to cover or offset the cost of station installation. <a href="http://www.business.ca.gov/Programs/Zero-Emission-Vehicles-ZEV">http://www.business.ca.gov/Programs/Zero-Emission-Vehicles-ZEV</a>
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

ENERGY EFFICIENCY, RENEWABLE ENERGY, AND WATER EFFICIENCY	DESCRIPTION
	that aim to encourage continued action among commercial kitchen industry users, and between industry users and water utilities. <a href="http://www.allianceforwaterefficiency.org/commercial-kitchens-guide-library.aspx">http://www.allianceforwaterefficiency.org/commercial-kitchens-guide-library.aspx</a>
Bureau of Reclamation: WaterSMART Program	2018 WaterSMART Program funding opportunities for water and energy efficiency, small-scale water efficiency, and water marketing strategy projects. <a href="https://www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=61828">https://www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=61828</a>

## 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 study session hosted by the Grass Valley Planning Commission on June 19th, 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 kept open from May 31st, 2018 to July 21st, 2018 and received 46 responses. Both the survey and study session were publicized at the City Hall offices, Chamber of Commerce office, and the Grass Valley Public Library. 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. Additionally, the SBC Climate Planning Team hosted an interactive public input session on July 28th at the City's booth during the first night of Grass Valley Thursday Night Market, and collected additional input from over 35 community members.

The public input collected at the study session, from the online survey, and at the market booth 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.

### JUNE 19<sup>TH</sup>, 2018 STUDY SESSION 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, a summary of public input collected in the online survey, 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.

The Planning Commission and 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 Study Session Workshop**

Topic	Comments
Residential Energy Use	<ul style="list-style-type: none"><li>• Historic Homes – concern for how difficult historic and older homes would be to upgrade<ul style="list-style-type: none"><li>○ There are opportunities for lighting and appliance upgrades</li><li>○ Insulation and weatherization (windows, floors, and roof) are effective efficiency upgrades for historic homes</li></ul></li><li>• Incentives should be publicly available to residents</li><li>• Rental homes – renters may not be able to participate, landlords may not be interested<ul style="list-style-type: none"><li>○ Look into programs to help renters</li><li>○ Solar joint contract between neighbors is a way to engage landlords in solar</li></ul></li><li>• Real estate – awareness of energy use in home<ul style="list-style-type: none"><li>○ Home shoppers are starting to look at this factor when buying a new home</li></ul></li><li>• Cost-effective – programs that are not cost prohibitive and are cost-effective</li><li>• Achievable solutions</li></ul>
Non-Residential Energy Use	<ul style="list-style-type: none"><li>• Important for businesses to save money on energy</li><li>• Title 24 – go beyond mandates</li><li>• Data available to keep energy use up to date</li><li>• Non-residential lighting seems to be a great first step – easy first step</li></ul>



	<ul style="list-style-type: none"> <li>City to lead by example – this is an effective way to get started <ul style="list-style-type: none"> <li>Behavior changes</li> <li>Water-energy possibilities for City to take on</li> </ul> </li> </ul>
New Construction	<ul style="list-style-type: none"> <li>Title 24 standards – how can we go beyond them? City should help to train and ensure community can go farther than Title 24</li> </ul>
Renewable Energy	<ul style="list-style-type: none"> <li>City should pass 100% Renewable Resolution</li> <li>Would be joining Nevada City, Truckee, and Nevada County</li> <li>Residential Solar – some success stories in community already</li> <li>How to make it accessible for the whole community – looking at other programs</li> </ul>
Water-Energy	<ul style="list-style-type: none"> <li>Drought-related issues</li> </ul>
Working Group	<ul style="list-style-type: none"> <li>Working Group should convene and work on plan for long-term</li> <li>Include residents and business owners</li> <li>CivicSpark fellow – will be there for the first year, but City should pursue a fellow every year for life of the plan</li> <li>Community engagement (both from SBC development of plan, and from City after adoption of plan) – ideas include Thursday Night Market, more workshops, etc.</li> </ul>

#### JUNE 28<sup>TH</sup>, 2018 GRASS VALLEY THURSDAY NIGHT MARKET EVENT

SBC staff members joined the City to host a booth during the first night of Grass Valley's Thursday Night Market for an interactive public input session. Community members were encouraged to provide feedback, play a fun energy themed spin-to-win game, and take the online survey. During this event, we were able to answer questions, collect input, hand out information on the EAP and online survey, and provide more face-to-face time with the local community.

The booth was attended by over 35 Thursday Night Market attendees provided a number of excellent comments that are summarized here:

**Table H-1: Comments from Study Session Workshop**

Topic	Comments
General Comments (each bullet point is an individual's response)	<ul style="list-style-type: none"> <li>Would like to have solar, but the City will not allow tree removal to allow more sun exposure</li> <li>Need to combine Solar and Hydro for renewable strategy</li> <li>Barriers to residential solar – up front cost, how to get solar?</li> <li>Would like to learn from plan – more about different forms of renewable energy</li> <li>Don't see what benefits would be to me – energy bill is already low, our small house/apartment doesn't use a lot of energy.</li> <li>If the City goes forward with a plan for solar (for example), concerned about funding. Where would funding come from, would it impact other things in the budget? For example, would funding be pulled from schools, roads, etc? How would any renewable energy pursuits by the City affect the overall budget? Basically – renewables are great and we need it, but concerned it will mean sacrificing other important parts of the budget.</li> <li>Turn Idaho-Maryland contaminated site into a solar farm</li> <li>Any strategies for water-energy are unknown – tell us more in the plan</li> <li>Saved lots of money and water when living in San Diego (SDG&amp;E) by using their rebates (water-barrel upgrades and incentives)</li> <li>Can't justify solar – house is energy efficient, energy bill is around \$35/month <ul style="list-style-type: none"> <li>Use PG&amp;E E6 plan religiously, no A/C, propane appliances, white roof, etc.</li> </ul> </li> <li>Energy efficiency practices we already do – turn off lights, solar</li> </ul>

	<ul style="list-style-type: none"> <li>• Would like to reduce natural gas bill, energy bill is already low</li> <li>• Would like to see a working group work on all the regional EAP – especially since Nevada City has theirs, and Nevada County might be next, would be great to combine and coordinate efforts.</li> <li>• We have a drought tolerant landscape with drip irrigation that is on a timer – saves water and energy</li> <li>• How to save energy on well water? Does pump system affect water-energy savings?</li> <li>• We have solar water heating for pool</li> <li>• Water-energy barriers – new hot water heater brands have bad reviews, and the cost is so high... this combo is a barrier. How to find quality appliance upgrade</li> <li>• Would like to see Hydro and Biomass – but only if SMALL</li> <li>• What about rental programs? Or incentives for renters?</li> <li>• How we save – turn of lights, reduce energy usage during peak hours, etc.</li> <li>• We would like more options for solar... different kinds of programs for getting solar</li> <li>• EV options? What about more things like the Prius rebate/incentive?</li> <li>• Our PG&amp;E bill is really low already <ul style="list-style-type: none"> <li>○ Great insulation on the house, lighting is on timers, our gas bill is low, but would like to get that down more</li> </ul> </li> <li>• What about methane from animal ag?</li> <li>• Outdoor solar lights</li> </ul>
Energy Efficiency	<ul style="list-style-type: none"> <li>• What area of your home or business uses the most energy? <ul style="list-style-type: none"> <li>○ Water heater – 2 respondents</li> <li>○ Electric stove</li> <li>○ Heater – 2 respondents</li> <li>○ A/C – 5 respondents</li> <li>○ Fridge/freezer</li> <li>○ Phantom loads</li> <li>○ Try to use whole house fan instead of A/C</li> </ul> </li> <li>• What barriers do you face when reducing energy usage and costs in your home or business? <ul style="list-style-type: none"> <li>○ Initial cost of solar panels + batteries</li> <li>○ Changing your lifestyle</li> <li>○ Children + lights</li> <li>○ PG&amp;E!</li> <li>○ Changing habits</li> </ul> </li> </ul>
Renewable Energy	<ul style="list-style-type: none"> <li>• Which renewable energy source is the most viable for Grass Valley? <ul style="list-style-type: none"> <li>○ 1) Solar 2) Biomass 3) Hydro 4) Geothermal and Wind tied</li> </ul> </li> <li>• Do you have a renewable energy system on your property? Yes – that's great! No? Tell us what challenges you face when employing a renewable energy system: <ul style="list-style-type: none"> <li>○ Expensive to set up solar – up front cost</li> <li>○ Renter</li> <li>○ Not feasible – I live in an apartment</li> </ul> </li> <li>• Other renewable energy comments: <ul style="list-style-type: none"> <li>○ I do not want to see hydro-electric dams</li> <li>○ Want to see solar city buses</li> <li>○ What about an optional solar energy community plan through the city?</li> <li>○ Where will the funds to develop renewable energy projects come from?</li> <li>○ Small (biomass) under 3 mw plants could be utilized for small trees in our overcrowded forests</li> <li>○ Methane from pigs – renewable energy idea</li> </ul> </li> </ul>

Water-Energy	<ul style="list-style-type: none"> <li>• What helps you achieve the greatest water savings? Do you face any challenges when increasing water-energy efficiency in your home or business? <ul style="list-style-type: none"> <li>○ Very conscious of water usage, not wasting water, recycling when possible</li> <li>○ Drip irrigation</li> <li>○ Grey water system</li> <li>○ Challenge – bad pipes for city water</li> <li>○ Collect cold water in a pitcher while letting hot water (running) heat up</li> <li>○ Challenge – being more mindful, hard to change habits</li> </ul> </li> <li>• How is your water heated? Did you know 25% of energy usage in your home goes to your water heater? <ul style="list-style-type: none"> <li>○ Gas water heater – 5 respondents</li> <li>○ Gas tankless water heater – very efficient</li> <li>○ Solar-thermal</li> <li>○ Propane tankless water heater</li> </ul> </li> </ul>
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## 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 May 31st, 2018 and closed July 21st, 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 City of Grass Valley**

Survey Questions	Responses
Respondent Profile	46 total responses 63% from City of Grass Valley residents 6.5% age 25 to 34 8.5% age 35 to 44 8.5% age 45 to 54 26.5% age 55 to 64 50% age 65+ 78% homeowners 10% business owners 9% own business space
If you're a business owner, what is the average monthly electricity bill at your business?	50% \$100 to \$125 50% over \$125
What area of your business uses the most energy?	Responses: Cooler and heating
If you're a business owner, are you familiar with energy efficiency practices that can reduce energy usage and associated costs for your business?	100% Yes

Survey Questions	Responses
If yes, have you seen cost savings or other benefits from participating in these programs?	50% Yes 50% No
As a business owner, what barriers, if any, do you see when reducing energy usage and costs for your business?	Comments: <ul style="list-style-type: none"> <li>- Older buildings aren't energy efficient, to update them is very costly</li> <li>- I have a consulting business operating out of my home. The barrier to more energy efficiency might be alternative sources like solar.</li> </ul>
Have you participated in any energy efficiency programs for business owners?	50% Yes, participated 50% No
If you have completed an energy efficiency project, why did you choose to complete the project?	N/A
Are you interested in a free energy audit for your business?	100% Yes
What is your average monthly home electrical bill?	47% Under \$80 12.5% \$80 to \$100 12.5% \$100-125 25% Over \$125 3% Not sure
Are you familiar with energy efficiency practices that can reduce energy usage and associated costs for your home?	90% Yes 10% No
Have you seen cost savings or other benefits from participating in these programs?	6% No 22% Unaware of my benefits 25% N/A/ 47% Yes – how much? Comments: <ul style="list-style-type: none"> <li>- Minimal amount</li> <li>- Solar hot water-heating saves about ½</li> <li>- \$100/month or more</li> <li>- \$80 from HVAC set back thermostat and tankless water heater.</li> <li>- It varies – I haven't kept track of the amounts</li> <li>- Some cost reduction on electricity bill</li> <li>- Not sure, but added much more attic insulation</li> <li>- Not sure</li> <li>- \$10</li> </ul>

Survey Questions	Responses
	<ul style="list-style-type: none"> <li>- Energy practices are different than energy programs – I don't use AC much, keep heat off in winter – programs I do not participate in any I know of other than PG&amp;E plans</li> <li>- \$50 per month</li> <li>- \$75</li> <li>- Benefit is doing the right thing, not sure \$ amount</li> </ul>
<p>What challenges, if any, do you face when reducing energy usage and costs in your home?</p>	<p>Comments:</p> <ul style="list-style-type: none"> <li>- Too hot or too cold</li> <li>- Not sure</li> <li>- Time of use meter conflicts with hot times of day. I have a pool.</li> <li>- Older homes are costly to update to be maximized energy efficient.</li> <li>- Weather. Need to heat and cool.</li> <li>- None.</li> <li>- We have done everything available to reduce costs.</li> <li>- Maintaining comfortable climate</li> <li>- None</li> <li>- Electric heating with space heaters</li> <li>- How can I get solar as a renter</li> <li>- Cost of equipment upgrade</li> <li>- Planning for optimum times to use energy and/or reduce energy when the grid is stressed by weather and/or heavy usage at the end of the day.</li> <li>- None really. The house is a bit hot in hot weather but that's OK.</li> <li>- High cost of some of the changes that would need to be made to our home.</li> <li>- Staying warm.</li> <li>- Too much shade from neighbor's trees</li> <li>- Still have natural gas expenses, even though we have more than enough solar capacity</li> <li>- None</li> <li>- Old appliances</li> <li>- Sometimes it's hotter in summer and cooler in winter than is my ideal temperature.</li> <li>- No problem, so far</li> <li>- Initial cost</li> <li>- Winter heating as I now have an electric heat pump</li> <li>- Old furnace with natural gas</li> <li>- None</li> <li>- Water heating</li> <li>- I have a growing number of wifi connected gadgets that are on all the time.</li> <li>- Air conditioning</li> <li>- None except a change in habits</li> <li>- A tad hot in late afternoon in summer</li> <li>- Identifying the most energy intensive appliances</li> </ul>
<p>If applicable, what steps have you taken to lower energy usage and associated costs?</p>	<p>35.5% Participate in PG&amp;E/Utility programs 64.5% Other</p> <p>Please specify:</p> <ul style="list-style-type: none"> <li>- Use less water, set cool temp at 78, keep windows covered</li> <li>- Common sense, lighting</li> <li>- Solar hot water, increased attic insulation, replaced heater A/C and all ducting, replaced all windows for entire house</li> </ul>

Survey Questions	Responses
	<ul style="list-style-type: none"> <li>- Installed tankless water heater</li> <li>- Participate in OhmConnect</li> <li>- Update insulation, reflective roofing shingles</li> <li>- Insulation</li> <li>- PG&amp;E net metering solar</li> <li>- Home Energy use is very low</li> <li>- Turn off lights, use stove once a day</li> <li>- Lower the thermostat to 65 degrees, shower every other day</li> <li>- EVA rate plan</li> <li>- Installed solar panels with net metering</li> <li>- Have taken no steps.</li> <li>- Wood stove rather than natural gas, travel away from home in winter</li> <li>- Open and close windows/shades w/ the movement of the sun.</li> <li>- Replacing inefficient lighting with LEDs. Turning things off when not using to avoid phantom loads.</li> </ul>
What area of your home uses the most energy?	<ul style="list-style-type: none"> <li>- Air conditioner</li> <li>- Kitchen</li> <li>- Pool</li> <li>- Cooling and heating</li> <li>- Living/kitchen</li> <li>- Kitchen/laundry/furnace</li> </ul>
Are you interested in completing an energy audit of your home?	<p>19% Yes</p> <p>53% No</p> <p>28% Maybe/Other comments:</p> <ul style="list-style-type: none"> <li>- If free</li> <li>- Possibly</li> <li>- I think that I may have had something of this order, but it wasn't called an energy audit</li> <li>- Already had one</li> <li>- Not at present time</li> <li>- Not sure</li> </ul>
If you have completed an energy efficiency project in your home, why did you choose to complete the project?	<ol style="list-style-type: none"> <li>1. Reduce electricity costs and save money</li> <li>2. Keep clean energy available and "dirty" energy turned off</li> <li>3. Roof/house failing, lack of inadequate insulation</li> <li>4. Reduce pollution and fossil fuel dependency</li> <li>5. Reduce natural gas bills</li> <li>6. Improve lighting and appliances</li> </ol>
Please rank the following forms of renewable energy generation in the order of most viable to least viable in Grass Valley, 1 being the most viable.	<p>Solar – 1</p> <p>Hydro – 2</p> <p>Biomass – 3</p> <p>Wind – 4</p> <p>Geothermal - 5</p>
Do you currently employ a renewable energy system on your property?	<p>31% Yes</p> <p>69% No</p>



Survey Questions	Responses
If you have completed a renewable energy project, why did you choose to complete the project?	Comments: <ul style="list-style-type: none"> <li>- Because not enough has been done to cut energy costs, we have resources why not creatively use what we have to resolve this problem</li> <li>- Protect the environment and save money</li> <li>- Solar</li> <li>- Cost savings, tax credit, and reduce pollution</li> <li>- Save on energy costs for HOA and help the planet</li> <li>- No project completed</li> <li>- I did not have a program</li> <li>- Reduce fossil fuels</li> <li>- Environmental concerns and cost savings over time</li> </ul>
If you currently do not have a renewable energy system but would like to, what barriers do you face?	Comments: <ul style="list-style-type: none"> <li>- Cost – initial cost, upkeep, and replacement cost in the future</li> <li>- I am a renter, but I want solar</li> <li>- Look of solar panels on a historical Victorian home</li> <li>- Live in government-subsidized apartment complex which I don't think would consider such a move, but solar could be used to advantage.</li> <li>- Bill too low – don't need</li> <li>- Numerous trees near home that keep it shaded. This situation is an advantage because it helps cool my house and keep AC costs low.</li> <li>- Spend more on natural gas than solar since heat/hotwater/stove are on natural gas</li> </ul>
Are you interested in a site assessment of your home or business for renewable energy?	38% Yes 62% No Comments: <ul style="list-style-type: none"> <li>- If free</li> <li>- Already complete</li> <li>- Depends what it entails</li> </ul>
Would you be interested in learning more about rebate and incentive programs for renewable energy?	62% Yes 38% No
What is your average monthly water and sewer bill?	33% Under \$35 15% \$35 to \$70 30% \$70 to \$100 22% Over \$100 Comments: <ul style="list-style-type: none"> <li>- On a well and septic system</li> <li>- Water provided and billed by NID</li> <li>- May be greater</li> <li>- Irrigation water –</li> <li>- Complex - supplied water and sewer so I have no bill</li> <li>- It is divided among 30 units and I don't know what our bill is</li> <li>- WAG since sewer is \$110 for 2 months and water varies with season</li> <li>- Landlord pays the water bill so I'm not sure what we pay.</li> </ul>

Survey Questions	Responses
Are you aware of any programs that exist to help you save water, lower your bill, and/or reduce water consumption?	<p>44% Yes 56% No</p> <p>Comments:</p> <ul style="list-style-type: none"> <li>- Use a low flow shower head, use shower water to flush toilet</li> <li>- Aware of no programs, but I do practice turning off toilet if gone for a day, etc.</li> <li>- This is important! I'd love to see local agencies (NID and GV) help with this</li> <li>- It seems we are at a minimum. Even being gone for months does not lower our bill</li> <li>- I would love to have help to be able to use some of my "brown" water in my yard</li> </ul>
If so, have you participated in any utility rebate or incentive programs for water efficiency/conservation?	<p>4% Yes 80% No 16% N/A</p> <p>Comments:</p> <ul style="list-style-type: none"> <li>- Drip irrigation, removed grass lawn areas</li> </ul>
If yes, have you seen any cost savings or other benefits from participating in these programs?	<p>16% No 24% Unaware of my benefits 56% N/A 4% Yes → how much?</p> <p>Responses:</p> <ul style="list-style-type: none"> <li>- 24%</li> </ul>
If not, would you be interested in learning more about rebate and incentive programs for water-energy efficiency?	<p>70% Yes 30% No</p>
Are you interested in having an assessment of your indoor or outdoor water use?	<p>67% Yes 33% No</p> <p>Comments:</p> <ul style="list-style-type: none"> <li>- If free</li> <li>- Ground water is important too</li> <li>- Depends on what the effort entails</li> <li>- This would be for our entire 30-unit building, not my individual home</li> <li>- Outdoor is our well</li> </ul>
What would help you achieve greater water savings?	<p>Comments:</p> <ul style="list-style-type: none"> <li>- Yes; I would</li> <li>- Using less</li> <li>- There is a need for all the water I use</li> <li>- Use natural spring water</li> </ul>

Survey Questions	Responses
<p>What barriers, if any, do you see in achieving greater water savings?</p>	<p>Comments:</p> <ul style="list-style-type: none"> <li>- NID</li> <li>- Not sure</li> <li>- Cost</li> <li>- Lack of knowledge of options</li> <li>- None</li> <li>- Would lose all landscaping with reduced summer water availability.</li> <li>- Time and money</li> <li>- The apartment complex could do more with its residents to educate regarding conserving water.</li> <li>- Climate change</li> <li>- I have a lot of beautiful landscaping. I would like to get rid of some of the lawns. I am an avid gardener, however, and am proud of the various ornamental specimens, trees, vegetable garden and fruit trees.</li> <li>- We enjoy our shrubs, trees, and flowers</li> <li>- Because we are a 30-unit building, we don't have individual water bills. As a result, we get no feedback on any conservation measures we might take. So, there is less incentive to conserve.</li> <li>- Minimum charges</li> <li>- Changing habits is challenging.</li> </ul>
<p>If you have completed a water-energy efficiency project, why did you choose to complete the project?</p>	<p>Comments:</p> <ul style="list-style-type: none"> <li>- N/A</li> <li>- I did install soaker hoses to backyard perimeter gardens to reduce waste.</li> <li>- To save money</li> <li>- Environmental protection</li> <li>- Outdoor plant watering</li> <li>- I have installed timers for the entire property. Shrubbery, flowers, garden plants, fruit trees all on drip system. The lawn is still watered by sprinklers, though we do always water at night to reduce evaporation.</li> <li>- Water shortages a few years ago</li> <li>- Eliminated lawn which reduced our watering.</li> <li>- Removed lawn and replaced it with low water shrubs</li> <li>- Save water</li> </ul>