Alpine County

Energy Action Plan

PUBLIC REVIEW DRAFT

OCTOBER 2016

Produced by Sierra Business Council

Supported by Pacific Gas and Electric Company (PG&E)

In Collaboration with Alpine County

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Credits and Acknowledgements

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

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EXECUTIVE SUMMARY

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

The Alpine County Energy Action Plan (EAP) is a roadmap for expanding energy-efficiency, water-efficiency and renewable-energy efforts already underway in the County. It builds upon energy-efficiency efforts begun in 2009 with the update to the Housing Element of the General Plan and work conducted by Sierra Business Council (SBC) in 2010 and 2012.

The document focuses on three energy use sectors within the community – residential, non-residential, and municipal (a subset of non-residential). The report only evaluates energy consumed by buildings and municipal operations; other energy consuming sectors such as transportation are not addressed but could be at a future date.

The two primary energy sources consumed by these community sectors are electricity, which is distributed by Pacific Gas and Electric Company (PG&E), Liberty Utilities, and Kirkwood Meadows Public Utility District (KMPUD), and propane, which is supplied by several regional providers. Additionally, there is potentially significant other non-utility fuel use in Alpine County which is not analyzed due to data limitations. The goal of the plan is to reduce electricity use in 2025 by 17% (from the business-as-usual forecast) and propane use by 9%. This translates to annual savings in 2025 of 3.28 million kilowatt hours (kWhs) of electricity and 60,896 gallons of propane.

According to the baseline inventory conducted for Year 2005 the Alpine County community consumed 18.6 kWhs of electricity and an estimated 661 thousand gallons of propane. Alpine County owns and operates a full vehicle fleet, county government buildings and facilities and public lighting. These municipal operations accounted for over 580,000 kWhs of electricity consumption and 48,700 gallons of propane in 2005, costing the County over $139,000.

The forecast for Year 2025 shows an increase of 11% in residential and a decrease of 8% in non-residential energy consumption due to an increase in occupied housing and a decrease in employment respectively. Although non-residential energy use is projected to decrease, any efforts made to save energy will save the community money that can be invested in the local economy. To date, community member's energy-efficiency efforts are saving over 280,000 kWhs of electricity annually in the PG&E service territory, which underscores the importance of having such measures.[1]

The baseline inventory and forecast work conducted by SBC identified additional areas where significant opportunities exist for further energy savings. The EAP specifies the actions needed to achieve those savings resulting in further reductions in energy consumption and increased energy savings for residents, businesses, and local governments. The document is organized into five chapters; the 'heart' of the document is contained

[1] Alpine residential and non-residential energy savings based on projects completed 2010-2016. (PG&E)

in Chapter 4: Energy Efficiency Goals, Strategies and Actions, and Chapter 5: Implementation Plan. The goals address five key areas of energy:

1. Existing Structures - Energy efficiency in existing homes, offices, etc.
2. New Construction - Energy performance in new and planned construction
3. Renewable Energy - Expansion of local renewable energy generation and use
4. County Operations - Energy efficiency in municipal operations
5. Water Energy - Reduction in water waste and its embedded energy use

The strategies focus on voluntary measures that can be taken by residents, businesses, and public agencies. Key components include: developing and disseminating information on existing rebate and incentive programs; public outreach via the County's website and printed materials; training for staff, contractors, realtors and developers; and partnerships with utilities as well as local and regional organizations. Energy reduction performance indicators and targets are established for each group of strategies. If all actions in this EAP are implemented, in Year 2025, electricity use will have reduced by 17% and propane use reduced by 9%. This translates to annual savings in 2025 of 3.28 million kWhs of electricity and 60,896 gallons of propane. These reductions are in addition to the forecasted change in energy use associated with the projected increase in occupied housing and decrease in employment in Alpine County.

The estimated energy and cost savings for each strategy area would be as follows:

Table ES-1:
Summary of Potential Year 2025 Energy and Cost Savings

Strategy Area		2025 Energy Savings		2025 Cost Savings	
		kWh	Gallons	Electricity[2]	Propane[3]
Energy Efficiency	Existing Structures	1,551,903	21,135	$393,563	$46,498
	New Construction	725,131	23,585	$183,893	$51,887
Renewable Energy	Existing Structures	595,801	-	$151,095	-
	New Construction	170,049	6,425	$43,124	$14,135
Municipal Operations	Existing Structures	123,141	9,750	$31,228	$21,450
Water Efficiency	Existing Structures	114,673	-	$29,081	-
Total[4]		**3,280,698**	**60,896**	**$831,985**	**$133,970**

[2]Assumed average rate of $0.2536 per kWh based on Forecast of PG&E Rates. http://www.ci.healdsburg.ca.us/Modules/ShowDocument.aspx?documentid=8906

[3] Assumed average rate of $2.2 per gallon based on 2010 Energy Information Agency West Coast Annual Average Retail Prices. http://www.eia.gov/dnav/pet/pet_sum_mkt_dcu_R50_a.htm

[4] In Tables, individual records may not add up to totals due to rounding.

The following table compares 2005 Baseline energy usage, 2025 Business as Usual (BAU) forecasted energy use[5] and potential energy use savings in 2025 with the successful implementation of the strategies and actions in the EAP. The majority of energy savings, 2.39 kWhs of electricity use and 30,800 gallons propane, are attributed to existing structures and would have significant impact in the community regardless of the projected new construction.

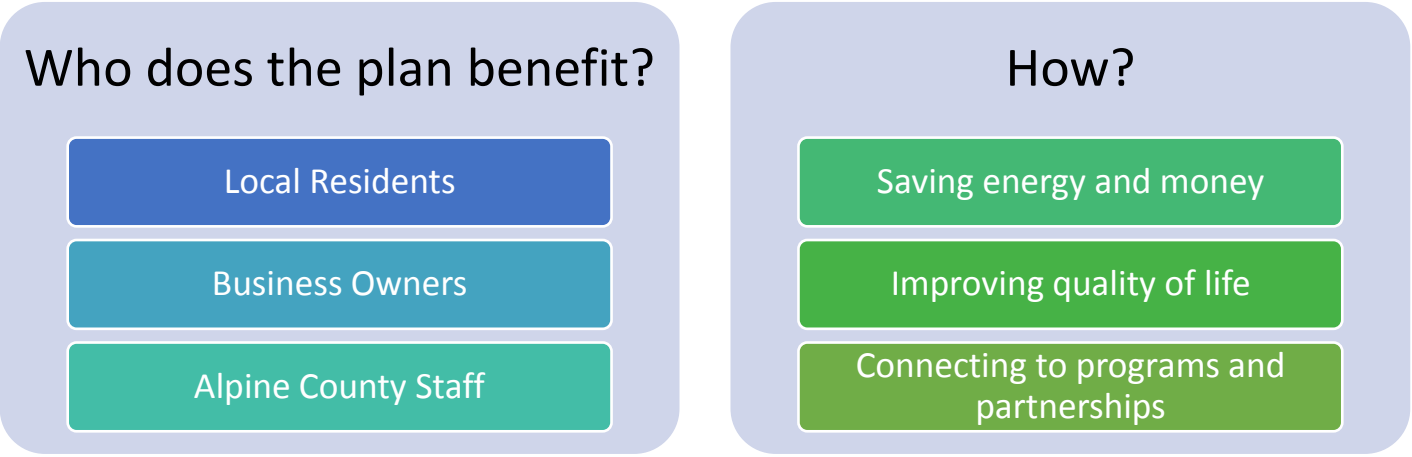
Table ES-2:
Comparison of Baseline and Forecasted Annual Energy Use with and without the EAP

Energy Use	2005 Baseline	2025 BAU Forecast	2025 with the EAP	Percent Difference
Electricity	18,559,586 kWh	18,812,358 kWh	15,531,660 kWh (-3,280,698 kWh)	17% reduction from 2025 BAU
Propane	661,201 gallons	675,141 gallons	614,245 gallons (-60,896 gallons)	9% reduction from 2025 BAU

Purpose of the Energy Action Plan

The Energy Action Plan recommends goals, strategies and actions that support the efforts of residents and business owners to increase their energy efficiency, increase their generation and use of renewable energy and reduce water waste. Residents and business owners will find that they can make their homes and offices more comfortable while reducing their energy use and consequently lowering their energy expenses. Alpine County can use the EAP to guide decisions that will help achieve greater energy efficiency as well as educate and inform the community. County staff can use it to guide decisions about how to make its buildings and operational infrastructure more efficient, prioritizing programs that inform, encourage, and inspire residents and business owners to increase their energy efficiency, water efficiency and renewable energy use in Alpine County.

By acting on the goals and strategies within this plan, the County can more flexibly meet its energy and water needs. This in turn helps the community become more self-sufficient and economically resilient in light of potential increases in energy prices, whether due to market conditions or the regulatory environment, as well as current drought conditions. Being energy efficient enhances the County's ability to respond to the ever changing external conditions related to energy supply and demand.



[5] Business as Usual usage is projected energy usage if no energy efficiency measures or programs are implemented

CHAPTER 1: BACKGROUND

Chapter 1 provides background on the Alpine County community and leading energy efficiency efforts that the County has prioritized.

Community Profile

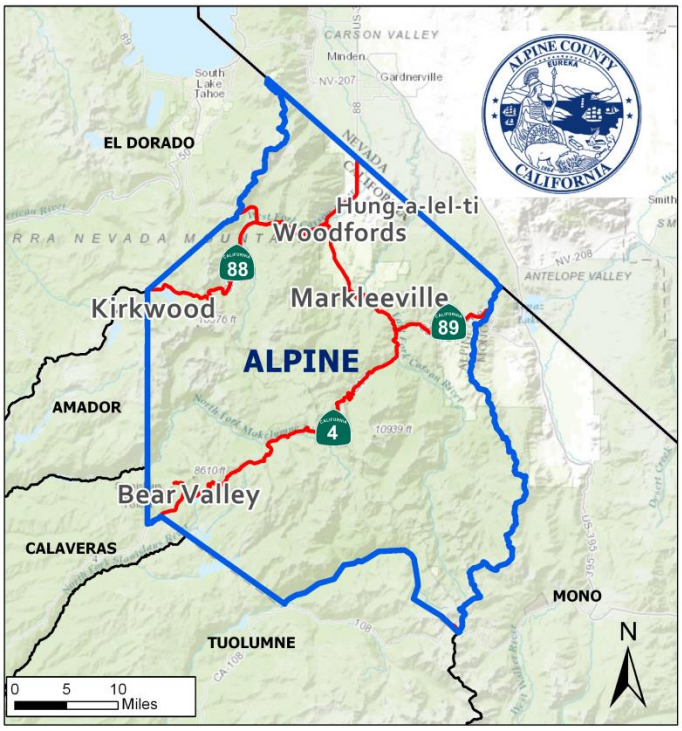


Image courtesy of Alpine County

Alpine County, is located in the eastern heart of the Sierra Nevada mountain range, south of Lake Tahoe and bordering Nevada. Alpine County has a rich history and legacy of pioneers, home first to the native Washoe people followed by miners that settled during the Comstock Lode near Virginia City in 1859. Its scenic beauty, wildlife, recreation, and other natural features and resources have shaped the community that enjoys it today. The County's land base, approximately 743 square miles consists of 94% publically managed land including; three national forests (Eldorado, Stanislaus, and Toiyabe), Mokelumne and Carson-Iceberg designated wilderness areas, Bureau of Land Management, and State of California lands. The County's unincorporated communities on the east slope of the Sierra Nevada are: Markleeville (county seat), Woodfords, and Hung-a-lel-ti. On the west slope are the ski resorts communities of Kirkwood and Bear Valley. It neighbors the counties of El Dorado, Amador, Calaveras, Tuolumne, Mono and Douglas County, Nevada. In 2016, the County was estimated to be home to 1,166 residents, making it the smallest county in California by population, and 1,778 residential housing units. Of those units, 27.7% were occupied with an average household size of 2.32 persons[6]. The remaining housing units are either vacant, seasonal or second homes. In Fiscal Year 2014/2015, the County government had 100 allocated employee positions and an operating budget of $27.1 million[7]. The County has no incorporated cities and its county seat is Markleeville.

The County owns and operates Turtle Rock Park, public lighting, and facilities in Markleeville, Woodfords and Bear Valley. Electricity for the community is distributed by Liberty Utilities on the east slope, Pacific Gas and Electric Company (PG&E) in the Bear Valley region, and Kirkwood Meadows Public Utilities District (KMPUD).

[6] Source: State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2011-2016. Sacramento, California, May 2016. http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/

[7] Source: Alpine County, State of California. Fiscal Year 2015-16 Adopted Budget, September 15, 2015. http://www.alpinecountyca.gov/DocumentCenter/View/1025

Propane is supplied by distributors operating out of the Gardnerville/Minden and South Lake Tahoe areas, as well as from private companies in Calaveras County to the Bear Valley area.

The climate in Alpine County reflects its location along the crest and eastern slope of the mountain range. Average temperatures range from summer highs in the mid-80 degrees Fahrenheit to winter lows in the low-20's, with an average annual rainfall of 21 inches and average snowfall of 93 inches.

Local Energy Efficiency Efforts

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

- Streamlined small residential rooftop solar energy systems permitting process
- Turtle Rock Park community meeting room retrofitted with energy efficient windows and refrigeration units
- County building recycling program resulting in reduced methane from County-generated waste
- Road maintenance and snow removal equipment replacement and retrofit to reduce emissions

Additionally, the County's General Plan has several goals, policies, and measures that specifically promote energy efficiency, water efficiency and the expansion of renewable energy:

- Achieve maximum levels of energy conservation through proper construction, design, and placement of all new developments (General Plan Goal No.16)
- All new public, private facilities and residences should be designed to meet requirements of Title 24 of the State Energy Code (Policy No.16a)
- In approving development permits the County should set requirements and/or make recommendations wherever possible that would improve energy conservation and save long-term costs (Policy No.16b)
- Develop energy resources including but not limited to solar, wind, geothermal, and small hydro without sacrifice to aesthetics or the existing natural or socioeconomic environment (General Plan Goal No.17)
- All new lots or parcels intended to contain structures for human occupancy should be designed to allow for and protect maximum utilization of available solar and wind resources (Policy No.17c)
- All new commercial or residential units utilizing community sewer or water systems should be required to contain low or restrictive flow water fixtures or devices wherever possible (Policy No.26b)

The County's code also contains several energy-related codes:

- Small residential rooftop solar energy systems (Code 15.04.035) – […] promotes and encourages the installation and use of solar energy systems by limiting obstacles to their use and by minimizing the permitting costs of such systems.
- Energy conservation (Code 17.12.050) – The design of the subdivision shall provide, in accordance with Section 66473.1 of the Subdivision Map Act and to the extent feasible, for future passive or natural heating or cooling opportunities. (Ord. 709 § 1 (Exh. A) (part), 2014)

CHAPTER 2: INTRODUCTION

Chapter 2 discusses the purpose and scope for the Alpine County EAP, the regulatory context for energy planning, how the EAP was developed and a user's guide to the document.

WHY PREPARE AN ENERGY ACTION PLAN?

Local economies in the Sierra Nevada rely heavily on natural resources for tourism, recreation, forestry, agriculture and other industries. Changes in weather patterns resulting in less precipitation and significantly warmer temperatures have the potential to adversely affect the vitality of the region's natural resources, which in turn directly impacts local business and residential communities.

Reducing a community's demand on the energy grid helps lessen the need for new energy generating plants and creates the flexibility for the community to more readily meet its energy needs with locally produced renewable energy. Retrofitting homes and businesses to be more efficient creates local jobs, reduces energy costs, improves air quality, makes homes and businesses more comfortable and in combination with increased opportunities for walking and bicycling, improves community members' health. In addition, money not spent on energy can instead be spent at local businesses, improving the local economy.

The Alpine County EAP outlines a series of strategies to reduce energy consumption in residential and non-residential structures as well as municipal facilities and operations. It is intended to provide guidance to staff, demonstrate the County's commitment to energy efficiency and inspire residents and businesses to participate in community efforts to maximize energy efficiency and reduce the associated air quality impacts of heating fuels and fossil fuel based electricity.

Climate Science Basics

Naturally occurring gases[8] 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

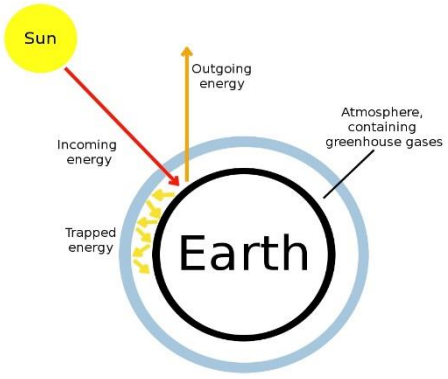


Image Credit: simpleclimate.wordpress.com

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

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.[9]

Local Climate Change Impacts

Alpine County, like all communities in the Sierra Nevada, faces challenges associated with climate change in the region. Increased frequency and altered timing of flooding will increase risks to agriculture, people, ecosystems and infrastructure. Potential impacts on water resources include reduced mountain snowpack, delayed snow accumulation, earlier snow melting and ultimately shortages in runoff and water supply. Extended droughts may increase wildland fire risk. Since local economies in the area rely heavily on these resources for agriculture, tourism, recreation and other industries, climate change may negatively affect economic activity in the County, and ultimately impact quality of life for community members.[10]

Regulatory Context

California is a leader in developing policies to reduce GHG emissions, and these policies are some of the drivers behind the completion of GHG inventories and energy planning at the local level. The state's key efforts are described on the following page:

1978	• **Title 24, Part 6.** Energy Efficiency Standards first adopted in 1978. Ongoing updates. Established minimum energy efficiency performance standards for residential and nonresidential buildings. Effective July 2014 new energy efficiency standards cost-effectively increase efficiency by 20% for residential buildings and 25% for non-residential buildings.
2002	• **Senate Bill 1078.** Established Renewable Portfolio Standards for each of the state's investor-owned utilities (IOUs), electric service providers, and community choice aggregators to acquire 20% of their electricity from renewable resources by 2010 and 33% by 2020.
2005	• **Executive Order S-3-05.** Governor's Executive Order. Set GHG reduction targets for state agencies at Year 2000 levels by 2010, 1990 levels by 2020 and 80% below 1990 levels by 2050.
2006	• **Assembly Bill 32.** Landmark legislation that requires the California Air Resources Board (ARB) to develop regulatory and market mechanisms that will reduce greenhouse gas emissions to 1990 levels by 2020.
2007	• **Senate Bill 97.** Requires lead agencies to analyze GHG emissions and climate change impacts under the California Environmental Quality Act.
2011	• **CALGreen.** Enhances sustainable construction practices through mandatory and voluntary measures including reduced construction waste, water conservation, non-toxic sealants and use of renewable materials. Now part of Title 24 and updated on same schedule.
2016	• **Senate Bill 32.** Expands upon AB 32 and requires the California ARB to develop regulatory and market mechanisims that will ensure that statewide greenhouse gas emissions are reduced to 40% below 1990 levels by 2030.

[9] Based on IPCC, 2007: 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.

[10] California Office of Environmental Health Hazard Assessment, Indicators of Climate Change in California: http://www.oehha.ca.gov/multimedia/epic/2013EnvIndicatorReport.html

Economic Opportunities

One of the potential outcomes of implementing the Alpine County EAP is increased investment in local green businesses and technologies which could provide new economic development opportunities for the County. The following indicators suggest a robust market for clean economy businesses and industries as we move forward to the next decade.[11] New clean economy jobs and business opportunities range from water efficiency and recycling to energy and battery technologies as well as the transformation of existing industries. All of this creates new economic opportunities for communities within the Sierra Nevada region.

- California has more patent registrations in clean technology than any other state.
- California leads the nation in energy storage systems development and innovation.
- Jobs within California's Core Clean Economy increased by 20% in the last decade (January 2002 to 2012) while the total state economy increased 2%.
- Within California's Core Clean Economy, the service sector ranked highest (57%) followed by manufacturing (13%), installation (11%), supplier (10%) and research and development (7%).
- California's clean manufacturing jobs over the last decade were up 53%, while total state economy manufacturing fell by 21%.

Relationship to CEQA

The County of Alpine determined the acceptance of the EAP is exempt from the California Environmental Quality Act (CEQA) 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.

Information in the document (and related background reports) could be used in environmental assessments required for new development projects.

ENERGY ACTION PLAN DEVELOPMENT

Process

Photo Credit: www.noehill.com

The path to the EAP began in 2010 when the County engaged Sierra Business Council (SBC) to conduct a GHG inventory of municipal facilities and community-wide activities and sources, including residential and non-residential sectors. Energy consumption data was gathered for baseline year 2005. Calculations were performed to estimate baseline emissions (based on Year 2005 energy consumption data) using the most current methodology and protocols at the time.[12] The baseline inventories of municipal operations and community-wide emissions were

[11] 2014 California Green Innovation Index, 6th Edition. Next 10. www.next10.org http://greeninnovationindex.org/sites/greeninnovationindex.radicaldesigns.org/files/2014-Green-Innovation-Index.pdf. p. 29, 33-44

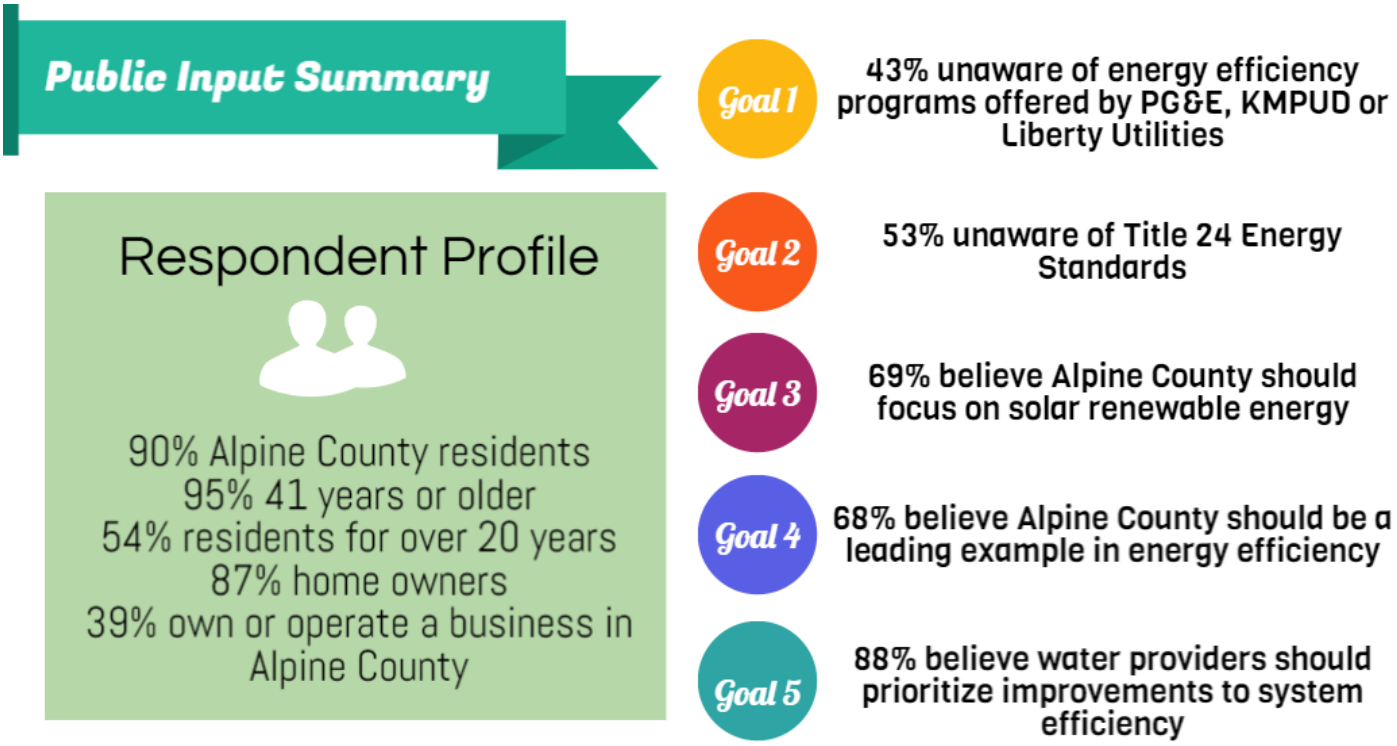
[12] The municipal inventory followed the Local Government Operations Protocol and the community inventory followed the recently released United States Community Protocol, the current national standard.

presented to the County Board of Supervisors in March 2011 and May 2012, respectively. In May 2016, the County decided to take the information gathered through the baseline inventory process and move forward with preparing an Energy Action Plan.

In 2016, the baseline inventory data was forecasted out to 2025 using local and regional growth projections. The data gathered during the inventory and forecasting process helped identify those activities within the community that consumed the most energy (and correspondingly had the highest GHG emissions). This information pointed the way to where the greatest energy efficiencies could be realized, resulting in a series of goals, strategies and actions the County can undertake to reduce energy consumption as well as dollars spent on energy. Performance indicators and targets were identified, where appropriate, to be used by the County to measure its progress toward achieving greater energy efficiency.

Public Outreach

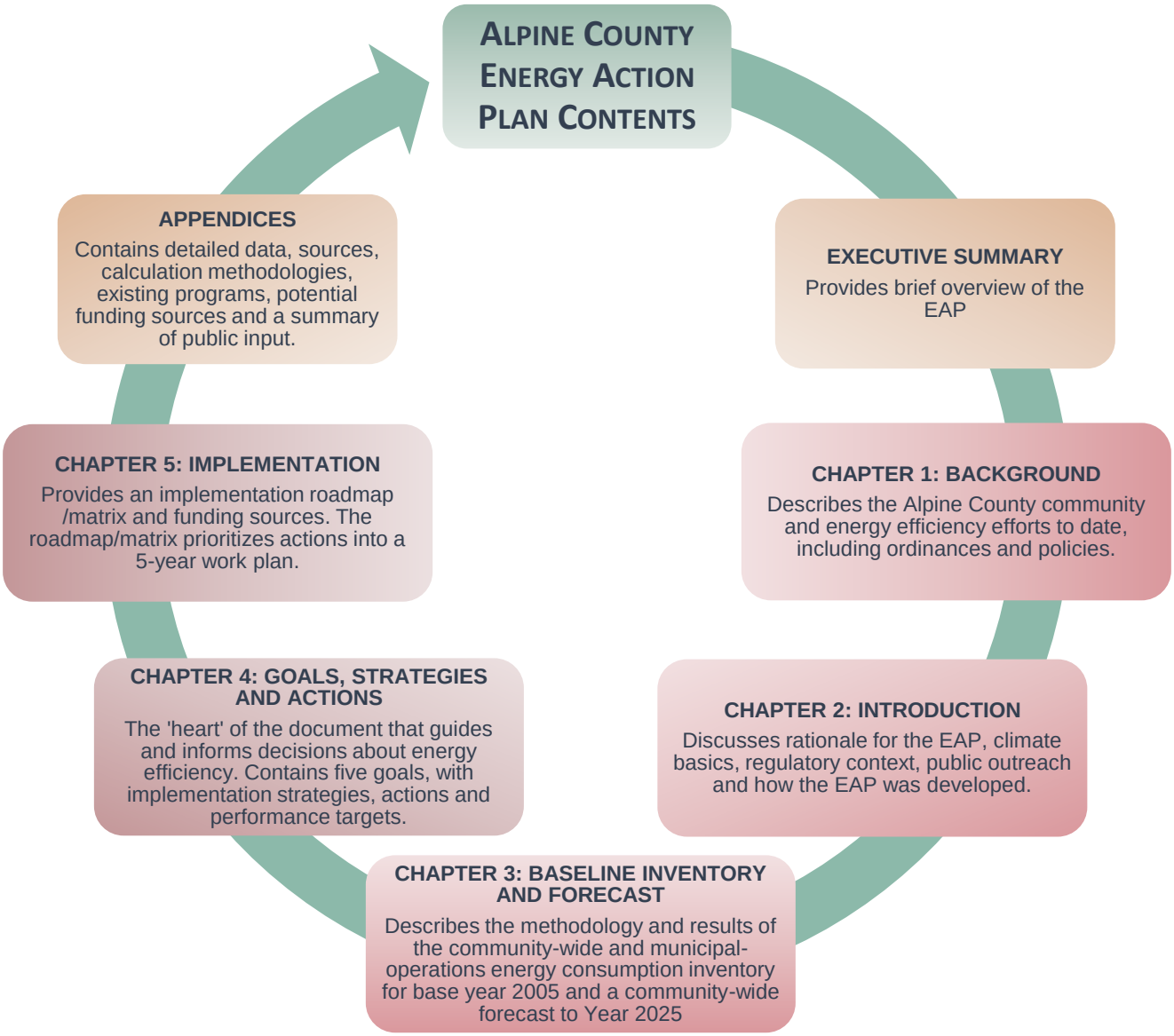
As with any local planning process, community involvement is an essential part of its success. For the EAP, input was widely sought within the County to help shape its content and ensure the document is relevant and realistic. The public outreach strategy included an online survey and a community study session hosted by the Alpine County Planning Commission (June 30, 2016). The online survey was kept open from June 13th, 2016 to August 1st, 2016 and received 41 responses. Both the survey and study session were publicized in the Record Courier, on the Bear Valley Cub's Facebook page and notified directly to local businesses and organizations via email blasts and phone calls to more than 100 Chamber of Commerce members, Bear Valley Residents, the Kirkwood Community Association. Additionally, the plan was presented at duly noticed public meetings before the Planning Commission and Board of Supervisors on October 27th and November 15th, 2016, respectively.



USER'S GUIDE TO THE REPORT

The EAP can be used as a tool to guide municipal and community decisions regarding the best ways to improve energy efficiency in homes, businesses, and municipal facilities. It is designed as an integrated 'living' document that can be modified and augmented as new information, programs and energy efficiency technologies become available. The following diagram describes the information contained in the five 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.

Figure 2-1:
Energy Action Plan Content and Organization



CHAPTER 3: BASELINE INVENTORY + FORECAST

Chapter 3 summarizes the 2005 baseline and 2025 forecast of community-wide energy consumption as well as the 2005 baseline of municipal-operations energy consumption.

SBC previously worked with Alpine County to conduct 2005 baseline GHG emissions inventories of the County's municipal-operations and community-wide activities and sources. These inventories were conducted in 2010-2012, with support from PG&E. The baseline and forecasted energy consumption informed the strategies for increasing energy efficiency, renewable energy generation and use, and water efficiency discussed in Chapter 4. It also provides a baseline year against which future progress can be measured.

2005 Baseline Community-Wide Inventory

The County's community-wide energy consumption data is expressed as aggregated residential and non-residential energy consumption by energy source. The County's municipal energy use for facilities located within the county is included with the aggregated community-wide energy usage. Electricity and propane consumption were the largest energy sources in the Alpine County built environment. There are also a number of homes in Alpine County that use wood and fuel oil as a heating source. This energy use was not included in this analysis due to data limitations.

2025 Business-as-Usual Community-Wide Forecast

The County's community-wide residential and non-residential energy usage was forecasted out to 2025 under a business-as-usual (BAU) scenario and is presented in Figure 3-1. Since the County's municipal energy use is included with the community-wide energy usage, a separate forecast for municipal energy was not completed. The BAU forecast scenario was completed using the Statewide Energy Efficiency Collaborative (SEEC) ClearPath California toolkit. The BAU forecast estimates how energy use would change from 2005 to 2025 in the absence of any energy efficiency or renewable energy 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 data was collected from the 2005 community-wide GHG emissions inventory prepared by SBC. The growth rates were calculated using projections of occupied housing and in-county employment prepared by state agencies.

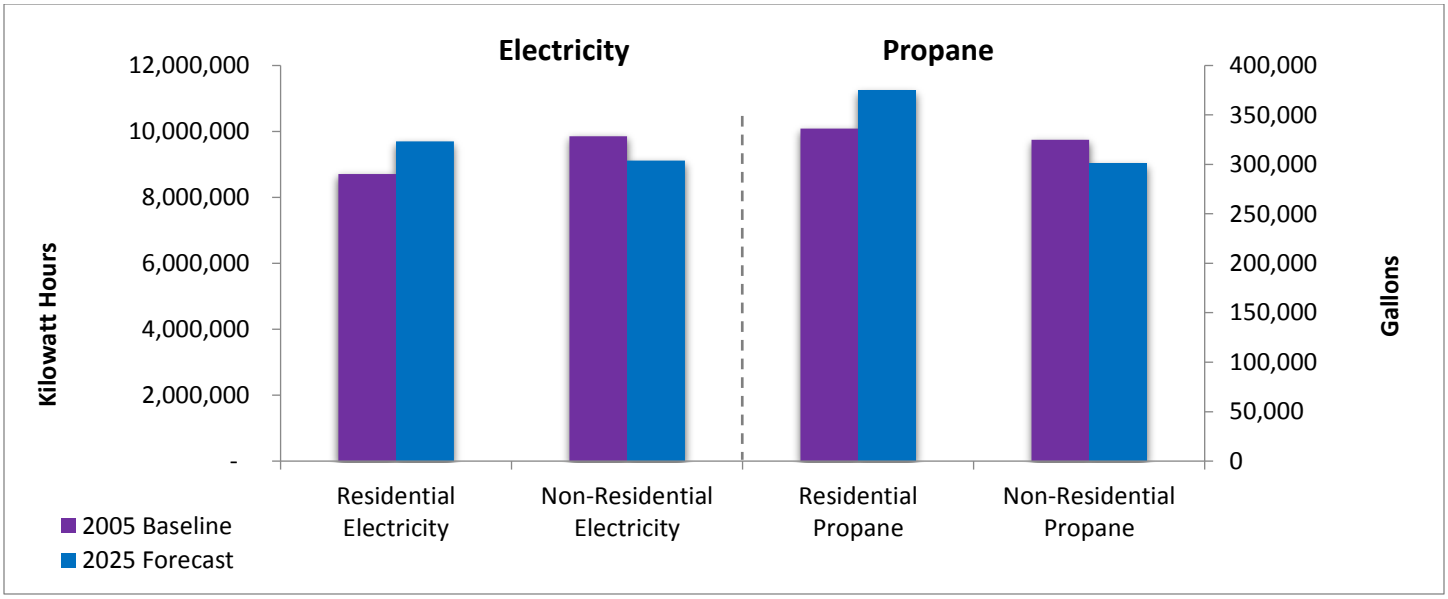
The County's residential energy use was forecasted to increase 11% by 2025 using the projected change in occupied housing in Alpine County. The annualized growth rates for occupied housing in the County were calculated based on the projected change in occupied housing from 2005 to 2025 reported by the California Department of Finance 2005-2015 occupied housing estimates and 2015-2025 occupied housing projections for Alpine County.[13]

[13] 2005, 2010 and 2015 data: California Department of Finance, Demographic Research Unit; Reports E-8 and E-5 - http://www.dof.ca.gov/research/demographic/Estimates/
2015, 2020 and 2025 data: Report P-4 - http://www.dof.ca.gov/research/demographic/projections/

The County's non-residential energy use was forecasted to decrease 8% by 2025 using the projected change of in-county employment in Alpine County. The annualized growth rates for employment in Alpine County were calculated based on the actual change of in-county employment reported by the California Employment Development Department estimates for Alpine County and the projected change of in-county employment based on the California Department of Transportation economic forecast for Alpine County[14,15].

While non-residential energy use is projected to decline based on the decreasing employment in Alpine County, the projected decline does not impact per employee energy use and costs in the County and still leaves significant opportunity to reduce energy use and costs through energy-efficiency, renewable-energy and water-efficiency projects.

Figure 3-1:
Baseline and BAU Forecast of Residential and Non-Residential Electricity and Propane Use



2005 Baseline Municipal-Operations Inventory

The County of Alpine's municipal facilities energy use, presented in Figure 3-2 and 3-3, is primarily electricity and propane usage, with the Woodfords Facilities, Markleeville Courthouse and Markleeville Admin & Sheriff Facilities using the most electricity and the Bear Valley Facilities using the most propane. The County's electricity consumption of 580,493 kWh and propane consumption of 48,751 gallons is 3.1% of the community's total electricity use and 7.4% of propane consumption, respectively. While the County has undertaken efforts to improve energy efficiency, there are still significant opportunities to reduce electricity and propane usage while

[14] California, Employment Development Department, Labor Market Information Division
Industry Employment & Labor Force – by Annual Average (March 2014 Benchmark)
http://www.labormarketinfo.edd.ca.gov/county/alpine.html In-County Total Employment, All Industries

[15] Caltrans Long-Term Socio-Economic Forecasts by County – Mariposa County 2014
http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html In-County Total Employment, All Industries

also saving money. In 2005, the County spent over $53,384 on electricity and $85,965 on propane for municipal owned and operated buildings. Detailed energy use is presented in Appendix A.

Figure 3-2:
2005 Baseline Municipal Facilities Electricity Consumption (kWh)

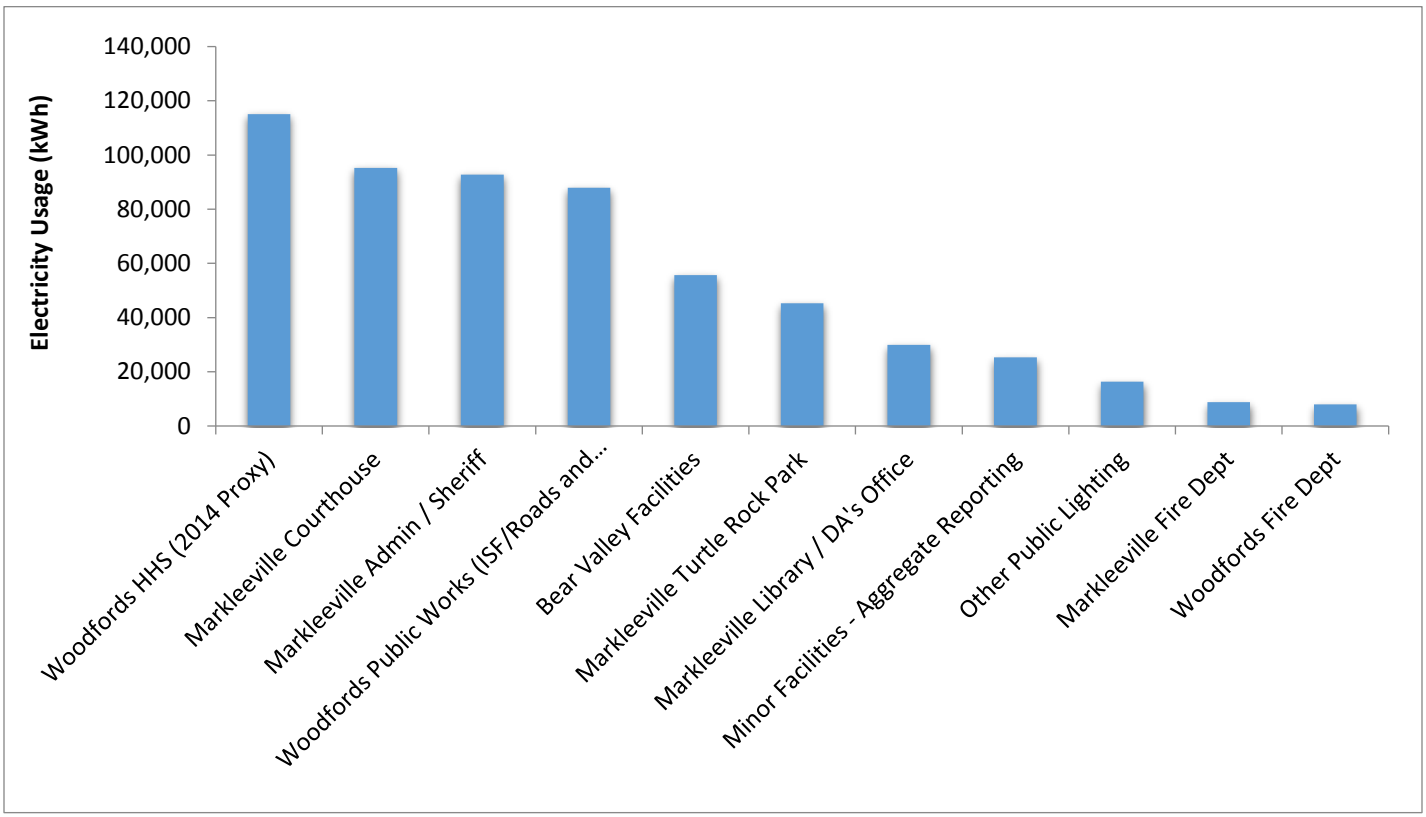
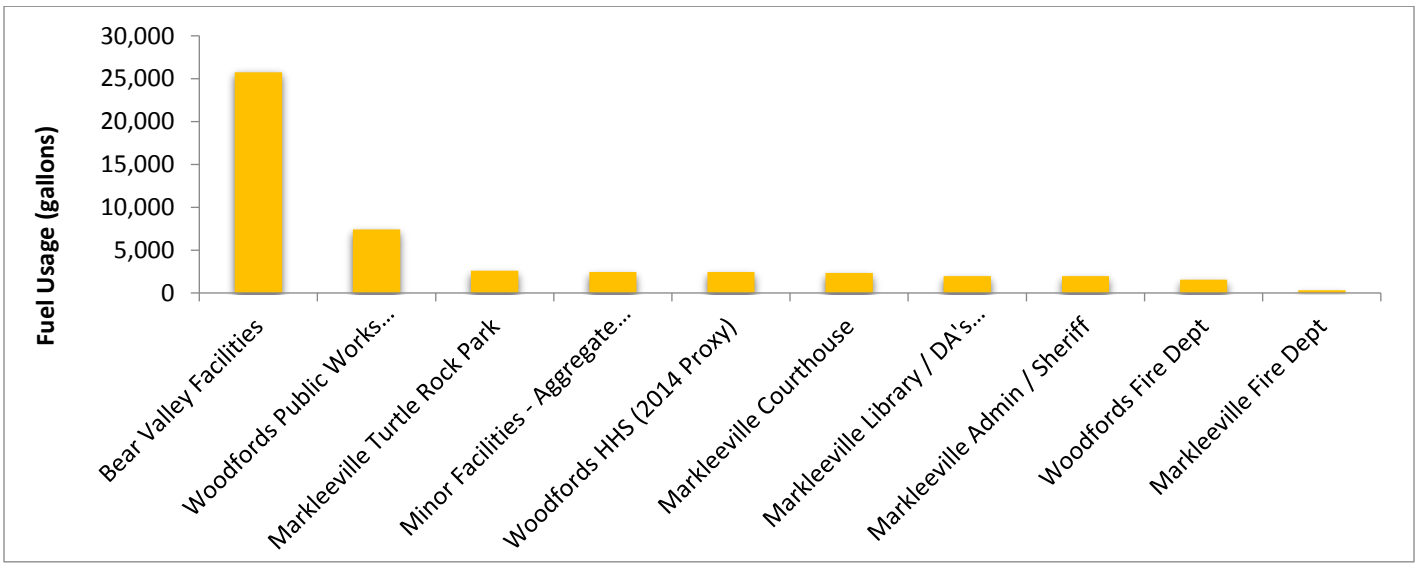


Figure 3-3:
2005 Baseline Municipal Facilities Propane Consumption (Gallons)



CHAPTER 4:
GOALS, STRATEGIES, AND ACTIONS

Chapter 4 identifies goals, strategies and actions Alpine County can undertake to encourage a reduction in municipal and community energy consumption, energy-related costs and energy-related GHG emissions in both the near and far term.

Rationale for Development of the Energy Action Plan

The baseline and forecast data indicate that due to a projected increase in occupied housing and decrease in employment, the community's residential energy use will increase and the community's non-residential energy use will decrease over time. The residential electricity and propane use is forecasted to increase by 11% by 2025 and non-residential electricity and propane use is forecasted to decrease by 8% by 2025. The continued use of non-renewable energy translates to additional negative air quality impacts within the region. Efforts made to save energy will save the community money that can be invested in the local economy. To achieve the stated potential energy savings in this plan, it is recommended to convene a working group within the county whose sole focus is the implementation of one or more of the strategies outlined in this plan. Having local support and buy-in from the community, beyond what is facilitated by county staff, is essential to carry out successful energy reduction projects and meet the energy reduction goals of this plan.

Definition of Key Terms

Key terms used in this report are defined below to assist in understanding the purpose of each and the interconnection between them. Definitions for some non-key terms are footnoted throughout the report at the bottom of the relevant page.

TERM	DEFINITION
GOAL	An expression of a desired outcome, 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. *For example: To 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. *For 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. *For example: Review existing lighting conditions and install new light fixtures where required.*

PERFORMANCE INDICATOR	A quantifiable measure that is used to gauge performance in meeting identified actions. *For example: Percentage of public space reviewed for safe lighting conditions.*
TARGET	The numerical result that demonstrates achievement of a strategy. *For example: Fifty percent (50%) of public spaces reviewed by 2025.*

Basis For Energy Goals And Strategies

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

- Community and Municipal Operations 2005 Baseline Greenhouse Gas Emissions Inventories (prepared by SBC in 2011-2012)
- Alpine County General Plan (1999, Revised 2009)
- Alpine County Code (as accessed on County's current webpage)
- Review of measures underway and in place in Alpine County
- Review of measures in other similar jurisdictions
- Meetings and consultation with County staff
- Public input received from community members

There are a myriad of measures and practices to reduce energy consumption and emissions. Selection of those most appropriate for Alpine County was based on the criteria below and in consultation with County staff:

- Potential of actions to reduce energy use
- Estimated cost to County to implement actions
- Estimated costs and savings for residents and business owners
- Availability of staff resources or other partner organizations to implement actions
- Availability of potential funding to assist with implementation
- Benefits to the community in addition to energy savings (e.g. cost savings, air-quality improvement)

The goals, strategies and actions pertain to the energy consumed by buildings and facilities in the residential, non-residential and municipal sectors. Other sectors, such as transportation, are not included in this report but could be addressed in future studies.

Energy Reduction Potential

The energy reduction potential was calculated for applicable measures using data collected in the baseline municipal-operations and community-wide GHG inventories and the energy use forecasts combined with the estimated energy savings associated with completion of the applicable 2025 targets. The annual energy

reduction potential was calculated using top-down methods[16] to estimate energy savings achieved in 2025 by meeting the associated 2025 targets. Calculations are documented in Appendix C.

Energy Costs and Savings

For the County, the economic implications of implementing the energy-efficiency and energy-reduction measures primarily involve costs associated with staff time and potential costs associated with retaining outside consultants to assist with program implementation. Using the County's 2015-2016 adopted budget, an estimate was made of low, medium and high cost ranges that could be incurred by the County to implement the action measures in the report. The potential cost savings realized from implementation of some of the measures were not factored into this range, given the uncertainty of program design details and how they would exactly be carried out. The purpose of the cost range is to provide a relative measurement for fiscal impact to the County that will assist in prioritizing the measures for implementation. For Alpine County, the following cost ranges are used in this report:

Cost to County (annual)	
Low	$0 - $15,700
Medium	$15,701 - $31,500
High	$31,501+

For residents and businesses, some reduction measures do not result in any notable private costs or savings. However, wherever possible, analysis and quantification was framed in terms of annual costs/savings (or average annual costs/savings). While there are funding sources and financing mechanisms available to offset private costs, calculations were based on a hypothetical average and did not include potential offsets. Almost all measures with private cost implications result in a return on investment in energy cost savings that will accrue over time, thus defraying some of the initial investment costs. The strategies were designed with a focus on actions with the highest return on investment.

Cost / Savings to Businesses or Residents (annual)	
Low	$0 - $100
Medium	$101 - $250
High	$251 or greater

Energy Action Plan Potential Energy Savings

Estimated potential annual energy savings in 2025 were calculated for each strategy and where applicable reported for residential and non-residential energy use. Combined, the strategies in the EAP can potentially reduce energy use by 3,280,698 kWh and 60,896 gallons of propane.

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

Table 4-1:
Summary of Potential 2025 Annual Energy Savings

Strategy Area	Strategy		2025 Potential Annual Energy Savings	
			Electricity (kWh / Year)	Propane (Gallons / Year)
Energy Efficiency	1.1: Expand outreach and education to increase participation in voluntary home energy-efficiency programs.	Residential	522,392	10,088
	1.2: Expand outreach and education to increase participation in voluntary non-residential energy-efficiency programs.	Non-Residential	1,029,511	11,047
	2.1: Improve compliance with Title 24 Green Building and Energy Efficiency Standards.	Residential	212,464	14,594
		Non-Residential	491,091	7,420
	2.2: Provide incentives for buildings to exceed the current Title 24 Energy Efficiency Standards or achieve green building certification.	Residential	12,742	888
		Non-Residential	8,835	683
Renewable Energy	3.1: Evaluate the County's residential and non-residential renewable energy potential and assess barriers to increased renewable energy generation and use.	Residential	388,643	
		Non-Residential	207,158	
	3.3: Encourage new development projects to meet 100% of their energy needs from renewable sources achieving Zero Net Energy.	Residential	119,986	2,554
		Non-Residential	50,063	3,871
Municipal Operations	4.1: Improve the energy efficiency of existing municipal structures.	Municipal Buildings	112,823	9,750
	4.2: Evaluate the feasibility of upgrading public lighting to energy-efficient LEDs.	Public Lighting	10,318	
Water Energy	5.1: Encourage residents and businesses to reduce the waste of water and its embedded energy indoors.	Water	81,921	
	5.2: Encourage residents and businesses to reduce the waste of water and its embedded energy outdoors.	Water	26,687	
	5.3: Encourage the completion of Leak Loss detection to reduce unaccounted for loss of water and its embedded energy.	Water	6,065	
Total Potential 2025 Annual Energy Savings			**3,280,698**	**60,896**

Energy Goals and Strategies

The goals and strategies in this section are focused on improving the energy efficiency of existing and future buildings, reducing costs associated with energy consumption in municipal buildings and operations, and reducing the carbon intensity of the community's energy sources. The goals in this chapter are interrelated, and many of the strategies, when implemented, may achieve multiple goals at the same time. The goals were designed with California's preferred "loading order" in mind for meeting energy demand: first cost-effective energy efficiency, then cost-effective renewable energy and finally conventional energy sources.

Summary of Goals and Strategies

ALPINE COUNTY ENERGY ACTION PLAN GOALS AND STRATEGIES	
Goal 1:	Increase Energy Efficiency in Existing Structures
	Strategy 1.1: *Expand outreach and education to increase participation in voluntary home energy-efficiency programs.* ***Strategy 1.2:*** *Expand outreach and education to increase participation in voluntary non-residential energy-efficiency programs.* ***Strategy 1.3:*** *Identify and promote programs that help finance energy-efficiency, water-efficiency and renewable-energy projects.*
Goal 2:	Increase the Energy Performance of New Construction
	Strategy 2.1: *Improve compliance with Title 24 Green Building and Energy Efficiency Standards.* ***Strategy 2.2:*** *Provide incentives for buildings to exceed the current Title 24 Energy Efficiency Standards or achieve green building certification.* ***Strategy 2.3:*** *Reduce the heat island effect and related summer heat gain in residential and non-residential projects.*
Goal 3:	Increase Local Renewable Energy Generation and Use
	Strategy 3.1: *Evaluate the County's residential and non-residential renewable energy potential and assess barriers to increased renewable energy generation and use.* ***Strategy 3.2:*** *Develop a comprehensive renewable-energy program that provides outreach, financing, and technical assistance.* ***Strategy 3.3:*** *Encourage new development projects to meet 100% of their energy needs from renewable sources achieving Zero Net Energy.*
Goal 4:	Increase Energy Efficiency in Municipal Structures and Operations
	Strategy 4.1: *Improve the energy efficiency of existing municipal structures.* ***Strategy 4.2:*** *Evaluate the feasibility of upgrading public lighting to energy efficient LEDs.*
Goal 5:	Reduce Water Waste and Associated Energy Use
	Strategy 5.1: *Encourage residents and businesses to reduce the waste of water and its embedded energy indoors.* ***Strategy 5.2:*** *Encourage residents and businesses to reduce the waste of water and its embedded energy outdoors.* ***Strategy 5.3****: Encourage the completion of Leak Loss detection to reduce unaccounted for loss of water and its embedded energy.*

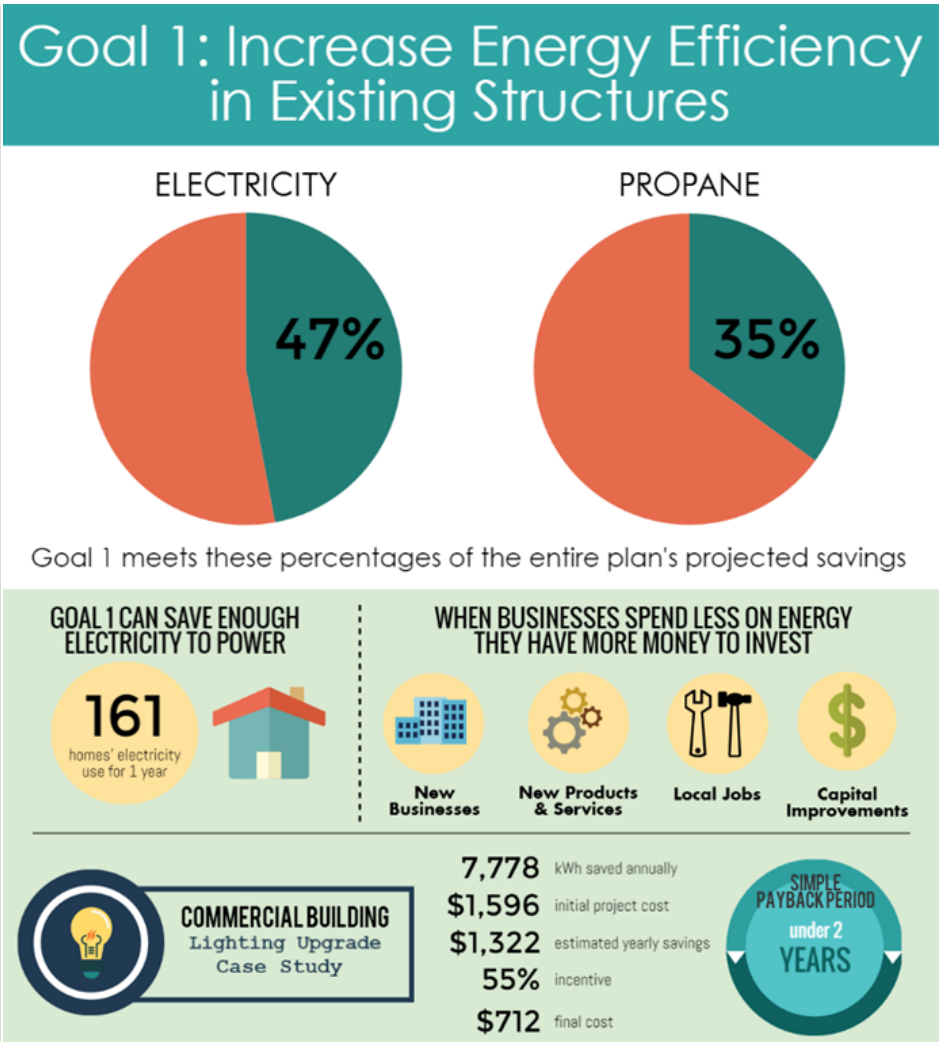
Goal 1: Increase Energy Efficiency in Existing Structures

Nearly 42% of the housing stock or 770 of the 1,778 housing units in Alpine County were built prior to the adoption of California's first Title 24 Energy Efficiency Standards in 1978 and the non-residential building stock is likely similarly dated. Improving the energy efficiency of existing buildings will save homeowners and businesses money by reducing their long-term energy costs. Energy-efficiency upgrades including switching to LED lighting, increasing insulation, reducing air leakage and installing geothermal heat pumps can make homes and businesses healthier, more comfortable and significantly decrease the energy required to heat and cool. Purchasing Energy Star rated appliances and electronics can also reduce one's energy use and bills. Many energy-efficiency projects pay for themselves within a couple of years or less. PG&E, Liberty Utilities, KMPUD and the U.S. Department of Energy provide incentives, rebates and tax credits for energy-efficiency projects that help offset the upfront costs. Additionally, there are new financing programs that can help offset the upfront costs of energy-efficiency projects. The County should leverage existing resources to expand education and outreach programs to promote energy efficiency in existing residential and non-residential structures. The County should also expand the availability of financing programs to reduce barriers to energy-efficiency projects.

Strategy 1.1:
Expand outreach and education to increase participation in voluntary *home* energy-efficiency programs.

Strategy 1.2:
Expand outreach and education to increase participation in voluntary *non-residential* energy-efficiency programs.

Strategy 1.3:
Identify and promote programs that help finance energy-efficiency, water-efficiency and renewable-energy projects.



STRATEGY 1.1:

Expand outreach and education to increase participation in voluntary home energy-efficiency programs.

Residential energy-efficiency improvements have the potential to make homes more comfortable, reduce energy bills and GHG emissions while also increasing the value of the home. The County should partner with PG&E, Liberty Utilities, KMPUD, the Energy Upgrade California alliance, local board of realtors, and other community organizations to leverage existing resources and expand public education and outreach campaigns that encourage residents to voluntarily make energy-efficiency improvements within their homes.

As part of outreach, the County should include on its website information on available energy-efficiency rebates and incentive programs. The website will also link to case studies of home owners who have implemented cost-effective, energy-efficiency improvements.

The County should also prioritize partnering with schools for energy efficiency education curriculum which can include educational presentations and hands-on learning for students. The Environmental Protection Agency (EPA) Office of Environmental Education offers the opportunity to apply for funding that will support locally-focused environmental education projects that increase public awareness and knowledge about environmental issues. See Appendix F for more detail.

	IMPLEMENTATION ACTION	TIMELINE	RESPONSIBILITY
1.1.1	Partner with utilities to expand participation in and knowledge of income-eligible programs to residents of Alpine County.	2017	Planning Department
1.1.2	Partner with utilities, the Energy Upgrade California alliance and other community organizations to increase participation in energy-efficiency rebates and incentive programs.	2017	Planning Department
1.1.3	Include on the County's website information on and links to residential energy-efficiency rebates, incentives, and case studies.	2017	Planning Department
1.1.4	Partner with local schools and other organizations to provide energy efficiency educational presentations or curriculum.	2017	Planning Department
	PERFORMANCE INDICATOR	TARGET	
1	Percentage of households participating in energy-efficiency rebate programs.	20% participating by 2025	
2	Percentage of households achieving an improvement in building energy efficiency.	20% achieving 30% savings in electricity use and 15% savings in propane use by 2025	
3	Number of households achieving an improvement in building energy efficiency	325 Existing Households	

Annual Energy Reduction Potential:
522,392 kWh
10,088 Gallons Propane

Cost to County:
Low

Cost to Resident / Business Owner:
Low to High (depending on finance program)

Savings to Resident / Business Owner:
Low to High (depending on finance program)

Community Co-Benefits:
Reduced Energy Costs and Improved Air Quality

Potential Funding Sources:
Partnerships with Organizations, Utilities and County Funds

STRATEGY 1.2:

Expand outreach and education to increase participation in voluntary non-residential energy-efficiency programs.

Investments in building energy-efficiency retrofits can save considerable amounts of energy and reduce a business's operational costs. The greatest barriers to these improvements are lack of information about efficiency practices and scarcity of low-cost financing for the initial capital costs.

In partnership with PG&E, Liberty Utilities, KMPUD, SBC's Sierra Nevada Energy Watch program (SNEW), and other local partners, including businesses and school districts, the County should provide outreach programs aimed at maximizing voluntary energy efficiency within community businesses and special districts. These programs would target specific commercial sectors such as restaurants, supermarkets, retail, office, and manufacturing to provide useful energy and cost saving recommendations. The program would encourage businesses to conduct benchmarking[17], energy audits and implement cost-effective, energy-efficiency projects.

According to the results of the online survey completed, 48% of respondents recommended emails as the best way for information on energy-efficiency programs to be distributed, followed by mailers and the County website. Case studies of businesses that have implemented cost-effective, energy-efficiency improvements can be showcased to provide real savings gained from these upgrades. Switching to LED lighting, upgrading HVAC and refrigerant equipment can result in significant savings for businesses and reduced operating expenses.

	IMPLEMENTATION ACTION	TIME TABLE	RESPONSIBILITY
1.2.1	Partner with utilities and community organizations to expand the use of energy-efficiency programs in Alpine County.	2017	Planning Department
1.2.2	Provide tools that demonstrate the financial benefits of efficiency upgrades to local businesses on County website, email newsletters and mailers.	2017	Planning Department
1.2.3	Include information on non-residential energy-efficiency rebates, incentives and case studies on County website, email newsletters and mailers.	2017	Planning Department
	PERFORMANCE INDICATOR	**TARGET**	
1	Number of businesses served with energy-efficiency improvements.	103 served by 2025	
2	Percentage of businesses participating in energy-efficiency rebate programs.	40% participating by 2025	
3	Percentage of businesses achieving an improvement in building energy efficiency.	40% achieving 30% electricity savings and 10% propane savings by 2025	

Annual Energy Reduction Potential:
1,029,511 kWh
11,047 Gallons Propane

Cost to County:
Low

Cost to Resident / Business Owner:
Low to High (depending on finance program)

Savings to Resident / Business Owner:
Low to High (depending on finance program)

Community Co-Benefits:
Reduced Energy Costs and Improved Air Quality

Potential Funding Sources:
Partnerships with Organizations and County Funds

[17] Energy benchmarking compares a building's energy performance against that of similar buildings.

STRATEGY 1.3:

Identify and promote programs that help finance energy-efficiency, water-efficiency and renewable-energy projects.

The up-front costs of energy-efficiency improvements can be a considerable barrier for many homeowners and businesses. According to the online survey, 55% of respondents noted cost as their greatest obstacle to completing projects. However there are numerous options to address this challenge, including on-bill financing, low-interest loans, energy-efficient mortgages, 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. For further information refer to this report's implementation section and appendices.

Another example, Property Assessed Clean Energy (PACE) programs are an innovative financing tool that allows residential and non-residential property owners to receive financing for energy-efficiency, clean-energy and water-efficiency projects, which they repay through a voluntary special assessment on their property tax bill. There are several organizations in California that provide cities and counties in California with access to PACE financing programs at no-cost to the local governments. By opting into multiple programs, the County can help establish a competitive marketplace for PACE financing.

The County should partner with utilities, community organizations and local banks to identify and promote existing and potential financing programs through email notices, mailers, and on the County's website as recommended by the public input received from the online survey.

	IMPLEMENTATION ACTION	TIME TABLE	RESPONSIBILITY
1.3.1	Partner with utilities, community organizations and local banks to support PACE financing and other existing financing programs.	2018	Planning Department
1.3.2	Include on the County's website information on existing financing programs for energy-efficiency upgrades.	2017	Planning Department
	PERFORMANCE INDICATOR	TARGET	
	N/A	N/A	

Annual Energy Reduction Potential:
Supports Strategy 1.1 and 1.2

Cost to County:
Low to Medium

Cost to Resident / Business Owner:
None

Savings to Resident / Business Owner:
None

Community Co-Benefits:
Reduced Energy Costs and Improved Air Quality

Potential Funding Sources:
Partnerships with Organizations, Utilities, Local Banks and County Funds

Goal 2: Increase the Energy Performance of New Construction

New buildings offer a significant opportunity to achieve high levels of energy performance through advanced materials and holistic design. Additionally, renewable energy systems can be incorporated into project planning and construction to reduce upfront costs. Since 1977, when the first California Energy Efficiency Standards were implemented, the required measures have saved Californians billions of dollars in reduced electricity bills.[18] The County should work with developers and contractors to improve the understanding and compliance with existing Title 24 Energy Efficiency and Green Building Standards and promote measures to exceed the Energy Efficiency Standards. During each standard update cycle, jurisdictions have the opportunity to require standards that are more stringent than the statewide Standards as long as the measures are cost-effective over the life of the building. The County should review the potential for incentives and/or recognition programs for buildings that exceed the Title 24 Energy Efficiency Standards or achieve green building certification.

Strategy 2.1:

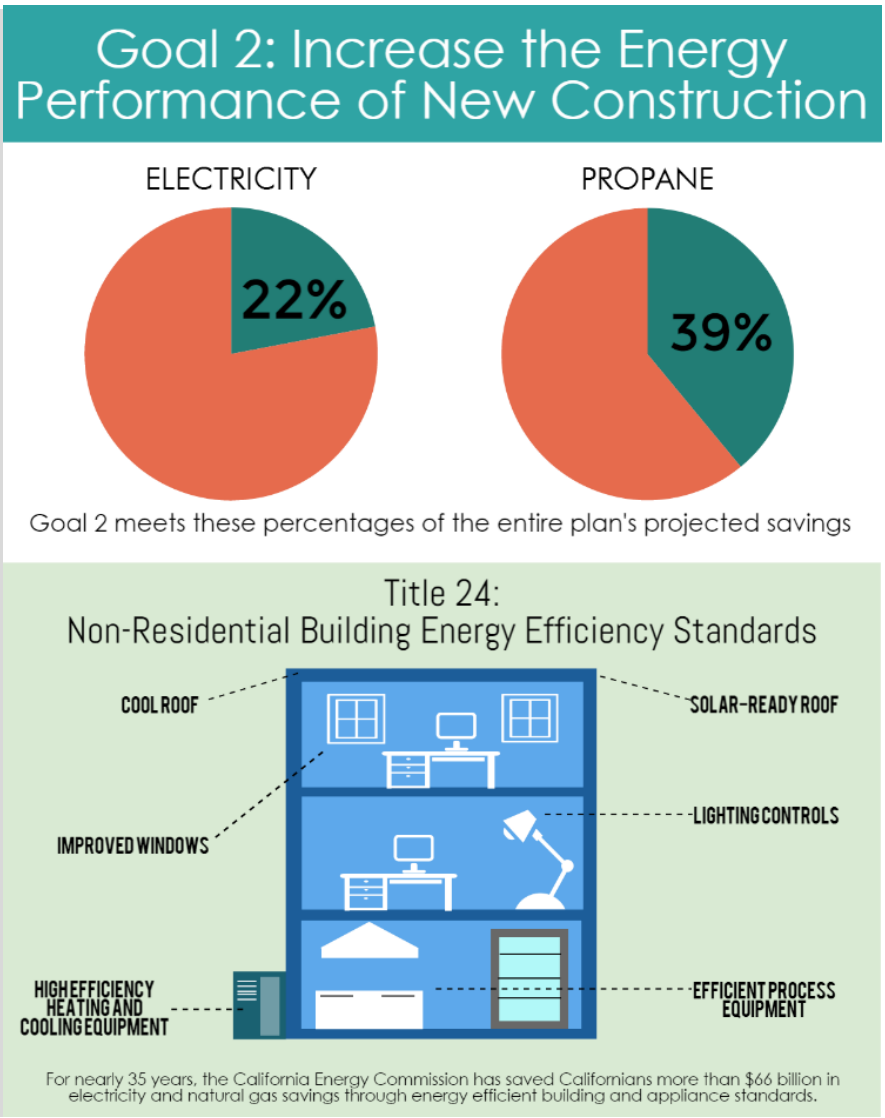
Improve compliance with Title 24 Green Building and Energy Efficiency Standards.

Strategy 2.2:

Provide incentives for buildings to exceed the current Title 24 Energy Efficiency Standards or achieve green building certification.

Strategy 2.3:

Reduce the heat island effect and related summer heat gain in residential and non-residential projects.



[18] California Energy Commission Energy Efficiency Standards. http://www.energy.ca.gov/efficiency/savings.html

STRATEGY 2.1:

Improve compliance with Title 24 Green Building and 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.[19] The California Green Building Standards include mandatory as well as voluntary green building measures that make buildings healthier, more comfortable and have energy and water saving benefits. Assisting developers and contractors in understanding the Standards will help them achieve higher efficiencies with their projects. According to the survey, 53% of respondents were not aware of the Title 24 energy standards. The energy reduction potential is based on the full compliance with the mandatory Standards compared to the baseline energy use of a home or business in 2005.

The County should provide opportunities for building officials and planning department staff to attend Title 24 energy efficiency and green building trainings as well as promote trainings and educational materials to contractors and developers, via local contractors associations and other groups. Energy Code Ace and PG&E offer free Title 24, Part 6 tools, trainings and resources to assist the building industry, related stakeholders and the public to comply with the 2016 Building Energy Efficiency Standards.

	IMPLEMENTATION ACTION	TIME TABLE	RESPONSIBILITY
2.1.1	Provide opportunities for County building officials and planning department staff to attend Title 24 trainings.	2017	Planning & Building Departments
2.1.2	Include links to Title 24 energy and green building trainings and educational resources on the County's website.	2017	Planning & Building Departments
2.1.3	Outreach to local contractors association to provide trainings and best practices to its members.	2017	Planning & Building Departments
	PERFORMANCE INDICATOR	TARGET	
1	Percentage of County staff that attended Title 24 energy and green building trainings.	100% of Planning & Building staff by 2025	
2	Percentage of New Construction complying with Title 24.	100% of New Construction by 2025	

Annual Energy Reduction Potential:
703,555 kWh
22,014 Gallons Propane

Cost to County:
Low

Cost to Resident / Business Owner:
None

Savings to Resident / Business Owner:
High

Community Co-Benefits:
Reduced Energy Costs and Improved Air Quality

Potential Funding Sources:
Partnerships with Organizations and County Funds

[19] http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/2016_Building_Energy_Efficiency_Standards_FAQ.pdf

STRATEGY 2.2:

Provide incentives for buildings to exceed the current Title 24 Energy Efficiency Standards or achieve green building certification.

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 County can also be an effective incentive for developers to pursue green building certification or exceed the Energy Efficiency Standards. According to the Appraisal Institute, green building certifications significantly increase the value of buildings through improved rental income, higher occupancy, lower operating costs and lower risks.[20]

The County should look into the feasibility of providing incentives or awards for buildings that exceed the current Title 24 Energy Efficiency Standards or achieve green building certification. The County 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.

	IMPLEMENTATION ACTION	TIME TABLE	RESPONSIBILITY
2.2.1	Explore incentives or awards that encourage applicants to exceed Title 24 energy efficiency standards. Research what other jurisdictions have implemented.	2019	Planning & Building Departments
2.2.2	Determine the feasibility of providing incentives or awards for new buildings that exceed Title 24 Energy Efficiency Standards or achieve green building certification.	2019	Planning & Building Departments
2.2.3	If feasible, establish priority permit review for projects that exceed Title 24 Energy Efficiency Standards or achieve green building certification.	2019	Planning & Building Departments
	PERFORMANCE INDICATOR	TARGET	
1	Percentage of new residential housing units exceeding Title 24 Energy Efficiency Standards or green building certification.	25% of new residential buildings exceed energy standards by 30% by 2025	
2	Percentage of new non-residential buildings exceeding Title 24 Energy Efficiency Standards or green building certification.	25% of new non-residential buildings exceed energy standards by 15% by 2025	

Annual Energy Reduction Potential:
21,577 kWh
1,571 Gallons Propane

Cost to County:
Low

Cost to Resident / Business Owner:
None

Savings to Resident / Business Owner:
High

Community Co-Benefits:
Reduced Energy Costs and Improved Air Quality

Potential Funding Sources:
Partnerships with Organizations and County Funds

[20] Appraisal Institute, Green Building and Property Value: A Primer for Building Owners and Developers, https://www.appraisalinstitute.org/assets/1/7/Green-Building-and-Property-Value.pdf

STRATEGY 2.3:

Reduce the heat island effect[21] and related summer heat gain in residential and non-residential projects.

Trees, shade structures, cool (high albedo / solar reflectance) paving and roofing materials reduce the amount of solar energy absorbed and therefore temperature of rooftops and parking lots. By increasing the use of shading, cool paving and roofing materials it is possible to reduce heat gain in residential buildings and commercial centers during warm summer months, and optimize heat gain in the winter. This decrease in ambient air temperatures and reduced heat gain in warm summer months can reduce the amount of energy required for air conditioning.

Requirements could include: a) tree standards for existing streets and parking lots; b) heat gain mitigation requirements for new parking lots (through the use of shade structures, trees or cool pavement, etc.); c) cool roofing requirements for new construction. Shade structures can also accommodate solar panels thus serving a dual purpose.

The County should develop design guidelines and/or county codes that account for the benefits of reducing cooling loads through the use of shade trees, shade structures, cool pavement and cool roofs in new construction during summer months balanced with the benefits of solar exposure in winter months to increase heat gain that can offset heating costs and speed the melting of snow and ice on roadways, sidewalks and parking lots.

	IMPLEMENTATION ACTION	TIME TABLE	RESPONSIBILITY
2.3.1	Develop a landscaping ordinance and/or design guidelines to include parking lot heat-gain mitigation measures. Included would be a focus on shade trees and their energy benefits as well as guidance on tree types, planting, and maintenance.	2019	Planning Department
2.3.2	Require new development projects with parking lots to mitigate heat gain through the use of shade trees, shade structures with or without solar arrays, or cool pavement.	2019	Planning Department
2.3.3	Promote the installation of solar shade structures by requiring new development projects with more than 50 spaces to obtain and submit a quote for solar shade structures with the permit application.	2019	Planning Department
	PERFORMANCE INDICATOR	TARGET	
	N/A	N/A	

Annual Energy Reduction Potential:
Supports Strategies 2.1 and 2.2

Cost to County:
Medium

Cost to Resident / Business Owner:
None

Savings to Resident / Business Owner:
Medium

Community Co-Benefits:
Reduced Energy Costs and Improved Air Quality

Potential Funding Sources:
Partnerships with Organizations and County Funds

[21] Increase in ambient air temperature due to excess heat created by non-permeable surfaces (such as roofs and pavement) being exposed to high temperatures during hot sunny days.

Goal 3: Increase Local Renewable Energy Generation and Use

Local renewable-energy projects benefit the County's economy by creating jobs and reducing energy costs. In Alpine County there are unique opportunities for generating energy from renewable sources including wind, biomass, solar and micro-hydro. Rooftops and parking lots 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. Additionally, Alpine County is home to bountiful forests that need to be maintained to reduce catastrophic fire risk. Sustainably managing forests can provide Alpine County government facilities and community members with significant biomass resources that can be used to generate electricity and useful heat. Utilizing new biomass boilers can also significantly reduce emissions compared to open burning of piles.

Strategy 3.1:

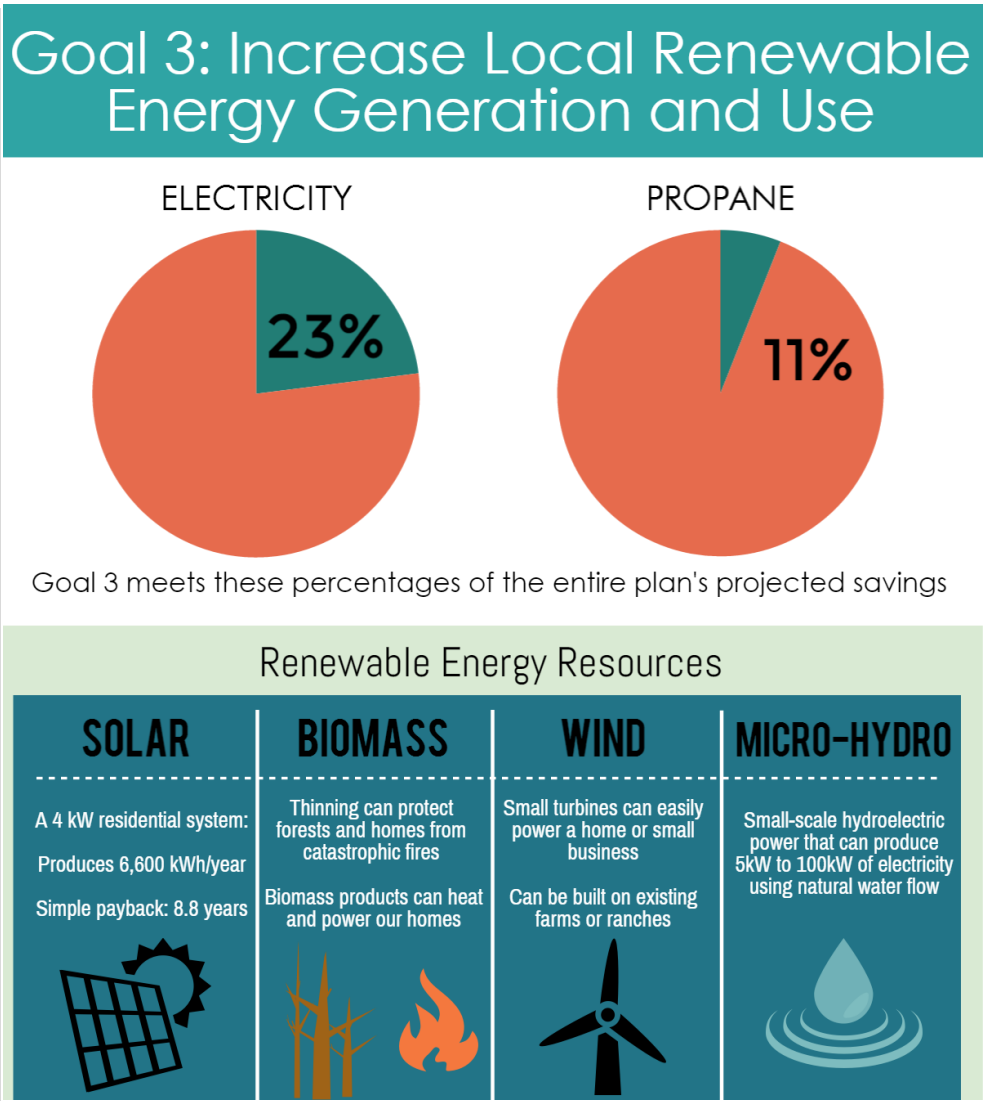
Evaluate the County's residential and non-residential renewable energy potential and assess barriers to increased renewable energy generation and use.

Strategy 3.2:

Develop a comprehensive renewable-energy program that provides outreach, financing, and technical assistance.

Strategy 3.3:

Encourage new development projects to meet 100% of their energy needs from renewable sources achieving Zero Net Energy.



STRATEGY 3.1:

Evaluate the County's residential and non-residential renewable energy potential and assess barriers to increased renewable energy generation and use.

According to the survey, 69% of residents believe solar is the most important renewable energy source for Alpine County to focus on. Some of the common barriers to renewable energy include prospecting, permitting, marketing and installation, operation and maintenance. The recently completed American Solar Transformation Initiative (ASTI) program was launched by the U.S. Department of Energy to address the barriers to solar and transform the market to allow for easier access, expand options and make resources more widely available. The ASTI program assessed local governments' level of solar accessibility by determining the community's potential for solar. Through feasibility reports, local government participants were also able to understand the solar potential of their buildings and lots and more easily make a decision to further pursue installation.

To facilitate installation of renewable energy systems, the County can use best practices learned from the ASTI program in order to widen access to renewable energy systems. To do so, the renewable energy potential within the residential and non-residential sectors of the County should be evaluated. The County should also formulate and evaluate strategies needed to expand use of these systems. The County should review the existing permitting process and identify the current barriers to renewable energy system installations. A streamlined permitting process using existing best practices will be developed to further promote and expedite the installation of renewable energy systems.

	IMPLEMENTATION ACTION	TIME TABLE	RESPONSIBILITY
3.1.1	Evaluate the residential and non-residential renewable energy potential in the community.	2017	Planning Department
3.1.2	Review existing permitting process and identify barriers to renewable energy system installations. Consider a requirement for solar easements in new developments.	2017	Planning & Building Departments
3.1.3	Develop streamlined permitting process for renewable energy system installations.	2017	Planning & Building Departments
3.1.4	Conduct a renewable energy feasibility assessment on municipal buildings and lots.	2019	Public Works Department
	PERFORMANCE INDICATOR	TARGET	
1	kWs of renewable energy systems installed on residential structures.	300 kWs by 2025	
2	Number of homes installing renewable energy systems	59 Households by 2025	
3	kWs of renewable energy systems installed on non-residential structures.	188 kWs by 2025	
4	Number of non-residential structures installing renewable energy systems	28 Non-Residential Structures by 2025	

Annual Energy Reduction Potential:
595,801 kWh

Cost to County:
Low to High

Cost to Resident / Business Owner:
None to High (depending on finance program)

Savings to Resident / Business Owner:
None to High (depending on finance program)

Community Co-Benefits:
Reduced Energy Costs and Improved Air Quality

Potential Funding Sources:
Community Organizations and County Funds

STRATEGY 3.2:

Develop a comprehensive renewable-energy program that provides outreach, financing and technical assistance.

Outreach efforts should aim to maximize community participation in renewable-energy generation and emphasize energy cost savings. The program should make information available on how home and business owners can incorporate renewable energy systems into their living and working environments.

The County should maintain a section on their website dedicated to renewable-energy programs with 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 County should work with utilities, community organizations and local banks to expand and promote available financing programs.

Additionally, there are new financing mechanisms such as power purchase agreements, solar leases and Property Assessed Clean Energy (PACE) financing 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 with a tax credit for 30% of qualified expenditures. There are also incentives for non-residential buildings as well, which although currently set to expire on December 31, 2016 will likely be extended.

	IMPLEMENTATION ACTION	TIME TABLE	RESPONSIBILITY
3.2.1	Partner with utilities and community organizations to provide educational materials and tools to help owners make informed decisions about the costs and benefits of renewable-energy projects.	2017	Planning Department
3.2.2	Update the County's website with links and tools to evaluate renewable-energy systems and how to request quotes from local and regional solar vendors.	2017	Planning Department
3.2.3	Partner with utilities, community organizations and local banks to expand and promote available financing options.	2018	Planning Department
	PERFORMANCE INDICATOR	TARGET	
	N/A	N/A	

Annual Energy Reduction Potential:
Supports Strategy 3.1

Cost to County:
Low

Cost to Resident / Business Owner:
None

Savings to Resident / Business Owner:
None

Community Co-Benefits:
Reduced Energy Costs and Improved Air Quality

Potential Funding Sources:
Partnerships with Community Organizations and County Funds

STRATEGY 3.3:

Encourage new development projects to meet 100% of their energy needs from renewable sources achieving Zero Net Energy.

California's Zero Net Energy (ZNE) goals state that all new residential construction be ZNE by 2020 and all new commercial construction be ZNE by 2030. A ZNE building produces as much energy through clean, renewable resources as it consumes over the course of a year.[22] These buildings are high performing, highly efficient, more resilient to economic and climate changes, and offer more comfortable homes with higher resale value and more productive workspaces. Achieving ZNE in new construction will save residents and businesses money and help foster technological development to meet the County's energy needs locally.

ZNE buildings are achieved first by 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.

The County should create incentives for increasing ZNE, such as streamlined permitting, partnering with organizations that can offer technical assistance to architects and developers, or awards-based recognition for achieving ZNE. The County should remove and barriers in their code that would hinder ZNE development. The County should also provide ZNE resources, trainings and other assistance for planning and building staff, as well as designers, buildings and contractors.

	IMPLEMENTATION ACTION	TIME TABLE	RESPONSIBILITY
3.3.1	Determine the feasibility of providing incentives or awards for new buildings that meet Zero Net Energy standards.	2019	Planning & Building Departments
3.3.2	Provide information to contractors and developers on the current incentives for renewable energy systems during plan review.	2017	Planning & Building Departments
	PERFORMANCE INDICATOR	TARGET	
1	Percentage of new residential construction that meets Zero Net Energy standards.	25% of residential new construction by 2025	
2	Percentage of new non-residential construction that meets Zero Net Energy standards.	25% of non-residential new construction by 2025	

Annual Energy Reduction Potential:
170,049 kWh
6,425 Gallons Propane

Cost to County:
Low

Cost to Resident / Business Owner:
None to High (depending on finance program)

Savings to Resident / Business Owner:
None to High (depending on finance program)

Community Co-Benefits:
Reduced Energy Costs and Improved Air Quality

Potential Funding Sources:
Partnerships with Organizations, Utilities and County Funds

[22] California ZNE Communications Toolkit, July 2013 http://newbuildings.org/sites/default/files/ZNE_MessagePlatform.pdf

Goal 4: Increase Energy Efficiency in Municipal Structures and Operations

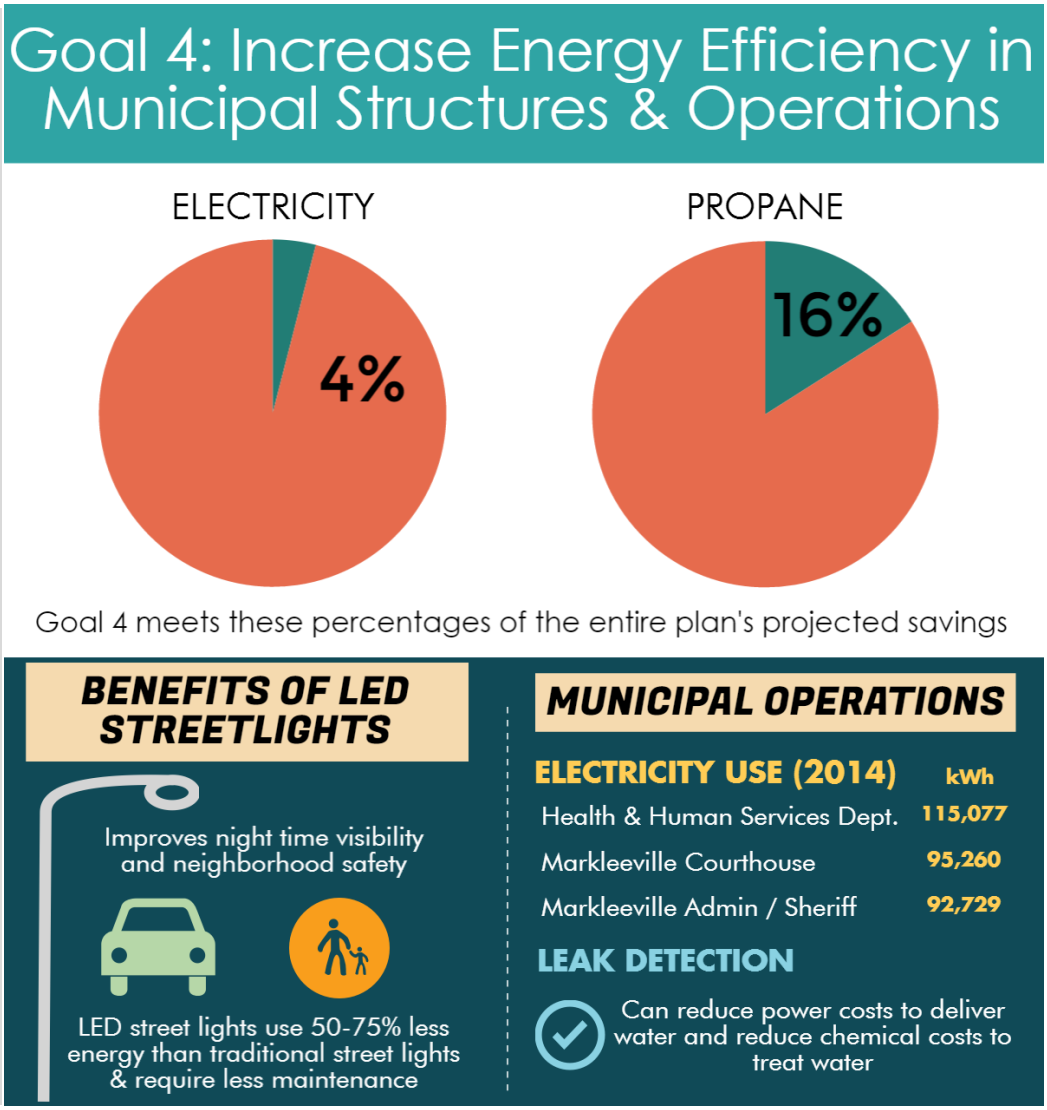
Measures undertaken by the County to improve energy efficiency not only reduces energy costs but also sets an example for the local community and the surrounding areas. According to the online survey, 68% of respondents believe it is important for Alpine County to be a leading example for other rural counties looking to be more energy efficient. The 2005 baseline municipal operations inventory indicated that the County consumed 580,493 kWh of electricity. The three largest consumers were Woodfords Health and Human Services building (20%), Markleeville Courthouse (16%) and the Markleeville Admin / Sheriff building (16%). Additionally the County consumed 48,751 gallons of propane. The three largest consumers were the Bear Valley Facilities (53%), Woodfords Public Works (15%), and Markleeville Turtle Rock Park (5%). It is imperative that the County set the stage for energy and cost savings through leading by example. These steps toward energy efficiency will not only improve the workspaces of County staff but also allow the County to invest money saved on other necessary public goods. Benchmarking municipal buildings and facilities with EPA's Portfolio Manager is the first step to track energy use and evaluate opportunities to save energy and money.

Strategy 4.1:

Improve the energy efficiency of existing municipal structures.

Strategy 4.2:

Evaluate the feasibility of upgrading public lighting to energy efficient LEDs.



STRATEGY 4.1:

Improve energy efficiency of existing municipal structures.

The County should establish a purchasing policy that requires new electrical equipment to be Energy Star rated (or similar energy usage rating). The County should benchmark municipal facilities using the free EPA Energy Star Portfolio Manager software to track energy use and determine the efficiency of existing facilities, including the Woodfords Health and Human Services building which consumed 108,940 kWh of electricity in 2014. The facilities with the greatest energy use or highest energy intensity should be targeted for energy audits and retro-commissioning[23] to optimize energy use and identify energy-efficiency opportunities.

County Department heads could establish department-level goals of reducing energy use within their own departments, helping to achieve the overall county goal.

	IMPLEMENTATION ACTION	TIME TABLE	RESPONSIBILITY
4.1.1	Benchmark county facilities using the EPA Energy Star Portfolio Manager, prioritizing them by the greatest energy use or highest energy intensity.	2017	Public Works Department
4.1.2	Establish a purchasing requirement that all new electrical equipment be Energy Star rated when available.	2018	Public Works & Administration Departments
4.1.3	Conduct energy audit and retro-commissioning of county facilities.	2019	Public Works Department
	PERFORMANCE INDICATOR	TARGET	
1	Benchmark county facilities.	2017	
2	Purchasing policy in place.	2018	
3	Audit and retro-commission county facilities.	2019	
4	Percentage of existing buildings energy use reduced.	20% of energy use reduced by 2025	

Annual Energy Reduction Potential:
112,823 kWh
9,750 Gallons Propane

Cost to County:
Low to High

Cost to Resident / Business Owner:
None

Savings to Resident / Business Owner:
None

Community Co-Benefits:
Reduced Energy Costs and Improved Air Quality

Potential Funding Sources:
Partnerships with Organizations, Energy Service Companies, Utilities and County Funds

[23] Retro-commissioning is a systematic process to improve an existing building's energy performance and occupants comfort through a whole-building systems approach

STRATEGY 4.2:

Evaluate the feasibility of upgrading public lighting to energy efficient LEDs.

In 2014, the County used 16,377 kWh for public lighting. The County should determine the feasibility and evaluate the cost-effectiveness of upgrading streetlights and other public lighting to higher-efficiency lighting such as LEDs. Typically, traditional street lights can be upgraded to LEDs and achieve savings between 50-70% of energy use.

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. PG&E offers rebates for the replacement of streetlights with LEDs and full turnkey LED replacement services to local governments. For street lighting that is not owned or operated by PG&E, customers may be offered incentives for a lower rate change and LED replacement.

	IMPLEMENTATION ACTION	TIME TABLE	RESPONSIBILITY
4.2.1	Evaluate cost-effectiveness of upgrading street lights and other outdoor public lighting to LEDs. Identify phasing & funding sources to offset costs.	2019	Public Works Department
	PERFORMANCE INDICATOR	**TARGET**	
1	Street and other outdoor lights upgraded.	100% upgrade by 2025	
2	Percentage of public lighting energy use reduced.	63% of energy use reduced by 2025	

Annual Energy Reduction Potential:
10,318 kWh

Cost to County:
Low to Medium

Cost to Resident / Business Owner:
None

Savings to Resident / Business Owner:
None

Community Co-Benefits:
Reduced Energy Costs and Improved Air Quality

Potential Funding Sources:
Partnerships with Organizations, Utilities and County Funds

Goal 5: Reduce Water Waste and Associated Energy Use

The State of California has a goal to reduce per capita water use, especially in drought years. In a typical California home the major indoor water users are toilets (33%), showers (22%), faucets (18%), washing machines (14%), and leaks (12%). Dishwashers rank last – 1%.[24] Given that indoor water is delivered to a few, readily identifiable appliances, it is easy to target those with the greatest water efficiency potential. Since it typically requires significant energy to source, treat and deliver water to community members; water efficiency measures have the effect of reducing the amount of energy needed to provide water. Additionally, according to the online survey, 88% of respondents believe community water providers should prioritize improvements to the efficiency of their water systems. Organizing a working group, comprised of citizens as well as elected officials and County staff, could benefit the community's actions to reduce water waste and the embedded energy.

Strategy 5.1:

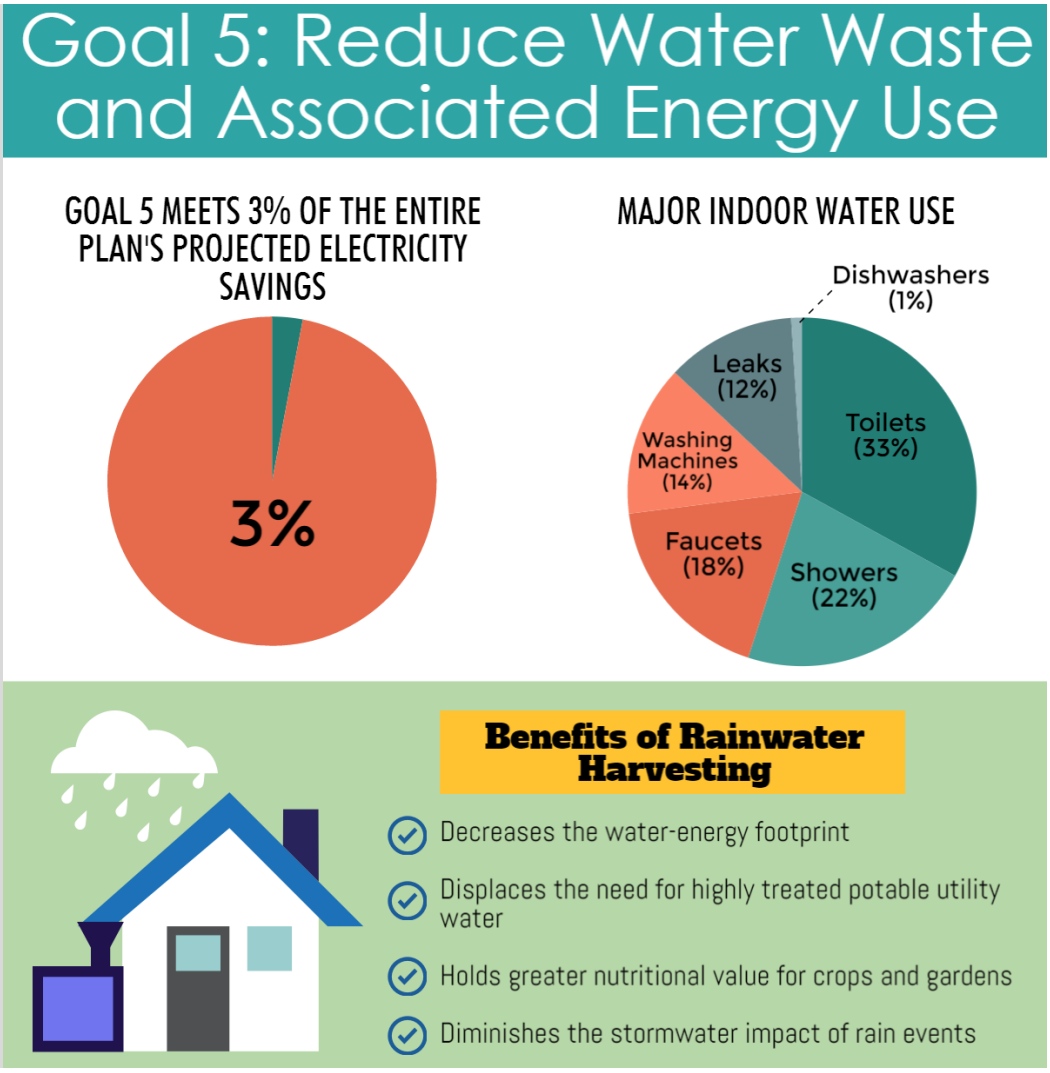
Encourage residents and businesses to reduce the waste of water and its embedded energy indoors.

Strategy 5.2:

Encourage residents and businesses to reduce the waste of water and its embedded energy outdoors.

Strategy 5.3:

Encourage the completion of Leak Loss detection to reduce unaccounted for loss of water and its embedded energy use.



[24] California Water Plan Update, Chapter 3. Urban Water Use Efficiency. 2013. http://www.water.ca.gov/calendar/materials/vol3_urbanwue_apr_release_16033.pdf

STRATEGY 5.1:

Encourage residents and businesses to reduce the waste of water and its embedded energy indoors.

Water-waste reduction and water efficiency education can be effectively communicated by the County's ability to lead by example. To do this, the County should benchmark municipal facilities current water usage. After baseline usage has been determined, the County should then set reduction goals working off of the state's 25% water use reduction goal.

Based on the 2013 California Water Plan Update, use of more water efficient toilets, showers, faucets, washing machines and leak detection could reduce water usage by 15 gallons per capita per day (GPCD), a 25% reduction from typical daily residential water usage of 62 GPCD. The County should continue to encourage residents and businesses to voluntarily reduce their water usage and promote innovative strategies for increased water efficiency.

The County should work with local water providers and utilities to explore the feasibility of implementing new water efficiency programs. Programs could include a toilet swap event or free low-flow showerhead giveaways. Additionally, many homes utilize private wells as a primary water source, and reduction in water waste will directly result in saved energy from electricity use associated with those wells.

	IMPLEMENTATION ACTION	TIME TABLE	RESPONSIBILITY
5.1.1	Benchmark water usage in municipal buildings & set reduction goals of at least 25%.	2017	Public Works Department
5.1.2	Work with utilities and local water providers to promote existing water-efficiency programs in Alpine County via County website and mailers.	2017	Planning Department
5.1.3	Explore with local water providers and utilities the feasibility of implementing water-efficiency programs.	2019	Planning Department
	PERFORMANCE INDICATOR	TARGET	
1	Percentage of households and businesses that voluntarily reduce indoor water use by 20% or more.	100% of households by 2025[25]	

Annual Energy Reduction Potential:
81,921 kWh

Cost to County:
Low

Cost to Resident / Business Owner:
Low

Savings to Resident / Business Owner:
Low

Community Co-Benefits:
Reduced Water Use, Reduced Wastewater Costs and Reduced Energy Costs

Potential Funding Sources:
Partnerships with Community Organizations, Utilities and County Funds

[25] Urban and Ag. water suppliers not meeting the 20% reduction required by SB X7-7 (enacted in 2009) will not be eligible for state water grants or loans

STRATEGY 5.2:

Encourage residents and businesses to reduce the waste of water and the embedded energy outdoors.

In 2015, the California Water Commission adopted a statewide model water efficient landscape ordinance that requires efficient irrigation systems and limits lawn in new residential and commercial developments, resulting in a third less water used on landscaping. Significant water savings can help achieve these savings in the outdoor environment through a few readily implementable programs. The County should work with regional agencies to expand education, incentive programs and trainings to encourage residents and businesses to voluntarily reduce their water waste. Priority permit review for projects meeting or exceeding the voluntary CALGreen water-efficiency measures should be examined for feasibility.

The County should evaluate the feasibility of providing Water-Wise house calls where a trained water-efficiency specialist will visit homes on request, review indoor and outdoor water needs, make water-efficiency recommendations and provide water-saving devices or if desired, will install certain water-saving devices. Additionally, the County should evaluate the feasibility of offering Water-Wise business calls where trained technicians will come to a commercial site, check for leaks, conduct outdoor irrigation check-ups and provide watering schedules.

The County should further lead by example by installing water-efficient landscaping in areas managed by the County to serve as public demonstration areas. Additionally, demonstrations of rainwater catchment or greywater systems should be available to homeowners to promote local onsite water reuse.

	IMPLEMENTATION ACTION	TIME TABLE	RESPONSIBILITY
5.2.1	Adopt local water efficient landscape ordinance to ensure new development meets state requirements.	2017	Planning Department
5.2.2	Work with regional agencies, water providers and utilities to evaluate the feasibility of offering Water-Wise programs and additional water-efficiency rebates.	2018	Planning Department County Administrator's Office
5.2.3	Encourage and evaluate the feasibility of offering incentives to meet voluntary compliance with CALGreen water-efficiency measures.	2019	Planning and Building Departments
5.2.4	Install water-efficient landscaping and design a demonstration zero-water landscape garden, rainwater catchment and greywater system.	2019	Public Works Departments
	PERFORMANCE INDICATOR	TARGET	
1	Percentage of households and businesses that voluntarily reduce outdoor water use by 20% or more.	100% of households by 2025	
2	Demonstration zero-water landscape, rainwater catchment, or greywater system designed.	2020	

Annual Energy Reduction Potential:
26,687 kWh

Cost to County:
Low

Cost to Resident / Business Owner:
Low

Savings to Resident / Business Owner:
Low

Community Co-Benefits:
Reduced Water Use and Reduced Energy Costs

Potential Funding Sources:
Partnerships with Community Organizations, Utilities and County Funds

STRATEGY 5.3:

Encourage the completion of Leak Loss detection to reduce unaccounted for loss of water and the embedded energy.

Old and aging water infrastructure often results in high water loss through leaks, inaccurate meters and water theft. Studies have estimated that these leaky and outdated systems waste an estimated 14 to 18 percent (5.9 billion gallons) of daily water use in the United States[26]. When systems are leaky, they also need more pressure to move water along the pipeline and into homes and businesses. Raising water pressure requires a significant amount of energy and heavy costs. By addressing leak detection, water system operators in the County can ensure that the community is receiving water efficiently and remove any extra costs associated with the amount of energy needed to deliver water.

In order to understand the scale of water losses, water system operators in the County should complete a water audit. 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.[27]

	IMPLEMENTATION ACTION	TIME TABLE	RESPONSIBILITY
5.3.1	Outreach to water system operators to recommend completion of water audits to assess the scale of unaccounted for water losses	2018	Public Works Department
5.3.2	Outreach to water system operators to recommend completion of leak detection.	2018	Public Works Departments
	PERFORMANCE INDICATOR	**TARGET**	
1	Water audits completed by water system operators.	100% of water systems by 2020	
2	Leak loss detection completed at water system operators.	100% of water systems by 2020	
3	Percent of potable water systems with 40% reduction in water losses.	100% of potable water systems by 2025	

Annual Energy Reduction Potential:
6,065 kWh

Cost to County:
Low

Cost to Resident / Business Owner:
Low

Savings to Resident / Business Owner:
Low

Community Co-Benefits:
Reduced Water Use and Reduced Energy Costs

Potential Funding Sources:
Partnerships with Organizations and County Funds

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

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

CHAPTER 5: IMPLEMENTATION PLAN

Chapter 5 provides a roadmap for implementing the EAP. The County of Alpine recognizes that a clear and straight-forward implementation program is essential to achieve the goals of the EAP.

To successfully implement the EAP, the County, regional organizations and community members will need to work together and leverage existing and new national and state programs.

Ensuring the strategies translate from policy language into on-the-ground results is critical to the success of the EAP. To facilitate this, each strategy described in Chapter 4 contains a table that identifies the specific actions the County can carry out in order to achieve the identified goals. The second section of each table provides performance indicators and targets that enable staff, Board members, and the public to track strategy implementation and evaluate the effectiveness of the EAP.

Evaluating the effectiveness of the EAP requires two key tasks: evaluation of the EAP as a whole and evaluation of the individual strategies. Community-wide emissions inventories provide the best indication of the overall EAP effectiveness, although it will be important to reconcile actual growth in the County versus the growth projected in the forecasts developed for the EAP. Conducting these inventories periodically, instead of annually, will allow direct comparison to the 2005 baseline while lessening the impact on staff resources. It is recommended that inventories are completed at least every 5 years in order to monitor the effect of the EAP and adapt the strategies and actions to reach the identified goals.

While community-wide inventories will provide information about the EAP's overall effectiveness, 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 of PG&E, KMPUD and Liberty Utilities the County should coordinate strategy evaluation on the same schedule as the community-wide inventories and summarize progress towards meeting the identified performance targets. For the EAP to remain relevant, the County must be prepared to evaluate and revise the strategies and actions over time. It is likely new information, technology, and programs will emerge; therefore, the County must be ready to take advantage of these opportunities. Additionally, the County should prepare interim progress reports, using a template provided by SBC, on an annual basis to track performance.

Implementation Program

The Implementation Program identifies specific actions and steps the County can take to achieve the specified 2025 targets. The following matrix prioritizes the actions by year based on staff resources, potential funding availability, and partner organization's capacity. The matrix serves as a guidepost for staff to initiate actions in order to implement the EAP and track progress. The involvement of a community working group will be necessary to carry out these actions and alleviate limited staff resources.

Table 5-1: EAP Implementation Matrix

YEAR	IMPLEMENTATION ACTION	SUPPORTS	RESPONSIBILITY	INFORMATION SOURCES
2017	Partner with utilities and regional organizations to activate existing energy-efficiency, water-efficiency and renewable-energy programs.	1.1.1 1.1.2 1.2.1 3.2.1	Planning Department	PG&E, KMPUD, Liberty Utilities, Energy Upgrade California, Sierra Business Council & El Dorado County Health and Human Services Department
	Benchmark energy use in county facilities and water usage in municipal buildings.	4.1.1 5.1.1	Public Works Department	PG&E, KMPUD, Liberty Utilities, water providers, Sierra Business Council & U.S. Environmental Protection Agency
	Provide information on and opportunities for staff, contractors and developers to attend Title 24 training and information on incentives for renewable energy systems.	2.1.1 2.1.2 2.1.3 3.3.2	Planning & Building Departments	PG&E, KMPUD, Liberty Utilities, Sierra Business Council & Energy Code ACE
	Update the County's website with information and links to energy-efficiency, water-efficiency and renewable-energy programs, case studies and financing programs.	1.1.3 1.2.2 1.2.3 1.3.2 3.2.2 5.1.2	Planning Department	PG&E, KMPUD, Liberty Utilities, water providers, Energy Upgrade California, Sierra Business Council & El Dorado County Health and Human Services Department
	Analyze renewable energy potential, review barriers to renewable energy systems and streamline permitting.	3.1.1 3.1.2 3.1.3	Planning & Building Department	U.S. Department of Energy & Sierra Business Council
	Partner with local schools and organizations to provide energy efficiency educational presentations or curriculum.	1.1.4	Planning Department	U.S. Environmental Protection Agency Office of Environmental Education
	Adopt local water efficient landscape ordinance	5.2.1	Planning Department	California Department of Water Resources
2018	Partner with program implementers to authorize PACE financing and Water Wise programs.	1.3.1 5.2.2	Planning Department	Center for Sustainable Energy & water providers
	Adopt purchasing guidelines, energy-efficiency analysis requirements in RFPs.	4.1.2	Planning Department	U.S. Environmental Protection Agency
	Partner with utilities and local banks and other organizations to expand financing options for energy-efficiency, renewable-energy and water-efficiency projects.	3.2.3	Planning Department	PG&E, KMPUD, Liberty Utilities, El Dorado County Health and Human Services Department
	Outreach to water system operators to recommend completion of water audits and Leak Loss detection programs.	5.3.1 5.3.2	Public Works Department	American Water Works Association & International Water Association
2019	Conduct energy audits, retro-commissioning and renewable energy feasibility assessment of municipal facilities and lighting. Implement cost-effective energy-efficiency projects.	3.1.4 4.1.3 4.2.1	Public Works Department	PG&E, KMPUD, Liberty Utilities & Sierra Business Council
	Determine the feasibility of offering incentives for new construction that completes a green building checklist including: exceed Title 24 energy requirements, meet Zero Net Energy standards and exceed water efficiency requirements.	2.2.1 2.2.2 2.2.3 3.3.1 5.2.3	Planning & Building Departments	PG&E, KMPUD, Liberty Utilities, Sierra Business Council, Build It Green & U.S. Green Building Council
	Work with community organizations to redesign water bills to reduce water waste, develop new water-efficiency programs and help market programs and install demonstration garden.	5.1.3 5.2.4	Public Works Department	Alpine County Environmental Health Department
	Develop heat gain mitigation guidelines and ordinances for streets and parking lots.	2.3.1 2.3.2 2.3.3	Planning & Building Departments	PG&E, KMPUD, Liberty Utilities & Sierra Business Council

Funding Sources and Financing Mechanisms

This section describes potential funding sources and financing mechanisms that the County can pursue to offset the financial burden of implementing the EAP. Each EAP strategy is accompanied with a simplified analysis of costs and savings, potential funding sources, and partnership opportunities. The spectrum of potential public and private funding sources is ever evolving and will need to be continually evaluated. This section outlines funding options that are currently available (as of September 2016). For additional information on energy efficiency programs and financing programs refer to Appendix D and F, respectively.

- U.S. Department of Energy (DOE)
- U.S. Environmental Protection Agency (EPA)
- California Energy Commission (CEC)
- California Infrastructure and Economic Development Bank (IBANK)
- California Statewide Communities Development Authority (CSCDA)
- Pacific Gas and Electric Company (PG&E)
- Liberty Utilities
- Kirkwood Meadows Public Utility District (KMPUD)

U.S. Department of Energy

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.

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. Since 1992, EPA has distributed between $2 and $3.5 million in grant funding per year, supporting more than 3,600 grants through the Environmental Education Grants Program.

California Energy Commission

The CEC offers low-interest loans to public institutions to finance energy-efficiency and energy generation projects on a first-come, first-serve basis. Interest rates are currently between zero and one percent. The CEC also manages the Energy Partnership Program, which provides no-cost (up to $20,000) technical assistance to public agencies. Technical assistance includes conducting energy audits, preparing feasibility studies, contractor assistance, and design review consultation among other services. The CEC also funds Energy Upgrade California, which was designed to be Californian's one-stop-shop for home and business improvement projects that lower energy use and conserve water and natural resources. Californians can use the site to plan upgrade projects, locate participating contractors, and find rebates and incentives including up to $6,500 towards whole house energy upgrades.

California Infrastructure and Economic Development Bank

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. In September 2014, California IBANK launched the California Lending for Energy and Environmental Needs Center (CLEEN Center) and the Statewide Energy Efficiency Program (SWEEP) to provide low-cost financing to State and local governments for approved energy efficiency projects. The targets will be clean energy projects such as generation, distribution, transmission and storage; energy conservation measures; environmental mitigation measures; and water treatment and distribution.

California Statewide Communities Development Authority

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 provides program participants with two energy financing programs. The Sustainable Energy Bond Program, which provides access to tax-exempt financing for energy efficiency projects through contracts with Energy Service Companies that contain guaranteed energy savings to cover the full cost of all retrofit work. 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 the property tax bills.

Pacific Gas and Electric Company

PG&E provides technical assistance, rebates, incentives, and financing options to promote energy efficiency and renewable energy projects. For Residential customers, PG&E offers income-eligible customers monthly discounts and free energy saving improvements. PG&E also offers appliance rebates and whole-home upgrade incentives. For Non-Residential customers, PG&E offers the Energy Efficiency Financing program, which provides businesses and government agencies access to 0% loans up to $100,000 for businesses and $250,000 for government agencies. PG&E also offers incentives and technical assistance to improve the operational performance of facilities' equipment, lighting, and control systems through a Retro-commissioning program. Additionally, PG&E offers design assistance, incentives, and educational resources for new construction that exceeds Title 24 energy efficiency standards through the Savings By Design program.

Liberty Utilities

Liberty Utilities provides energy conservation tips, free home and business audits, commercial customer incentives, residential rebates and free energy efficient lightbulbs and other conservation measures at events and during audits. For Residential customers, Liberty Utilities offers income-qualified customers energy-efficient home improvements at no-cost through their Energy Savings Assistance Program. Additionally, Liberty Utilities offers Net Metering to customers who generate renewable energy on their premises.

APPENDIX A: ALPINE COUNTY 2005 BASELINE ENERGY USE

Appendix A summarizes the 2005 baseline energy use data used in the development of the Energy Action Plan development.

Pacific Gas and Electric Company (PG&E), Liberty Utilities (previously NV Energy doing business as Sierra Pacific Power Company in 2005) and Kirkwood Meadows Public Utility District (KMPUD, previously Mountain Utilities) provided the majority of electricity used in Alpine County in 2005. The 2005 aggregated electricity consumption data was provided by PG&E and NV Energy for all accounts within the County. Mountain Utilities electricity consumption data was collected from the California Energy Consumption Database. 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 direct-access electricity consumed in Alpine County was collected from County-level, direct-access electricity data provided by the California Energy Commission (CEC). Additionally, transmission and distribution losses associated with electricity consumed in Alpine County was estimated based on the Environmental Protection Agency's Emissions & Generation Resource Integrated Database (eGRID) Western Grid average loss factor for 2005. Residential and non-residential non-utility propane consumption was collected from Campora Propane, Ebett's Pass Gas and KMPUD. Data from Campora Propane and KMPUD was scaled to 2005 using the annual heating degree days in Alpine County.

Potable water and wastewater electricity use was calculated based on data provided by potable water providers and wastewater treatment operators in Alpine County and electricity use provided by PG&E, NV Energy and KMPUD. The potable water and wastewater electricity use was subtracted from each utility's reported non-residential electricity use in order to provide additional context and develop potable water and wastewater electricity specific reduction strategies.

Table A-1: Alpine County 2005 Baseline Community-Wide Residential Energy Use

Energy Source	Value	Units	Data Source
Electricity Consumption - PG&E	3,037,649	kWh	Pacific Gas and Electric Company
Electricity Consumption - NV Energy	3,854,563	kWh	NV Energy
Electricity Consumption - KMPUD	1,350,000	kWh	California Energy Consumption Database
Electricity Consumption – Transmission & Distribution	464,319	kWh	U.S. EPA eGRID
Total Electricity Consumption	**8,706,531**	**kWh**	

Propane (LPG) Consumption - Campora Propane (Scaled 2010)	2,769,921	Gallons	Campora Propane
Propane (LPG) Consumption – KMPUD (Scaled 2014)	86,626	Gallons	Kirkwood Meadows Public Utility District
Propane (LPG) Consumption - Ebett's Pass Gas	150,946	Gallons	Ebett's Pass Gas
Total Propane Consumption	**98,700**	**Gallons**	

Table A-2: Alpine County 2005 Baseline Community-Wide Non-Residential Energy Use

Energy Source	Value	Units	Data Source
Electricity Consumption - PG&E	2,105,287	kWh	Pacific Gas and Electric Company
Electricity Consumption - NV Energy	1,982,173	kWh	NV Energy
Electricity Consumption - KMPUD	4,499,129	kWh	California Energy Consumption Database
Electricity Consumption - Direct Access	84,675	kWh	California Energy Commission
Electricity Consumption – Transmission & Distribution	488,490	kWh	U.S. EPA eGRID
Electricity Consumption and Transmission & Distribution Losses - Potable Water	303,837	kWh	Potable Water Providers, PG&E, NV Energy, KMPUD and U.S. EPA eGRID
Electricity Consumption and Transmission & Distribution Losses – Wastewater Treatment	389,465	kWh	Wastewater Treatment Operators, PG&E, NV Energy, KMPUD and U.S. EPA eGRID
Total Electricity Consumption	**9,853,055**	**kWh**	
Propane (LPG) Consumption - Campora Propane (Scaled 2010)	70,710	Gallons	Campora Propane
Propane (LPG) Consumption – KMPUD (Scaled 2014)	226,418	Gallons	Kirkwood Meadows Public Utility District
Propane (LPG) Consumption - Ebett's Pass Gas	27,800	Gallons	Ebett's Pass Gas
Total Propane Consumption	**324,929**	**Gallons**	

Table A-3: Alpine County 2005 Baseline Municipal-Operations Energy Use

Facility	Electricity Use (kWh)	Propane Use (gallons)	Data Source
Woodfords HHS (2014 Proxy)	115,077	2440.9	NV Energy & County staff
Markleeville Courthouse	95,260	2317.5	NV Energy & County staff
Markleeville Admin / Sheriff	92,729	1952.5	NV Energy & County staff
Woodfords Public Works (ISF/Roads and CDA)	87,904	7428	NV Energy & County staff
Bear Valley Facilities	55,692	25729.33	Pacific Gas and Electric Company & County staff
Markleeville Turtle Rock Park	45,306	2609.5	NV Energy & County staff
Markleeville Library / DA's Office	29,906	1962.1	NV Energy & County staff
Minor Facilities - Aggregate Reporting	25,373	2445.5	NV Energy & County staff
Other Public Lighting	16,377		NV Energy & Pacific Gas and Electric Company
Markleeville Fire Department	8,840	303.8	NV Energy & County staff
Woodfords Fire Department	8,028	1562.1	NV Energy & County staff
Total Municipal Facilities Energy Consumption	**580,493**	**48,751**	**Includes PG&E Owned Street Lights and Transmission & Distribution Losses**

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

Appendix B summarizes the 2025 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 were taken.

Business-as-usual (BAU) community-wide energy usage was forecast using the Statewide Energy Efficiency Collaborative ClearPath California forecasting tool. Municipal energy use, included in non-residential energy use, was not forecast separately. Residential energy use was forecast using the occupied household estimates reported by the California Department of Finance (CA DOF) for Alpine County for January 1st 2005, 2010 and 2015[28] and the occupied household projections for Alpine County for 2020 and 2025[29] These figures are taken from the latest revisions to the same data sets used in the Housing Element Update.

Non-residential energy use was forecast using the estimated 2005, 2010 and 2015 employment in Alpine County reported by the California Employment Development Department (EDD) [30] and the projected 2020 and 2025 employment in Alpine County from the California Department of Transportation (CALTrans) Long-Term, Socio-Economic Forecast.[31] Annualized growth rates for each time period were calculated using the standard formula.

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

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

Year	Occupied Households	Growth Indicator Source
2005	488	CA DOF Report E-8
2010	499	CA DOF Report E-8
2015	492	CA DOF Report E-5
2020	524	CA DOF Report P-4
2025	543	CA DOF Report P-4

[28] California Department of Finance, Demographic Research Unit; Report E-8 (November 2012) and E-5 (May 2015) - http://www.dof.ca.gov/Forecasting/Demographics/Estimates/

[29] California Department of Finance, Demographic Research Unit; Report P-4 - http://www.dof.ca.gov/Forecasting/Demographics/Projections/

[30] California, Employment Development Department, Labor Market Information Division Industry Employment & Labor Force, In-County Total Employment, All Industries – by Annual Average (March 2014 Benchmark) http://www.labormarketinfo.edd.ca.gov/county/alpine.html

[31] Caltrans Long-Term Socio-Economic Forecasts by County – Alpine County 2015, In-County Total Employment, All Industries http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html

Time Period	Annualized Growth Rate	
2005-2010	0.45%	CA DOF Report E-8
2010-2015	-0.28%	CA DOF Report E-8 and E-5
2015-2020	1.27%	CA DOF Report E-5 and P-4
2020-2025	0.71%	CA DOF Report P-4

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

Year	Employment	Growth Indicator Source
2005	830	CA EDD Employment Estimates
2010	680	CA EDD Employment Estimates
2015	700	CA EDD Employment Estimates
2020	719	CALTrans Employment Projections
2025	769	CALTrans Employment Projections
Time Period	**Annualized Growth Rate**	
2005-2010	-3.91%	CA EDD
2010-2015	0.58%	CA EDD
2015-2020	0.54%	CA EDD and CALTrans
2020-2025	1.35%	CALTrans

Annualized growth rates for Alpine County occupied households and employment are recalculated for the time periods required for forecasting in ClearPath California.

Table B-3: ClearPath California BAU Energy Use Forecast Annualized Growth Rates.

Energy Use Sector	Growth Indicator	Growth Indicator Source	Annualized Growth Rate (2005-2009)	Annualized Growth Rate (2010-2014)	Annualized Growth Rate (2015-2019)	Annualized Growth Rate (2020-2025)
Residential	Occupied Housing	CA DOF	0.4468%	-0.1368%	0.9562%	0.8253%
Non-Residential	Employment	EDD/CalTrans	-3.9082%	-0.3330%	0.5459%	1.1898%

Table B-4: BAU Residential Energy Use Forecast by Energy Source

Energy Source	2005 Energy Use	2025 Energy Use	2005-2025 Change
Electricity (kWh)	8,706,531	9,698,300	991,769
Propane (Gallons)	336,272	374,576	38,304

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

Energy Source	2005 Energy Use	2025 Energy Use	2005-2025 Change
Electricity (kWh)	9,853,055	9,114,058	-738,997
Propane (Gallons)	324,929	300,565	-24,364

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.

Strategy 1.1: Expand outreach and education to increase participation in voluntary home energy-efficiency programs.		
Target: 20% of Existing Households Reduce Electricity Use 30% and Propane use 15% by 2025		
Baseline Year	2005	
Baseline Annual Residential Energy Use	8,706,531	kWh - Electricity
	336,272	Gallons - Propane
Baseline Number of Households	1,627	Housing Units
2025 Target Percent of Households Participating	20%	of existing homes
2025 Target Percent Energy Reduction From Baseline Year	30%	of electricity use
	15%	of propane use
2025 Participating Households = Baseline Households x Percent Participating =	325	Housing Units
2025 Electricity Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	522,392	kWh - Electricity
2025 Propane Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	10,088	Gallons - Propane

Strategy 1.2: Expand outreach and education to increase participation in voluntary non-residential energy-efficiency programs.		
Target: 40% of Existing Businesses Reduce Electricity Use by 30% and Propane Use by 10% by 2025		
Baseline Year	2005	
Baseline Annual Non-Residential Energy Use	8,579,260	kWh - Electricity
	276,178	Gallons - Propane
2025 Target Percent Participating	40%	of existing
2025 Target Percent Energy Reduction From Baseline	30%	of electricity use
	10%	of propane use
2025 Electricity Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	1,029,511	kWh - Electricity
2025 Propane Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	11,047	Gallons - Propane

Strategy 2.1: Improve compliance with Title 24 Green Building and Energy Efficiency Standards.		
Target: 100% of New Construction meets Title 24 Green Building and Energy Efficiency Standards		
Baseline Year	2005	
Residential		
Forecasted Energy Use Increase Without Title-24 Compliance	Electricity (kWh)	Propane (gallons)
2014-2016	169,354	6,533
2016-2019	259,891	10,033
2019-2022	230,298	8,902
2022-2025	236,158	9,120
Non-Residential		
Forecasted Energy Use Increase Without Title-24 Compliance	Electricity (kWh)	Propane (gallons)
2014-2016	84,091	2,978
2016-2019	127,748	4,533
2019-2022	285,089	10,120
2022-2025	295,344	10,478
2016 Existing Housing Stock (2016 DOF[32])	61.98%	Single Family
	38.02%	Multi-Family
Percent of Residential Energy Use Associated with Space Heating, Cooling, Indoor Lighting and Water Heating (2010 CEC[33])	Electricity	Propane
	32%	86%
2013 Title 24 Energy Savings Associated with Space Heating, Cooling, Indoor Lighting and Water Heating (2013 CEC[34])	Electricity	Propane
Single Family (SF)	36.4%	6.5%
Multi-Family (MF)	23.3%	3.8%
Non-Residential (Non-Res)	22%	17%
Residential		
2025 Residential Energy Savings from <u>2013</u> Title 24: = Forecast 2014-to-2016 Energy Use Increase x Percent Covered Energy Use x [(Percent SF x 2013 SF Percent Savings) + (Percent MF x 2013 MF Percent Savings)] =	17,027	kWh - Electricity
	308	Gallons - Propane
2025 Residential Energy Savings from <u>2016</u> Title 24: = Forecast 2016-to-2019 Energy Use Increase x Percent Covered Energy Use x [(Percent SF x 2013 SF Percent Savings) + (Percent MF x 2013 MF Percent Savings) + 2016 Percent Savings (28%)] =	43,789	kWh - Electricity
	2,563	Gallons - Propane
2025 Residential Energy Savings from <u>2019</u> Title 24: = Forecast 2019-to-2022 Energy Use Increase x Percent Covered Energy Use x [(Percent SF x 2013 SF Percent Savings) + (Percent MF x 2013 MF Percent Savings) + 2016 Percent Savings (28%) + 2019 Percent Savings (28%)] =	64,424	kWh - Electricity
	4,706	Gallons - Propane
2025 Residential Energy Savings from <u>2022</u> Title 24: = Forecast 2022-to-2025 Energy Use Increase x Percent Covered Energy	87,223	kWh - Electricity

[32] State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2011- 2016. Sacramento, California, May 2016. http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/

[33] 2010 CEC - http://www.energy.ca.gov/2010publications/CEC-200-2010-004/CEC-200-2010-004-ES.PDF

[34] 2013 CEC - http://www.energy.ca.gov/2013publications/CEC-400-2013-008/CEC-400-2013-008.pdf

Use x [(Percent SF x 2013 SF Percent Savings) + (Percent MF x 2013 MF Percent Savings) + 2016 Percent Savings (28%) + 2019 Percent Savings (28%) + 2022 Percent Savings (28%)] =	7,017	Gallons - Propane
Non-Residential		
2025 Non-Residential Energy Savings from 2013 Title 24: = Forecast 2014-to-2016 Energy Use Increase x 2013 Non-Res Percent Savings =	18,500	kWh - Electricity
	506	Gallons - Propane
2025 Non-Residential Energy Savings from 2016 Title 24: = Forecast 2014-to-2016 Energy Use Increase x (2013 Non-Res Percent Savings + 2016 Non-Res Percent Savings (20%)) =	53,654	kWh - Electricity
	154	Gallons - Propane
2025 Non-Residential Energy Savings from 2019 Title 24: = Forecast 2014-to-2016 Energy Use Increase x (2013 Non-Res Percent Savings + 2016 Non-Res Percent Savings (20%) + 2019 Non-Res Percent Savings (20%)) =	176,755	kWh - Electricity
	2,368	Gallons - Propane
2025 Non-Residential Energy Savings from 2022 Title 24: = Forecast 2014-to-2016 Energy Use Increase x (2013 Non-Res Percent Savings + 2016 Non-Res Percent Savings (20%)+ 2019 Non-Res Percent Savings (20%) + 2022 Non-Res Percent Savings (20%)) =	242,182	kWh - Electricity
	4,392	Gallons - Propane

Strategy 2.2: Provide incentives for buildings to exceed the current Title 24 Energy Efficiency Standards or achieve green building certification.		
Target: 25% of New Construction Reduces Energy Use Beyond Title 24 Requirements (Residential 30% and Non-Residential 15%)		
Baseline Year	2005	
Residential		
Forecasted Energy Use after meeting 2016 Title 24	216,102	kWh - Electricity
	7,470	Gallons - Propane
Forecasted Energy Use after meeting 2019 Title 24	165,874	kWh - Electricity
	4,196	Gallons - Propane
Forecasted Energy Use after meeting 2022 Title 24	148,935	kWh - Electricity
	2,102	Gallons - Propane
Percent of Residential Energy Use Associated with Space Heating, Cooling, Indoor Lighting and Water Heating (2010 CEC[33])	Electricity	Propane
	32%	86%
Non-Residential		
Forecasted Energy Use after meeting 2016 Title 24	74,094	kWh - Electricity
	4,378	Gallons - Propane
Forecasted Energy Use after meeting 2019 Title 24	108,334	kWh - Electricity
	7,752	Gallons - Propane
Forecasted Energy Use after meeting 2022 Title 24	53,162	kWh - Electricity
	6,086	Gallons - Propane
2025 Target Percent Participation	25%	Residential
	25%	Non-Residential
2025 Target Percent Energy Savings	30%	Residential
	15%	Non-Residential
Residential		

2025 Energy Savings Beyond Title 24 Requirements: = Forecasted Energy Use after meeting 2016, 2019 and 2022 Title 24 x Percent of covered energy use x Percent Participation x Percent Energy Savings =	12,742	kWh - Electricity
	888	Gallons - Propane
Non-Residential		
2025 Energy Savings Beyond Title 24 Requirements: = Forecasted Energy Use after meeting 2016, 2019 and 2022 Title 24 x Percent Participation x Percent Energy Savings =	8,835	kWh - Electricity
	683	Gallons - Propane

Strategy 3.1: Evaluate the County's residential and non-residential renewable energy potential and assess barriers to increased renewable energy generation and use.		
Target: 41 Existing Households and 14 Businesses Install Solar PV by 2025		
Baseline Year	2005	
2025 Target Potential Installations	1,627	Residential
	Unknown	Non-Residential
Number of Existing Installations 2012-2016	5	Residential
	1	Non-Residential
Total kW of Existing Installations 2012-2016	19.1	kW Residential
	4.5	kW Non-Residential
2025 Target Participating Installations per Year (4 x the 2005-2016 Average)	4	Residential Households per Year
	1	Non-Residential Installations per Year
Average Hours of Electricity Production (PV Watts[35])	4.45	Hours / Day
2025 Number of Participants = 2025 Target Participation Installations per Year x 9 years + Number of Existing Installations 2012-2016 =	41	Residential
	10	Non-Residential
2025 kW Solar Installed = Number of Participants x Total Size of Existing Installations / Number of Existing Installations =	157	kW Residential
	45	kW Non-Residential
2025 Solar-Produced Electricity = 2025 kW Solar Installed x Average Hours per Day Production x 365 Days / Year =	254,651	kWh - Residential Electricity
	73,166	kWh - Non-Res Electricity
Target: 18 Households and 18 Businesses Install Wind Energy Systems by 2025		
Baseline Year	2005	
2025 Target Potential Installations	1,627	Residential
	Unknown	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
2025 Target Participating Installations per Year	2	Residential Households per Year
	2	Non-Residential Installations per Year

[35] PV Watts. National Renewable Energy Laboratory. http://pvwatts.nrel.gov/

Average Size of Small Wind System in PG&E service territory (CEC ERP[36])	7.968	kW
Average Height of Rotor Hub	90	Feet
Estimated Average Annual Power Output (Open EI[37])	7,444	kWh
2025 Number of Participants = 2025 Target Participation Installations per Year x 9 years + Number of Existing Installations 2005-2016 =	18	Residential
	18	Non-Residential
2025 kW Wind Installed = Number of Participants x Average Size of Small Wind Systems =	143	kW Residential
	143	kW Non-Residential
2025 Wind-Produced Electricity = Number of Participants x Estimated Average Annual Power Output =	133,992	kWh - Residential Electricity
	133,992	kWh - Non-Res Electricity

Strategy 3.3: Encourage new development projects to meet 100% of their energy needs from renewable sources achieving Zero Net Energy.		
Target: 25% of New Developments Meet Zero Net Energy Goals by 2025		
Baseline Year	2005	
Residential		
Forecasted Energy Use after meeting 2016, 2019 and 2022 Title 24	530,911	kWh - Electricity
	13,768	Gallons - Propane
Energy Savings Beyond Title 24	12,742	kWh - Electricity
	888	Gallons - Propane
Non-Residential		
Forecasted Energy Use after meeting 2016, 2019 and 2022 Title 24	235,590	kWh - Electricity
	18,216	Gallons - Propane
Energy Savings Beyond Title 24	8,835	kWh - Electricity
	683	Gallons - Propane
2025 Target Percent Participation	25%	Residential
	25%	Non-Residential
Residential		
2025 Energy Savings Meeting Zero Net Energy Goals: = Forecasted Energy Use after meeting 2016, 2019 and 2022 Title 24 x Percent Participation - Energy Savings Beyond Title 24 =	119,986	kWh - Electricity
	2,554	Gallons - Propane
Non-Residential		
2025 Energy Savings Meeting Zero Net Energy Goals: = Forecasted Energy Use after meeting 2016, 2019 and 2022 Title 24 x Percent Participation - Energy Savings Beyond Title 24 =	50,063	kWh - Electricity
	3,871	Gallons - Propane

[36] CEC ERP - http://www.energy.ca.gov/renewables/emerging_renewables/

[37] OPEN EI - http://en.openei.org/wiki/Small_Wind_Guidebook/How_Much_Energy_Will_My_System_Generate

Strategy 4.1: Improve the energy efficiency of existing municipal structures.		
Target: Reduce Energy Use in Municipal Buildings by 20% by 2025		
Baseline Year	2005	
Baseline Annual Municipal-Operations Energy Use	564,116	kWh - Electricity
	48,751	Gallons - Propane
Baseline Number of Municipal Facilities	11	Facilities
2025 Target Percent Energy Reduction	20%	of energy use
2025 Electricity Savings = Baseline Energy Use x Percent Reduction =	112,823	kWh - Electricity
2025 Propane Savings = Baseline Energy Use x Percent Reduction =	9,750	Gallons - Propane

Strategy 4.2: Evaluate the feasibility of upgrading public lighting to energy efficient LEDs.		
Target: Reduce Energy Used for Public Lighting by 63% by 2025		
Baseline Year	2005	
Baseline Annual Municipal-Operations Energy Use Street Lights and Other Lighting	16,377	kWh - Electricity
2025 Target Percent Energy Reduction	63%	of energy use
2025 Street and Other Lighting Savings = Baseline Energy Use x Percent Reduction =	10,318	kWh - Electricity

Strategy 5.1: Encourage residents and businesses to reduce the waste of water and the embedded energy indoors.		
Target: 100% of Households and Businesses Reduce Indoor Water Use by 20% by 2025		
Baseline Year	2005	
Baseline Year Population served by Water Systems (Includes Seasonal Residents)	1,184	People
Alpine County 2005 Average Gallons Per Capita Per Day (GPCD)	188	Gallons / Capita / Day
Percent of Urban Water Demand (2013 CA WPU[38])	31%	Residential Indoor
	44%	Landscape Irrigation
	20%	Non-Residential Indoor
2025 Target Percent Reduction in Indoor Water Use	20%	of water use
2005 Alpine County Estimated Potable Water Energy Use	303,837	kWh - Electricity
2005 Alpine County Estimated Potable Water Production	81.4	Million Gallons
2005 Alpine County Estimated Wastewater Energy Use	389,465	kWh - Electricity
2005 Alpine County Estimated Wastewater Production	63.3	Million Gallons
2005 Alpine County Estimated Potable Water Energy Use Intensity = 2005 Alpine County Estimated Potable Water Energy Use / 2005 Alpine County Estimated Potable Water Production =	3,733	kWh / Million Gallons

[38] 2013 California Water Plan Update, http://www.waterplan.water.ca.gov/docs/cwpu2013/2013-prd/Vol3_Ch03_UrbanWUE_PubReviewDraft_Final_PDFed_co.pdf

2005 Alpine County Estimated Wastewater Energy Use Intensity = 2005 Alpine County Estimated Wastewater Energy Use / 2005 Alpine County Estimated Wastewater Production =	6,153	kWh / Million Gallons
2005 Estimated Indoor Water Use = Total GPCD x (Percent Res + Percent Non-Res) =	96	Gallons / Capita / Day
2005 Estimated Annual Indoor Water Use = 2005 Estimated Indoor Water Use x Baseline Year Population * 365 Days Per Year / 1,000,000 =	41	Million Gallons
2025 Reduced Indoor Water Use = 2005 Estimated Annual Indoor Water Use x Percent Reduction =	8	Million Gallons
2025 Energy Savings from Reduced Indoor Water Use = 2025 Reduced Indoor Water Use x 2005 Alpine County Estimated Energy Use Intensity =	81,920.69	kWh / Year

5.2: Encourage residents and businesses to reduce the waste of water and the embedded energy outdoors.		
Target: 100% of Households and Businesses Reduce Outdoor Water Use by 20% by 2025		
Baseline Year	2005	
Baseline Year Population served by Water Systems	1,184	People
Alpine County 2005 Average Gallons Per Capita Per Day (GPCD)	188	Gallons / Capita / Day
Percent of Urban Water Demand (2013 CA WPU[38])	31%	Residential Indoor
	44%	Landscape Irrigation
	20%	Non-Residential Indoor
2025 Target Percent Reduction in Outdoor Water Use	20%	of water use
2005 Alpine County Estimated Potable Water Energy Use	303,837	kWh - Electricity
2005 Alpine County Estimated Potable Water Production	81.4	Million Gallons
2005 Alpine County Estimated Potable Water Energy Use Intensity = 2005 Alpine County Estimated Potable Water Energy Use / 2005 Alpine County Estimated Potable Water Production =	3,733	kWh / Million Gallons
2005 Estimated Outdoor Water Use = Total GPCD x (Percent Landscape Irrigation) =	83	Gallons / Capita / Day
2005 Estimated Annual Outdoor Water Use = 2005 Estimated Outdoor Water Use x Baseline Year Population * 365 Days Per Year / 1,000,000 =	36	Million Gallons
2025 Reduced Outdoor Water Use = 2005 Estimated Annual Outdoor Water Use x Percent Reduction =	7	Million Gallons
2025 Energy Savings from Reduced Outdoor Water Use = 2025 Reduced Outdoor Water Use x 2005 Alpine County Estimated Energy Use Intensity =	26,687	kWh / Year

5.3: Encourage the completion of Leak Loss detection to reduce unaccounted for loss of water and the embedded energy.		
Target: 100% of Potable Water Systems Reduce Water Losses by 40% by 2025		
Baseline Year	2005	
Baseline Year Population served by Water Systems	1,184	People
Alpine County 2005 Average Gallons Per Capita Per Day (GPCD)	188	Gallons / Capita / Day
Percent of Urban Water Demand (2013 CA WPU[38])	31%	Residential Indoor
	44%	Landscape Irrigation
	20%	Non-Residential Indoor
	5%	Water Losses
2025 Target Percent Reduction in Water Losses	40%	of water use
2005 Alpine County Estimated Potable Water Energy Use	303,837	kWh - Electricity
2005 Alpine County Estimated Potable Water Production	81.4	Million Gallons
2005 Alpine County Estimated Potable Water Energy Use Intensity = 2005 Alpine County Estimated Potable Water Energy Use / 2005 Alpine County Estimated Potable Water Production =	3,733	kWh / Million Gallons
2005 Estimated Water Losses = Total GPCD x (Percent Water Losses) =	9.40	Gallons / Capita / Day
2005 Estimated Annual Outdoor Water Use = 2005 Estimated Outdoor Water Use x Baseline Year Population * 365 Days Per Year / 1,000,000 =	4	Million Gallons
2025 Reduced Outdoor Water Use = 2005 Estimated Annual Outdoor Water Use x Percent Reduction =	2	Million Gallons
2025 Energy Savings from Reduced Outdoor Water Use = 2025 Reduced Outdoor Water Use x 2005 Alpine County Estimated Energy Use Intensity =	6,065	kWh / Year

APPENDIX D: EXISTING ENERGY EFFICIENCY PROGRAMS, POLICIES AND CODES IN ALPINE COUNTY

Appendix D documents the existing energy-efficiency administrators, policies and codes in Alpine County with links to relevant websites.

Table D-1: Existing Energy Efficiency Programs

EXISTING PROGRAMS	DESCRIPTION
Pacific Gas & Electric Company (PG&E)	PG&E offers incentives, rebates and educational resources to residents, businesses, non-profits and government agencies in Mariposa County. http://www.pge.com/
Liberty Utilities	Liberty Utilities offers energy conservation tips, free home and business audits, commercial customer incentives, residential rebates and free energy efficient lightbulbs and other conservation measures at events and during audits. (https://libertyutilities.com/)
Sierra Business Council (SBC)	SBC administers the Sierra Nevada Energy Watch program, delivering cost effective energy-efficiency projects and benchmarking services to businesses, non-profits, and government agencies in Mariposa County. SBC also offers consulting services to governments on energy and climate planning. http://sierrabusiness.org/
El Dorado County Health and Human Services Department	The El Dorado County Health and Human Services Department provides assistance to Alpine County income eligible households for energy assistance and weatherization services through the Home Energy Assistance Program. https://www.edcgov.us/HEAP/
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. http://www.gridalternatives.org/
TRC Energy Services	TRC Energy Services administers the California Advanced Homes program, which highlights best practices in energy efficiency, green building and sustainability, and offers generous financial incentives to help builders and architects create environmentally friendly, energy-efficient communities for potential home buyers. http://cahp-pge.com/

Table D-2: Existing Energy Efficiency Policies and Codes

EXISTING POLICIES	
POLICY/CODE DOCUMENT	**DESCRIPTION**
Alpine County General Plan (2009) Conservation Element: Section I. Energy	Achieve maximum levels of energy conservation through proper construction, design, and placement of all new developments. (Goal No. 16)
	All new public, private facilities and residences should be designed to meet requirements of Title 24 of the State Energy Code. (Policy No. 16a)
	In approving development permits the County should set requirements and/or make recommendations wherever possible that would improve energy conservation and save long-term costs.(Policy No. 16b)
	Develop energy resources including but not limited to solar, wind, geothermal, and small hydro without sacrifice to aesthetics or the existing natural or socioeconomic environment. (Policy No. 17)
	Existing and proposed special service districts should consider power generation using locally available hydro, wind, or other resources among the services and facilities they would intend to provide. (Goal 17b)
	All new lots or parcels intended to contain structures for human occupancy should be designed to allow for and protect maximum utilization of available solar and wind resources. (Policy No. 17c)
	The investigation and development of geothermal resources on Alpine County's eastern slope should be encouraged. (Policy No. 17d)
	Opportunities for generating electricity using wasted heat from future industrial, commercial, or manufacturing processes (cogeneration) should be considered where feasible and appropriate. (Policy No. 17e)
Alpine County General Plan (2009) Element III - Section D: Public Service and Facilities	All new commercial or residential units utilizing community sewer or water systems should be required to contain low or restrictive flow water fixtures or devices wherever possible. (Policy No. 26b)
Alpine County General Plan (2009) Implementation Program 12: Energy Conservation	Program Description: Energy costs form a substantial portion of total housing costs. Reduction in energy usage through conservation and land use can substantially reduce household energy use and reduce overall housing costs. Objectives: A) The county will continue to implement the standards of the California Building Code including energy conservation standards. B) The County will continue to require employee housing be constructed in conjunction with major projects in Bear Valley and Kirkwood thereby reducing energy use associated with commuting. C) Households needing energy assistance will be referred to the appropriate public utility or the El Dorado County Department of Community Services for assistance through LIHEAP. D) Code Enforcement and rehabilitation efforts will include a focus on energy efficiency and conservation. To promote energy conservation in housing, Alpine County will: Partner with community services agencies to seek financial assistance for low income persons to offset the cost of weatherization and heating and cooling homes.

	Partner with public utility districts and private energy companies to promote free energy audits for low-income owners and renters, rebate programs for installing energy efficient features/appliances, and public education about ideas to conserve energy. Support standards, including zoning standards that promote passive solar heating and other forms of conservation and alternative energy where appropriate. Partner with nonprofit and for profit developers to seek appropriate grant funding to assist with construction of energy efficient housing.

APPENDIX E: EXISTING ENERGY EFFICIENCY PROGRAMS IN ALPINE COUNTY

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

Table E-1: Existing Residential Energy Efficiency Programs

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
PG&E 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. https://www.energyupgradeca.org/en/
PG&E Advanced Home Upgrade	PG&E's Advanced Home Upgrade program offers rebates up to $6,500 to go beyond building shell upgrades and is typically more complex, involving deep improvements. A Home Upgrade Professional will conduct a comprehensive energy assessment using energy-modeling software to create a customized energy-saving plan for your home. https://www.energyupgradeca.org/en/
PG&E SmartAC™	PG&E's SmartAC program offers the opportunity to help prevent summer energy supply emergencies from disrupting day to day activities. Upon joining, SmartAC will install their free SmartAC device. Once installed, the customer will receive a SmartAC reward check. http://www.pge.com/smartac
PG&E SmartRate™	PG&E's SmartRate program gives a discount at 3¢ per kWh on the customer's June through September monthly rate, or the equivalent of 23% off Tier 1 usage. In exchange, the customer pays a surcharge of 60¢ per kWh for 2-7PM usage between 9 and 15 PG&E SmartDays™, May through October. With SmartRate automatic bill protection, the first summer is risk free. http://www.pge.com/smartrate
PG&E Home Appliance Rebate	PG&E offers residential customers rebates on the purchase of Energy Star® home appliances. Rebates on cooling systems range from $20-$425, heating systems from $100-$500 and appliances from $50-$75. http://www.pge.com/en/myhome/saveenergymoney/rebates/index.page
PG&E Solar Water Heating	PG&E's Solar Water Heating program provides incentives up to $2,719 based on the expected performance of the system. http://www.pge.com/csithermal
Liberty Utilities Conservation Tips	Liberty Utilities offers no-cost and low-cost conservation tips as well as room-by-room recommendations and seasonal recommendations. https://california.libertyutilities.com/markleeville/residential/smart-energy-use/electric/conservation-tips.html
Liberty Utilities Refrigerator Recycling Rebate	Liberty Utilities offers a $35 rebate for recycling up to 2 working refrigerators between 10 and 30 cu-ft in capacity per year. https://california.libertyutilities.com/uploads/CA_Refrigerator_Recycling_Program_Customer_Form.pdf
Liberty Utilities Energy Audits	Liberty Utilities offers free home energy audits. A Liberty Utilities auditor will visit your home or business and will identify ways you can save energy and money. You will receive free energy efficient light bulbs & other conservation measures to help you save. https://california.libertyutilities.com/markleeville/residential/smart-energy-use/electric/energy-audits.html
Liberty Utilities Energy Efficient Lighting	Liberty Utilities provides energy efficient lightbulbs free of charge at events and during audits. Additionally special large orders may be available upon request. https://california.libertyutilities.com/markleeville/residential/smart-energy-use/electric/index.html#navbar-smart-uses-residential

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
KMPUD Energy Conservation Tips	Kirkwood Meadows Public Utility District offers no or low-cost tips on ways to conserve energy in your home and community. https://www.kmpud.com/community/energy-efficiency/
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, assembly or original system installation, and piping or wiring to interconnect a system to the home. http://energy.gov/savings/residential-renewable-energy-tax-credit
California Advanced Homes	California Advanced Homes™ Program, administered by PG&E and TRC Energy Services, highlights best practices in energy efficiency, green building and sustainability, and offers generous financial incentives to help builders and architects create environmentally friendly, energy-efficient communities for potential home buyers. http://www.californiaadvancedhomes.com/
New Solar Homes Partnership (NSHP)	The NSHP provides financial incentives and other support to home builders, encouraging the construction of new, energy efficient solar homes that save homeowners money on their electric bills and protect the environment. http://www.gosolarcalifornia.org/about/nshp.php

Table E-2: Existing Targeted Residential Energy Efficiency Programs

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
Home Energy Assistance Program (HEAP)	HEAP provides financial assistance to income-qualified applicants in the form of an annual utility credit for gas, electric, propane or firewood to help with the high costs of heating and/or cooling. HEAP programs in Alpine County are administered by the El Dorado County Health and Human Services Department. https://www.edcgov.us/HEAP/
Weatherization Assistance Program (WAP)	WAP provides free weatherization services and products to improve a home's energy efficiency and reduce overall utility costs, including attic insulation, weather stripping, caulking, minor home repairs and related conservation measures. WAP programs in Alpine County are administered by the El Dorado County Human Services Department. 530-573-3492 http://www.edcgov.us/Government/HumanServices/Family_Services/Home_Weatherization_Program.aspx
PG&E Relief for Energy Assistance through Community Help (REACH)	REACH provides grants for projects that reduce energy vulnerability such as PG&E's one-time emergency financial assistance. http://www.pge.com/reach/
PG&E California Alternate Rates for Energy (CARE)	Qualified low-income customers that are enrolled in the CARE program receive a 30-35 percent discount on their electric and natural gas bills. CARE is administered by PG&E. http://www.pge.com/care/
PG&E Family Electric Rate Assistance (FERA)	The FERA program provides a monthly discount on electric bills for income-qualified households of three or more persons. FERA is administered by PG&E. http://www.pge.com/fera
PG&E and Liberty Utilities Energy Savings Assistance Program (ESAP)	The Energy Savings Assistance Program provides income-qualified customers with energy-saving improvements at no charge. The program is administered by PG&E and Liberty Utilities. http://www.pge.com/en/myhome/saveenergymoney/financialassistance/energysavingsassistanceprogram/index.page https://california.libertyutilities.com/markleeville/residential/smart-energy-use/electric/energy-savings-assistance-program.html
PG&E Medical Baseline Allowance	Residential customers with a qualified physician certified medical condition can receive additional quantities of energy at the lowest (baseline) price. The program is administered by PG&E. http://www.pge.com/medicalbaseline
PG&E Multi-Family	PG&E's Multi-Family Program is for property owners and managers of existing residential dwellings or mobile home parks with five or more units. The program encourages owners to install qualifying energy-efficient products in individual tenant units and common areas of residential apartments, mobile home parks and condominium complexes. A full list of available rebates and incentives is available online. http://www.pge.com/multifamily/

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
Liberty Utilities Energy Savings Assistance Program (ESAP)	Liberty Utilities' ESAP offers income-qualified customers energy efficiency improvement at no cost. https://california.libertyutilities.com/loyalton/residential/smart-energy-use/electric/energy-savings-assistance-program.html
Single Family Affordable Solar Housing (SASH)	The California Solar Initiative 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 administered by GRID Alternatives. http://www.gridalternatives.org/learn/sash

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

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
PG&E Rebates and Incentives	PG&E offers non-residential customers rebates and incentives for power management software, occupancy sensors on lights, steam traps, HVAC motors and pumps, electric water heaters, process cooling, data center airflow management, boiler economizers, refrigeration, boiler heat recovery, refrigeration control, VSD pumps, boilers and fans. A full list of current rebates can be found using the PG&E money back tool. www.pge.com/businessrebates
PG&E HVAC Quality Maintenance Program	PG&E's Commercial HVAC Quality Maintenance Program offers generous incentives for enrolling in a three-year air conditioning quality maintenance service agreement and installing optional unit retrofits. The business owner will lower their operating, repair and replacement costs; optimize unit performance and efficiency; improve the indoor air quality and thermal comfort for employees and customers; help prevent HVAC unit failures that can threaten business operations; and reduce their carbon footprint. http://www.commercialhvacqm.com/
PG&E Lighting Rebates	PG&E offers rebates for high-efficient replacement lights as well as rebates to help cover the costs of qualifying fixtures and retrofit kits. http://www.pge.com/en/mybusiness/save/rebates/lighting/index.page
Liberty Utilities Customer Incentives	Liberty Utilities offers Incentives to commercial customers who wish to retrofit with energy efficient lighting or other energy efficiency upgrades. Call 775-336-1300 ext 107 or lwilliams@trisage.com. https://california.libertyutilities.com/markleeville/commercial/smart-energy-use/electric/electric-programs.html#navbar-smart-uses-commercial
Liberty Utilities Conservation Tips	Liberty Utilities offers no-cost and low-cost conservation tips. https://california.libertyutilities.com/markleeville/commercial/smart-energy-use/electric/conservation-tips.html
Liberty Utilities Refrigerator Recycling Rebate	Liberty Utilities offers a $35 rebate for recycling up to 2 working refrigerators between 10 and 30 cu-ft in capacity per year. https://california.libertyutilities.com/uploads/CA_Refrigerator_Recycling_Program_Customer_Form.pdf
Liberty Utilities Energy Audits	Liberty Utilities offers free business energy audits. A Liberty Utilities auditor will visit your home or business and will identify ways you can save energy and money. You will receive free energy efficient light bulbs & other conservation measures to help you save. https://california.libertyutilities.com/markleeville/commercial/smart-energy-use/electric/energy-audits.html
Liberty Utilities Energy Efficient Lighting	Liberty Utilities provides energy efficient lightbulbs free of charge at events and during audits. Additionally special large orders may be available upon request. https://california.libertyutilities.com/markleeville/residential/smart-energy-use/electric/index.html#navbar-smart-uses-residential
Federal Business Energy Investment Tax Credit	A taxpayer may claim an investment tax credit of 30% of qualified expenditures for solar, fuel cells, small wind systems or 10% of qualified expenditures for geothermal, microturbines and combined heat and power systems (CHP), aka co-generation systems. Expenditures include labor costs for on-site preparation, assembly or original system installation, and for piping or wiring to interconnect a system. http://energy.gov/savings/business-energy-investment-tax-credit-itc

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
PG&E Savings By Design (SBD)	SBD is a statewide program offered by PG&E to encourage high-performance new building design and construction for commercial buildings. The program offers building owners and their design teams a wide range of services, such as design assistance, design team incentives, owner incentives, and educational resources. www.pge.com/savingsbydesign
PG&E Retrocommissioning (RCx) Program	Retrocommissioning (RCx) is a systematic process for identifying less-than-optimal performance in your facility's equipment, lighting and control systems and making the necessary adjustments. While retrofitting involves replacing outdated equipment, RCx focuses on improving the efficiency of what's already in place. PG&E's RCx Program provides incentives and connects businesses with experts to make sure their facilities — and the equipment and systems within them — are running in peak condition for optimal energy savings. RCx projects can improve a facility's work environment and extend the service life of equipment. http://www.pge.com/en/mybusiness/save/rebates/retrocommissioning/index.page
PG&E 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. Energy specialists will conduct a free assessment of your facility and identify site specific opportunities to save you energy and money. Projects include upgrading old inefficient lighting to LEDs and replacing old refrigeration motors. http://ecoact.org/thehospitalityprogram/
PG&E LED Accelerator Program (LEDA)	The LED Accelerator Program (LEDA) incentivizes high performance LED retrofit and new installations in conjunction with networked controls or a new lighting design layout for multi-site commercial businesses. http://ledaccelerator.com/
PG&E Advanced Pumping and Efficiency Program (APEP)	PG&E's Advanced Pumping Efficiency Program (APEP) is an educational and incentive program intended to improve overall pump and booster efficiency and encourage energy conservation. The program subsidizes pump tests and provides cash-back incentives for pump overhaul above 25/hp. http://www.pumpefficiency.org/
Bright Schools	Provides technical assistance to schools for improving building energy efficiency and clean energy generation. Up to $20,000 available to successful applicants to fund professionally-prepared feasibility study for the most effective energy efficiency measures. http://www.energy.ca.gov/efficiency/brightschools/
Prop 39: California Clean Energy Jobs Act	The California Clean Energy Jobs Act (Prop. 39) changed the corporate income tax code and allocates projected revenue to California's General Fund and the Clean Energy Job Creation Fund for five fiscal years, beginning with fiscal year 2013-14. Under the initiative, roughly up to $550 million annually is available for appropriation by the Legislature for eligible projects to improve energy efficiency and expand clean energy generation in schools. http://www.energy.ca.gov/efficiency/proposition39/index.html
Energy Partnership Program	The California Energy Commission (CEC) Provides up to $20,000 in no cost technical assistance to public agencies in identifying the most cost effective energy efficient upgrades. http://www.energy.ca.gov/efficiency/partnership/
Energy Efficiency Financing	The California Energy Commission (CEC) provides 0-1% interest loans to public entities for projects with proven energy savings. http://www.energy.ca.gov/efficiency/financing/index.html
Water Energy Technology	The California Energy Commission (CEC) will implement a Water Energy Technology (WET) program to provide funding for innovative technologies that meet the following criteria: 1) Display significant water savings, energy savings, and greenhouse gas emission reductions. 2) Demonstrate actual operation beyond the research and development stage. 3) Document readiness for rapid, large-scale deployment (but not yet widely deployed) in California. http://www.energy.ca.gov/wet/
Water Energy Grant Program	This program funds residential, commercial and municipal water efficiency projects that reduce GHG emissions and reduce water and energy use. Eligible applicants include local agencies, JPA's, and non-profits. Eligible projects include residential and commercial water efficiency, municipal water efficiency programs, or projects that reduce greenhouse gas, reduce water and reduce energy use. Available funding is $28 million. The program is funded through the Cap and Trade legislation (specifically SB 103, Sec.11) and administered by California Department of Water Resources. http://www.water.ca.gov/waterenergygrant/

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
PG&E Streetlight Upgrade Program	PG&E will be replacing its non-decorative streetlights. In collaboration with the cities and counties across its service territory, PG&E will replace 160,000 existing high pressure sodium vapor (HPSV) bulbs with longer-lasting and more efficient light-emitting diode (LED) fixtures over the next three years. Cities and Counties can opt in for early upgrade by visiting: http://www.pge.com/streetlightupgrade
Tax Exemption for Farm Equipment and Machinery	In November 2012, The California State Board of Equalization determined the partial exemption from state sales and use tax applies to solar photovoltaic systems that are primarily used to power farm equipment and machinery. The system does not need to be directly connected to the equipment to qualify--it can be connected to the local electricity grid and used to offset the farm's electricity use via a net metering agreement with the local utility. Applicants will need to demonstrate that at least 50% of the electricity generated by the solar PV system is used by farm equipment annually. This tax exemption is also applicable to wind machines and could apply to other energy efficient farm equipment. http://www.boe.ca.gov/sutax/exemptfem.htm

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 Energy Efficiency Financing Programs

FUNDING SOURCE	DESCRIPTION
Property Assessed Clean Energy (PACE)	PACE is a means of financing energy-efficiency upgrades, water-efficiency upgrades or renewable energy fixtures on existing structures with little or no up-front costs. With PACE, residential and commercial property owners living within a participating district can finance up to 100% of their project and pay it back over time as a voluntary property tax assessment through their existing property tax bill. Loans are typically paid out over an assigned term of 15-20 years, keeping monthly payments low enough that utility savings may exceed the payment amount, generating a net-positive cash flow. It can also be used to finance leases and power-purchasing agreements (PPA's) for solar power or other renewable energy providers. http://energycenter.org/policy/property-assessed-clean-energy-pace
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 Energy Efficiency Financing Programs

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

Table F-3: Non-Residential Energy Efficiency Financing Programs

FUNDING SOURCE	DESCRIPTION
PG&E Energy Efficiency Financing	PG&E offers 0% interest loans of up to $100,000. Loans can be used to replace old and inefficient equipment with no up-front out-of-pocket investment. The program allows 5 years for repayment; however, the energy savings continue to accrue after the loan is paid off. http://www.pge.com/en/mybusiness/save/rebates/onbill/index.page
Energy Savings Agreement	An Energy Savings Agreement involves a financing contract with a private energy services company that packages energy efficiency as a service paid through the energy savings. It allows for 100% financing and is off balance sheet.
SAFE-BIDCO	SAFE-BIDCO offers small businesses, qualifying landlords, and non-profit organizations loans up to $450,000 for a maximum of 15 years to complete energy efficiency and renewable energy projects. The loan can cover energy studies, design and consultant fees, materials and equipment costs and loan fees. http://www.safe-bidco.com/loan-programs/energy-efficiency-loans/
Rural Energy for America Program (REAP)	The United States Department of Agriculture (USDA) provides guaranteed loan financing on loans up to 75% and grant funding for up to 25% of total eligible project costs to agricultural producers and rural small businesses to purchase or install renewable energy systems or make energy efficiency improvements. http://www.rd.usda.gov/programs-services/rural-energy-america-program-renewable-energy-systems-energy-efficiency
EPA Environmental Education Local Grants Program	The Environmental Protection Agency (EPA) Office of Environmental Education provides a Local Grants Program with the purpose of supporting locally-focused environmental education projects that increase knowledge about environmental issues and provide skills that participants need to make informed environmental decisions. Total funding is $2,730,000 nationwide. The EPA expects to award 30 grants total, each grant approximately $91,000 in federal funds. https://www.epa.gov/sites/production/files/2016-02/documents/2016_ee_local_grants_rfp_final_2_9_16_508version.pdf

Table F-4: Municipal Energy Efficiency Financing Programs

FUNDING SOURCE	DESCRIPTION
CEC Energy Efficiency Financing	The California Energy Commission (CEC) offers school districts, charter schools, county offices of education, state special schools, community college districts 0% loans for energy efficiency and energy generation projects. CEC offers cities, counties, special districts, public colleges, universities and public care institutions/hospitals 1% loans for energy efficiency and energy generation projects. http://www.energy.ca.gov/efficiency/financing/
PG&E Energy Efficiency Financing	PG&E offers 0% interest loans of up to $250,000. Loans can be used to replace old and inefficient equipment with no up-front out-of-pocket investment. The program allows 10 years for repayment; however, the energy savings continue to accrue after the loan is paid off. http://www.pge.com/en/mybusiness/save/rebates/onbill/index.page
Energy Savings Agreement	An Energy Savings Agreement involves a financing contract with a private energy services company that packages energy efficiency as a service that is paid through the energy savings. It allows for 100% financing and is off balance sheet.
CSCDA Sustainable Energy Bond Program	California Statewide Communities Development Authority (CSCDA) and the Foundation for Renewable Energy and Environment are teaming together to provide public agencies and nonprofit organizations throughout California with access to tax exempt financing for critical sustainable energy investments. Under the Sustainable Energy Bond Program, participating entities and organizations will contract with an Energy Service Company (ESCO) to complete energy and water conservation measures. Improvements could include street lighting, building lighting, pumps, HVAC, system controls, boilers, chillers, ducting, windows, partial roofing, toilets and others. The program participants will receive substantial utility cost savings, including a contractual guarantee sufficient to cover the full cost of all retrofit work. All projects

FUNDING SOURCE	DESCRIPTION
	are financed through tax exempt bonds. http://cscda.org/Public-Agency-Programs/Sustainable-Energy-Bond-Program
IBank Clean Energy Finance Center	The California Infrastructure and Economic Development Bank (IBank) Clean Energy Finance Center (CEFC) encourages concerted public and private investments and utilizes IBank's access to capital markets for selected clean energy and energy efficiency projects. The IBank CEFC will help to drive energy related projects for State and local governments. http://ibank.ca.gov/clean_energy.htm
USDA's Rural Utilities Service (RUS)	The Rural Utilities Service administers programs that provide much-needed infrastructure or infrastructure improvements to rural communities, including water and waste treatment, electric power and telecommunications services. The programs provide loans, grants, loan guarantees, capital and leadership. http://www.rd.usda.gov/about-rd/agencies/rural-utilities-service

APPENDIX G:
PUBLIC OUTREACH SUMMARY

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

During the development of the Energy Action Plan (EAP), public outreach was a key part of the process. To this effort, one publicly noticed study session was hosted by the Planning Commission on June 30th, 2016 and an 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 public input collected at the Planning Commission Study Session and from the online survey was incorporated into the development of the goals, strategies and actions highlighted in Chapter 4 and used to prioritize the actions in the Implementation Matrix in Chapter 5. For example, one comment from the study session was to work with school districts to provide energy-efficiency education so an additional action was added to Strategy 1.1 to work with local schools to provide energy-efficiency presentations and curriculum. In addition there were two public hearings on the EAP – one before the Planning Commission on October 27th, 2016 and one before the Board of Supervisors on November 15th, 2016. A variety of methods were used to 'spread the word' about the study session and survey including targeted social media posts through Sierra Business Council's and the Alpine County Chamber of Commerce's networks, in the Record Courier newspaper, multiple email blasts to local contacts, phone calls and emails to property associations including the Bear Valley Residents, Kirkwood Community Association, and Kirkwood Meadows Association, postings on the County's website, and invitations to other local organizations and businesses. The public input study session was conducted at the Alpine County Planning Commission meeting. A summary of public input is detailed below.

Study Session: June 30, 2016

The first joint study session summarized work performed by Sierra Business Council (SBC) for Alpine County, which included an inventory of community-wide and municipal-operations energy usage for a baseline of year 2005, and a detailed presentation on the development process of the energy action plan, along with potential goals, strategies and actions.

5 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 actions. A summary of the key comments is provided on the following page.

Table G-1: Comments from Study Session: June 30, 2016

TOPIC	COMMENTS
General	• A major concern here is heating and will be much more impactful for the community than lighting upgrades. LIHEAP is a great funding source to address this. • Liberty has done lightbulb upgrades for Residential Customers present. • The EAP doesn't cover transportation emissions from gasoline. This is a very specific exclusion because PG&E is very clear that the EAP is funded by rate payer dollars that come from natural gas, propane and electricity. More than 50% of GHGs come from transportation, but that will have to be looked at separately. Alpine County is a tourist destination that caters to tourists who drive here. • Rather than force staff to find sources of funding, hopefully the EAP will make it easier to know what's out there for us to access and cut down on our leg work. In the Bay Area, you have sustainability organizations and associations of local governments that do this kind of work for you. The EAP hopes to fill that gap for Sierra communities like Alpine and set local staff up to succeed. • The cost benefits of energy efficiency projects works different in Alpine that it does in areas with higher population density. This should be reflected in the plan. • Alpine County will eventually need to take ownership of ensuring that these voluntary measures are actually implemented in the community. • A major concern here is heating and will be much more impactful for the community than lighting upgrades. LIHEAP is a great funding source to address this.
Outreach	Contact Tom and Nancy Sweeny for Outreach assistance, their email list-serv gets the word out. Alpine County government doesn't have operational control over schools, but we shouldn't exclude them. Educational outreach is a way to increase participation in Energy Efficiency. Also, each district is given access to Prop 39 funding based on their size and attendance to upgrade their - lighting, process improvement heating and chilling, HVAC systems, CFOs, etc. Superintendents should have more information.
Barriers	People often try to sell Alpine county projects that are too big for it, this might be one of them.

Online Survey - Activated June 13, 2016 - Closed August 1, 2016

In an effort to expand outreach to local residents and businesses, Sierra Business Council developed an on-line survey to garner input on the proposed goals, strategies, and actions. 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 G-2: Online Survey Summary for Alpine County

Survey Questions	Responses
Respondent Profile	41 total responses 90% from County residents 95.12% were 41 or older 39.02% business owners 87.18% home owners
Do you currently use energy efficient products/appliances in your own home?	82% Yes Comments: Replacing home appliances with energy efficient models as the expire Appliances were energy efficient 30 years ago.
Are you aware of energy efficiency programs offered by your utility provider?	57% No
Are you aware of Title 24 energy codes & standards?	52.5% No
Are you involved in the following industries?	42% Design

Survey Questions	Responses
	14% Inspection 42% Construction 57% Real Estate
Do you plan on installing a renewable energy system in you on or on your property?	81.5% No
What obstacles are there in installing a renewable energy system in your home or on your property?	54.5% Too Expensive 33.33% Do not know enough about it Comments: Weather (winds, snow) makes solar difficult to install and maintain Recouping Investment takes too long Not enough information about rebates from utility companies
What renewable energy source do you think is the most important for Alpine County to focus on?	69% Solar 11% Biomass Comments: Need more information All of the above
Should the County be a leading example for other rural areas looking to be more energy efficient?	68% Yes Comments: Gov't. should present programs to the public on ways to save energy (or host such programs). Alpine County is too small to adopt expensive "solutions" that sound good but cost large amounts of money to implement, operate, and maintain.
What would you like to see the County do to improve its energy efficiency?	Comments: Solar panels Education for county employees and residents on how to conserve energy Biomass Energy efficient construction Set example in county buildings
How do you currently conserve water?	Comments: Limit outdoor watering Reduce indoor use (shower time, etc) Efficient toilets
What would help you conserve more water?	Comments: Reuse grey water Efficient toilets Water Meter Understand limits of wells Nothing, already doing it.
Do you believe the community water providers should prioritize improvements to the efficiency of their water systems?	88% Yes Many individuals on wells Limited funding available Reevaluate what projects they do spend their money on
Which of these 5 areas is the most important for Alpine County to spend its money on?	34% Renewable Energy 26% Municipal Operations 23% Existing Structures 8.5% Water-energy 8.5% New Construction
Which of these 5 areas is the most difficult for Alpine County to accomplish its energy goals?	Top 3: Municipal Operations Water-Energy Renewable Energy and Existing Structures
How willing are you to perform an energy efficient upgrade in your home or business?	47% Extremely 47% Moderately 6% Not at All
How would you prefer to learn about incentives and rebates?	54% Email 16% Mailers 10% Other 8% County Website 8% Workshops 2% Social Media