CITY OF SONORA
ENERGY ACTION PLAN

PUBLIC REVIEW DRAFT

FEBRUARY 2018

PREPARED BY SIERRA BUSINESS COUNCIL

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

IN COLLABORATION WITH THE CITY OF SONORA AND COMMUNITY MEMBERS

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

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EXECUTIVE SUMMARY

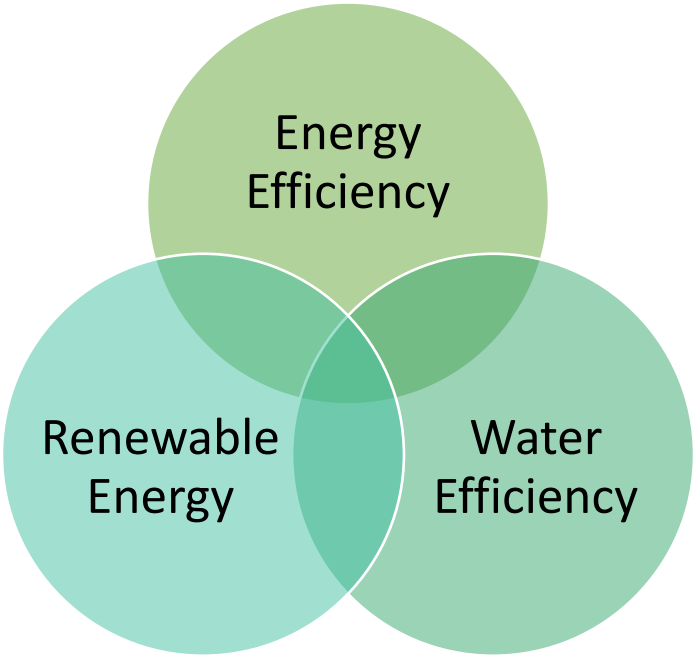
The Executive Summary provides the big picture overview of energy use in Sonora, the goals and potential savings associated with the implementation of the Energy Action Plan.

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

To inform the plan, Sierra Business Council (SBC) first evaluated the energy used in the entire community by the residential and non-residential sectors, including City and public agencies. This evaluation found that the community - including residential, non-residential, City, and public agencies - consumed 60,306,795 kilowatt hours (kWh) of electricity and an estimated 1,903,951 gallons of propane and 1,529 cords of wood in 2010. Of that energy use, the City's operations accounted for over 374,383 kWh of electricity consumption and 5,194 gallons of propane in buildings costing $35,125 and 266,352 kWh of electricity for public lighting costing $68,913 in 2010. In addition, the community wide potable and wastewater services accounted for 695,187 kWh of electricity consumption costing an estimated $35,102 in 2010.

SBC then projected the community's energy use out to the year 2035 if no actions are taken to lower energy consumption or improve the efficiency of current City and community-wide operations. The 2035 "business-as-usual" forecast[1] of annual energy use showed that electricity consumption would increase to 69,398,808 kWh, propane consumption would increase to 2,115,239 gallons, and wood consumption would increase to 1,612 cords of wood at an estimated cost of over $21.7 million in 2035.

This presents significant opportunity for community members and the City of Sonora to save money and energy by addressing the inefficiencies of current energy-consuming systems, operations, and behaviors. To achieve these savings, the City of Sonora EAP was developed to provide a broad view of energy use in the City, set energy and water-energy saving goals, recommend actions that result in short and long-term energy savings, and educate the community on existing resources designed to save utility customers money, energy, and water.



[1] Business as usual use is projected energy use if no energy efficiency measures or programs are implemented

The goal of the plan is to reduce the projected annual electricity use in 2035 by 55%, annual propane use by 25%, and annual wood use by 18%. This translates to annual savings of 38,184,137 kWh of electricity, 530,684 gallons of propane, and 287 cords of wood from the projected business as usual forecast. Since 2010, Sonora's community efforts are saving over 4,794,107 kWh of electricity annually from PG&E energy efficiency programs[2] and producing an estimated 3,640,474 kWh of electricity from solar photo voltaic (PV) systems[3], which underscores the importance of utilizing the available resources and funding. The actions within this plan are voluntary and do not require the City or community to meet these target reduction goals; however, savings may only be realized if the recommended actions are taken.

The heart of the plan is contained in Chapter 3: Goals and Strategies and Chapter 4: Implementation Plan. The goals address three key areas of energy: energy efficiency, renewable energy, and water efficiency.

The strategies focus on voluntary measures that can be taken by residents, businesses, and public agencies to reduce energy use through energy efficiency, renewable energy, water efficiency. Key components include: developing and disseminating information on existing programs at community events and on the City's website; energy-related training for City staff, building contractors, realtors, and homeowners associations; and partnerships with local and regional utilities and organizations to leverage resources and increase participation in existing and new programs.

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

The following table compares 2010 baseline energy use, 2035 business as usual forecasted energy use and potential energy use savings in 2035 with the successful implementation of the EAP strategies and actions. The majority of energy savings are attributed to existing structures and would have significant impact in the community regardless of the projected new construction. A critical way of achieving the energy savings estimated in this plan is by convening a Working Group that focuses on implementing the plan. In order to complete the actions in the Implementation Plan, it is recommended that with coordination assistance of the Local Government Commission's CivicSpark AmeriCorp fellow, the Working group can assist with implementation and alleviate the demand on City staff time. The Working Group should be comprised of representatives from the City, Tuolumne County, Tuolumne Utilities District, Tuolumne County Resource Conservation District, Amador Tuolumne Community Action Agency, Sonora School District, PG&E, Tuolumne County Association of Realtors, the business community, and residents.

Table ES-1: Summary of 2010 Baseline and 2035 BAU Forecast Energy Use and Potential 2035 Energy and Cost Savings

Energy Use	2010 Baseline	2035 BAU Forecast	2035 Potential Energy Savings	2035 Potential Cost Savings[4]	Percent Difference
Electricity	60,306,795 kWh	69,398,808 kWh	38,184,137 kWh	$8,018,669	55% reduction from 2035 BAU
Propane	1,903,951 gallons	2,115,239 gallons	530,684 gallons	$1,332,018	25% reduction from 2035 BAU
Wood	1,529 cords	1,612 cords	287 cords	$78,997	18% reduction from 2035 BAU

[2] Sonora residential and non-residential energy savings based on projects completed 2010-2016. California Public Utilities Commission. Accessed September 22, 2017. http://eestats.cpuc.ca.gov/Views/EEDataShelf.aspx

[3] Sonora residential and non-residential solar PV statistics based on installations completed 2010-2016. California Solar Initiative. Accessed September 22, 2017. https://www.californiasolarstatistics.ca.gov/data_downloads/

[4] Forecasted composite rate for 2035 of $0.21 per kWh based on SBC forecast of PG&E and TPPA Rates, 2035 average rate of $2.51 per gallon of propane based on 2010 Energy Information Agency West Coast Annual Average Retail Prices. Accessed September 22, 2017. http://www.eia.gov/dnav/pet/pet_sum_mkt_dcu_R50_a.htm, and 2010 average of $275 per cord estimated based on local listings for soft and hardwood.

CHAPTER 1: INTRODUCTION

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

DEFINITION OF KEY TERMS

Table 1-1: Definition of Key Terms

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

WHY PREPARE AN ENERGY ACTION PLAN?

In 2010, the Sonora community - including residential, non-residential, City, and public agencies - consumed 60,306,795 kWhs of electricity and an estimated 1,903,951 gallons of propane and 1,529 cords of wood costing an estimated $14 million.[5] The majority of this money leaves the community. Instead through efficiency and local energy projects, Sonora residents and businesses can reduce their energy use through efficiency projects that pay for themselves over time, some in as little as 6 months, or completely eliminate their energy costs through on-site renewable energy projects, which often

[5] Average composite rate for 2010 of $0.156 per kWh based on ratio PG&E and TPPA Rates, 2010 average rate of $2.21 per gallon of propane based on 2010 Energy Information Agency West Coast Annual Average Retail Prices. Accessed September 22, 2017. http://www.eia.gov/dnav/pet/pet_sum_mkt_dcu_R50_a.htm, and 2010 average of $275 per cord estimated based on local listings for soft and hardwood.

pay for themselves between 6 and 12 years depending system size and financing options. Additionally, because of the projected increase in occupied housing and employment in Sonora, the community's residential energy use is forecasted to increase by 5.45% by 2035 and non-residential energy use is forecasted to increase by 19.58% by 2035. By implementing this plan, the community could realize the following benefits:

Energy & Money Savings

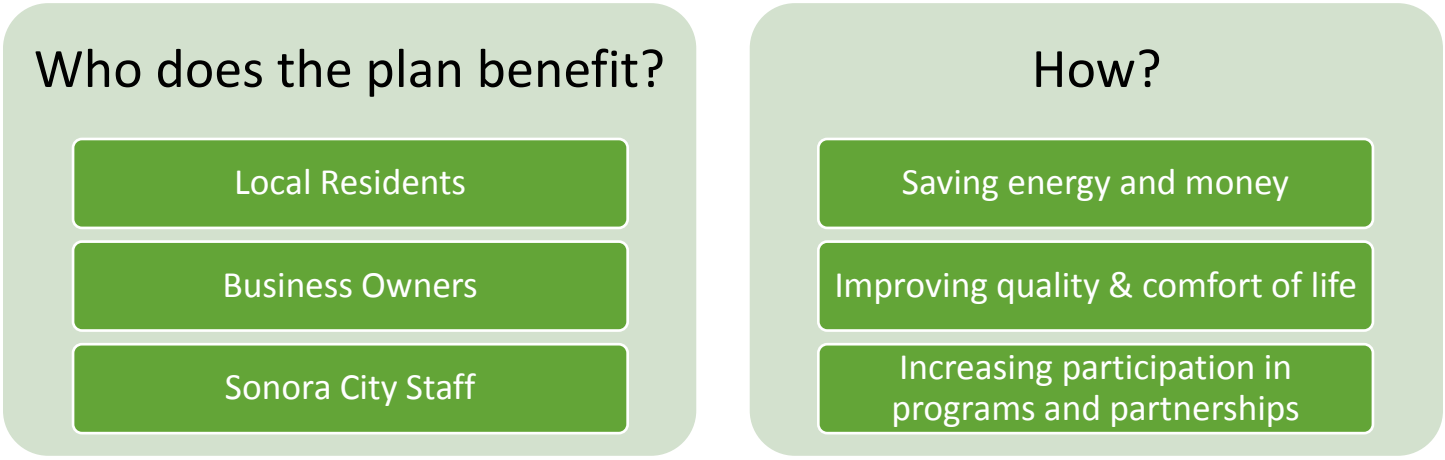
Community Resiliency

Local Air Quality Improvements

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

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

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



Most energy projects are cost-effective because energy savings are seen immediately, and the money saved on energy not used offsets the upfront costs over time. Depending on the size and scope of the project, energy projects can pay for themselves in anywhere from a few months to several years. Often with financing, projects can be cash flow positive from day one. The money saved through energy projects can then be reinvested into the local economy.

CLIMATE SCIENCE BASICS

Naturally occurring gases[6] dispersed in the atmosphere determine the Earth's climate by trapping solar radiation. This phenomenon is known as the greenhouse effect, which is a natural process that perpetuates life on earth by keeping the planet's surface warm. Scientific observation indicates that average air and ocean temperatures have steadily increased globally over the last 100 years. Evidence of this includes rapid levels of glacial melt, reductions in sea ice, shorter freezing seasons, and decreases in snowpack.

Scientific studies suggest that human activities are accelerating the concentration of greenhouse gases (GHG), which affects the global climate. The most significant contributor is the burning of fossil fuels for transportation and electricity generation, which introduces large amounts of carbon dioxide and other GHGs into the atmosphere. Collectively, these gases intensify the natural greenhouse effect, causing global average surface temperatures to rise.[7]

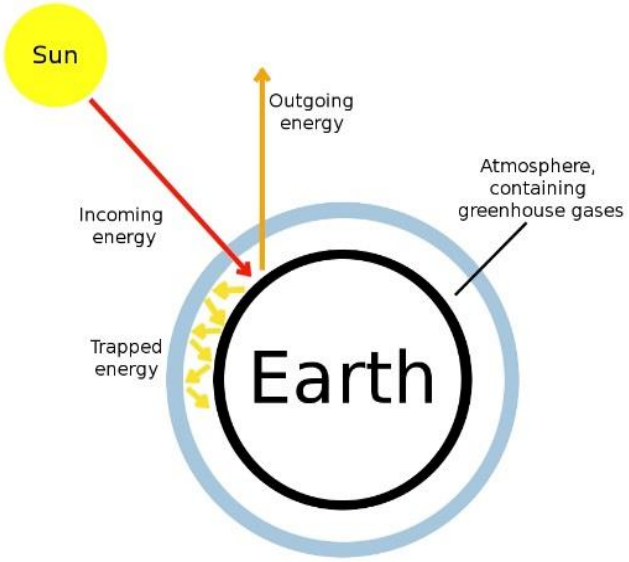


Image Credit: simpleclimate.wordpress.com

LOCAL CLIMATE CHANGE IMPACTS

Sonora, like most communities in the Sierra Nevada, faces challenges associated with regional climate change. 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 City, and ultimately impact quality of life for community members.[8]

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

REGULATORY CONTEXT

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

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

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

[8] California Office of Environmental Health Hazard Assessment. 2013 Report: Indicators of Climate Change in California. Accessed September 22, 2017. http://www.oehha.ca.gov/multimedia/epic/2013EnvIndicatorReport.html

Table 1-2: Regulatory Context

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

ECONOMIC OPPORTUNITIES

One of the potential outcomes of implementing the plan is increased investment in the clean energy industry which could open the door to new economic development opportunities in the City and surrounding communities. Some economic benefits include increased opportunities to train the local workforce in industries that directly affect the energy and water sectors. Additionally, the following indicators suggest a robust market for clean economy businesses and industries as we move forward into the next decade.[9]

- 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[10] 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%.

[9] 2014 California Green Innovation Index, 6th Edition. Next 10. p. 29, 33-44. Accessed September 22, 2017. http://greeninnovationindex.org/sites/greeninnovationindex.radicaldesigns.org/files/2014-Green-Innovation-Index.pdf.

[10] The key clean sectors of California's economy, which includes energy efficiency, clean generation, and storage.

RELATIONSHIP TO CEQA

The City of Sonora determined the acceptance of the EAP is exempt from the California Environmental Quality Act (CEQA) per section 15061 (b) (3) of the CEQA guidelines:

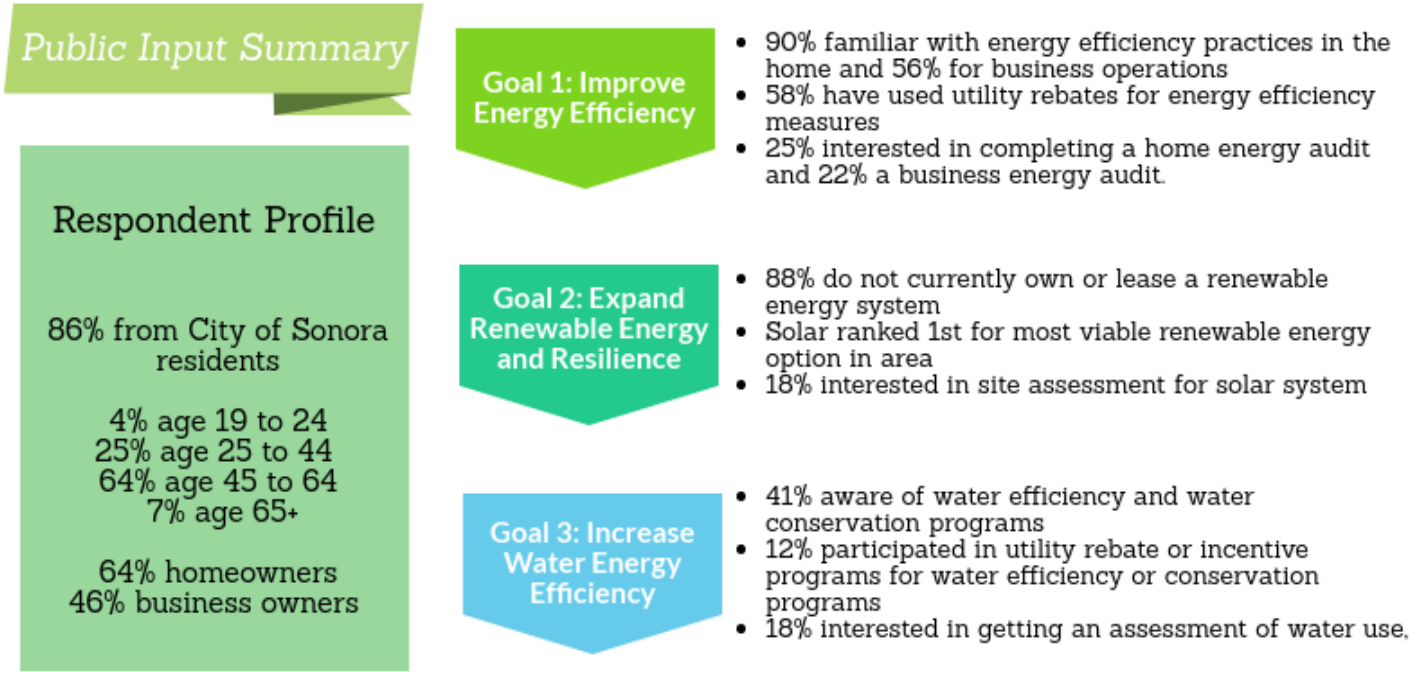
The activity is covered by the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment,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

ENERGY ACTION PLAN DEVELOPMENT

The path to the EAP began in 2017 when the City engaged Sierra Business Council (SBC) to develop a roadmap for the community to reduce energy use and costs. Energy consumption data was gathered for baseline year 2010 and the baseline energy use data was forecasted out to 2035 using local and regional growth projections validated by City staff. The data gathered during the inventory and forecasting process helped identify those activities within the community that consumed the most energy. This information pointed the way towards areas where the greatest energy-efficiency improvements could be realized, resulting in a series of goals, strategies, and actions the City and community can undertake to reduce energy use as well as money spent on energy.

Community involvement is an essential part of all successful planning efforts, and input was widely sought throughout the City to ensure the scope of the plan is appropriate, the goals are realistic, and the actions are doable. The public outreach strategy included an online survey and a community study session hosted by the Sonora Planning Commission on June 12, 2017. The online survey was kept open from May 25th, 2017 to June 30th, 2017 and received 28 responses. Both the survey and study session were publicized in the Union Democrat, at the City Hall offices, and directly distributed to more than 100 local businesses. Additionally, the plan was presented at the March 5th City Council meeting.

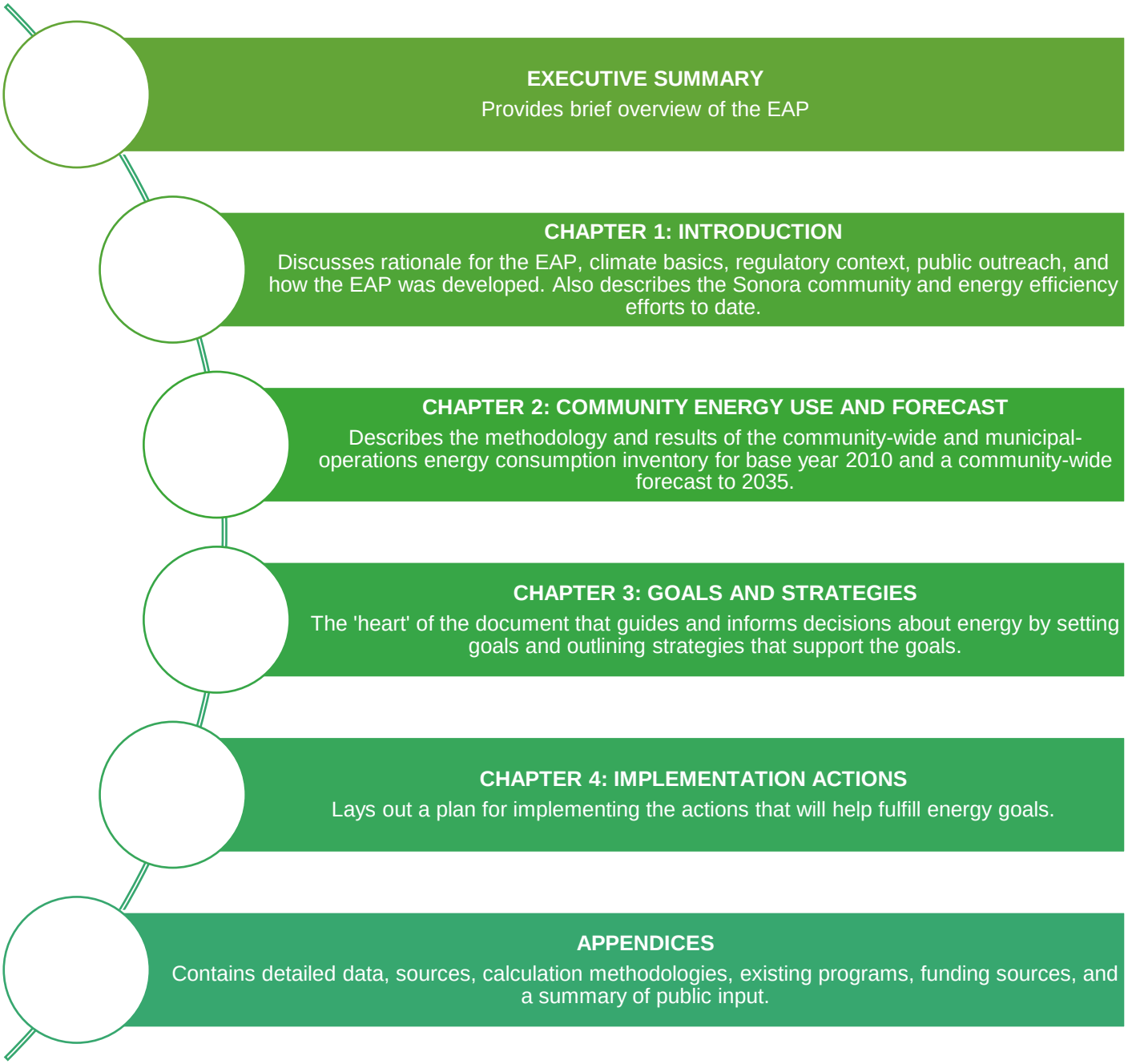
Figure 1-3: Public Input Summary



USER'S GUIDE TO THE REPORT

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

Table 1-4: Energy Action Plan Content and Organization



COMMUNITY PROFILE

The City of Sonora is the County seat of Tuolumne County and is one of the oldest cities in California. It is located on the West side of the Sierra Nevada mountain range in central California. It was incorporated on May 1, 1851 and has historically been referred to as the "Queen of the Southern Mines", located in the heart of the California Gold Country. Established as a mining town during the California Gold Rush, the City quickly evolved into the commercial center of the region.

Map of Sonora, courtesy of www.sonoraca.net

Sonora has a total area of 3.1 square miles and is intersected by California Highway 49 and bordered to the south by California Highway 108. The population of approximately 4,903 residents increases to nearly 25,000 people during the daytime due to the high number of employees and tourists entering the city. [11] The City runs its own Police, Fire, Public Works, Administrative Services, and Community Development departments. Other services the City provides include a microenterprise assistance program, loans for housing assistance, and a debris pickup program.[12] Electricity for businesses and residents in the city is provided by Pacific Gas and Electric (PG&E). Electricity for public agencies in the city is provided by Tuolumne Public Power Authority (TPPA). Propane is provided by several local and regional suppliers.

July and August are the hottest months for the city with average highs around 70 degrees Fahrenheit, while in December and January lows average around 42 degrees Fahrenheit. Sonora receives an average of 328 days of sun a year and 33 inches of rain during the wet season, January being the wettest month.[13]

LOCAL ENERGY EFFICIENCY EFFORTS

Electricity and propane are the two primary forms of energy used in the City. Electricity is distributed by PG&E and TPPA. Propane is supplied by several regional providers. Additionally, there is significant wood use as both primary and secondary heating fuel for some residents.

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

Streamlined small residential rooftop solar energy systems permitting process

The city council has adopted by resolution a Water Efficient Landscapes Manual in order to implement state and local regulations. (12.33.040)

The City has opted-in to the PG&E streetlight retrofit program.

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[11] United States Census Bureau Fact Finder, Sonora City, CA. Accessed October 17, 2017. https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml

City of Sonora Demographics. Accessed October 17, 2017. http://www.sonoraca.com/visitsonora/demographics.htm

[12] City Services. Accessed October 17, 2017. https://www.sonoraca.com/cityservices/index.htm

[13] City of Sonora Demographics. Accessed October 17, 2017. https://www.sonoraca.com/visitsonora/demographics.htm

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

Table 1-5: City of Sonora General Plan Energy and Water Efficiency Components

Housing Element	Encourage low-income homeowners or renters to apply for free energy audits and home weatherization by providing public information about the availability of energy-conservation programs and adding information to the city website regarding weatherization programs (General Plan Housing Element 3.C.9)
	Continue to enforce state energy efficiency standards as provided for in Government Code Title 24, Part 6 (General Plan Housing Element 3.C.10)
	Pursue implementing California Green Building Code or similar program for reuse and recycling of construction materials, pursue funding for loans for residential solar energy systems, encourage collection of rainwater and use of greywater systems, incorporate energy-saving features in conjunction with rehabilitation grants, and continue to support local agencies' efforts for improved in-home energy and conservation (General Plan Housing Element 3.C.13)
Conservation and Open Spaces Element	Continue participation in the Tree City USA program to preserve the quantity, quality, and diversity of healthy trees in the region. (General Plan Conservation and Open Spaces Element, 4.C.f)
Air Quality Element	Promote residential and commercial construction design that is energy efficient and maintains the area's air quality. (General Plan Air Quality Element 8.A.f)
	Establish partnership with the Amador-Tuolumne Community Action Agency (ATCAA) and Energy providers to attain state and federal air quality standards by expanding the use of EPA certified heating devices and to replace or repair stoves in Sonora which do not meet air quality standards at the state and Federal Level. (General Plan Air Quality Element 8.A.g)

CHAPTER 2: ENERGY USE & FORECAST

Chapter 2 summarizes the 2010 baseline, 2015 re-inventory and 2035 forecast of community-wide energy consumption as well as the 2010 baseline and 2015 re-inventory of municipal-operations energy consumption.

SBC completed an inventory of baseline energy use for 2010, a re-inventory of energy use in 2015, and forecasted energy consumption out to 2035 under a business as usual scenario to inform the strategies for improving energy efficiency, expanding utilization of renewable energy resources, and addressing the water-energy nexus. The baseline inventory and re-inventory serve as a benchmark against which future progress can be measured.

2010 BASELINE COMMUNITY-WIDE INVENTORY

The City's community-wide energy consumption data is expressed as aggregated residential and non-residential energy consumption by energy source. The City's municipal energy use for facilities located within the City is included with the aggregated non-residential energy use. Electricity and propane consumption were the largest energy sources in the City of Sonora built environment. In 2010, the City's community wide residential electricity consumption totaled 18,539,471 kWh, residential propane consumption totaled 1,143,480 gallons, and residential wood consumption totaled 1,529 cords. In addition, in that year, nonresidential electricity consumption totaled 41,072,137 kWh and nonresidential propane consumption totaled 760,471 gallons (See Figure 2-5). As an additional point of insight, electricity used by potable water and wastewater services provided for City residents by Tuolumne Utilities District was analyzed separately from nonresidential energy. In 2010, the City's wastewater services used 238,023 kWh of electricity and potable water services used 457,164 kWh of electricity (See Figure 2-6). It should be noted that 2010 residential and non-residential propane use was estimated using data from the 2010 Tuolumne County greenhouse gas inventory.

2015 COMMUNITY-WIDE RE-INVENTORY

Similarly to the 2010 baseline, electricity and propane consumption were the largest energy sources in the City of Sonora built environment. In 2015, the City's community wide residential electricity consumption totaled 17,061,713 kWh, residential propane consumption totaled 883,074 gallons, and residential wood consumption totaled 1,902 cords. This represents an 8.0% decrease in residential electricity use, 22.8% decrease in residential propane use and 24.4% increase in residential wood combustion. In addition, in that year, nonresidential electricity consumption totaled 41,180,580 kWh and nonresidential propane consumption totaled 745,372 gallons (See Figure 2-5). This represents a less than 0.3% increase in nonresidential electricity use and a 2.0% decrease in nonresidential propane use. As an additional point of insight, electricity used by potable water and wastewater services provided for City residents by Tuolumne Utilities District was again analyzed separately from nonresidential energy. In 2015, the City's wastewater services used 254,942 kWh of electricity and potable water services used 267,373 kWh of electricity (See Figure 2-6). This represents a 7.1% increase in wastewater services electricity use and a 41.5% decrease in potable water services electricity use. These changes in energy consumption illustrate the progress that has already been made towards achieving the 2035 energy reduction goals in this report. It should be noted that 2015 residential and non-residential propane use was estimated using data from the 2010 Tuolumne County greenhouse gas inventory and scaled based on the City of Sonora's change in occupied housing for residential propane use and employer establishments for non-residential propane use between 2010 and 2015, and then weighted by the difference in heating degree days between 2010 and 2015.

2035 BUSINESS-AS-USUAL COMMUNITY-WIDE FORECAST

The City's community-wide residential and non-residential energy use was forecasted out to 2035 under a business-as-usual (BAU) scenario and is presented in Figure 2-5. Since the City's municipal energy use is included with the community-wide energy use, a separate forecast for municipal energy use was not completed. The BAU forecast scenario was completed using the Statewide Energy Efficiency Collaborative (SEEC) ClearPath California toolkit. The BAU forecast estimates how energy use would change from 2010 to 2035 in the absence of any energy efficiency, renewable energy, or water efficiency policies or programs. The two required inputs for a forecast — baseline energy consumption data and growth rates — are presented in Appendices A and B, respectively. The baseline data was collected from PG&E and TPPA for electricity use and estimated for propane and wood use in 2010. The growth rates were calculated using projections of the number of households and in-City employment prepared by state agencies.

The City's residential energy usages were all forecasted to increase by 5.45%, resulting in 19,550,718 kWh of electricity usage (an increase of 1,011,247 kWh), 1,205,848 gallons of propane combustion (an increase of 62,368 gallons), and 1,612 cords of wood combustion (an increase of 83 cords) in 2035 (See Figure 2-5). This forecast is based on the projected change in the number of households in the City of Sonora. The annualized growth rates for the number of households in the City were calculated based on the projected change in the number of households in Tuolumne County from 2010 to 2035 reported by the CalTrans Long-Term Socio-Economic Forecast of households for Tuolumne County.[14] This projected growth would result in an additional 134 households in the City of Sonora based on the 2010 baseline of 2,463 households. The use of Tuolumne County data as a proxy for the City of Sonora for the residential forecast was justified by a comparison of County and City residential population data. Residential population data taken from California's Department of Finance shows that the population of City of Sonora has made up a slightly increasing percentage of Tuolumne County's overall population, as it rose from 8.18% in 2000 to 8.94% in 2015 (See Figure 2-1 & 2-2).[15,16]

The City's non-residential energy usages were all forecasted to increase by 19.58%, resulting in 49,115,004 kWh of electricity usage (an increase of 8,042,867 kWh) and 909,391 gallons of propane usage (an increase of 148,920 gallons) in 2035 (See Figure 2-5). This forecast is based on the projected change of in-City employment in the City of Sonora. The annualized growth rates for employment in the City of Sonora were calculated based on the actual change from 2010 to 2015 of in-County employment reported by the California Employment Development Department estimates for Tuolumne County and the projected change from 2015 to 2035 of in-County employment based on the California Department of Transportation economic forecast for Tuolumne County.[17,18] This projected growth would result in an additional 1,006 people working in Sonora based on the 2010 baseline of 5,139 people working in Sonora. The use of Tuolumne County data as a proxy for the City of Sonora for non-residential forecasts was justified by a comparison of the number of people employed within the County and the City. Employment data taken from the US Census Bureau's On the Map tool shows that the number of people employed in City of Sonora has made up between 33.0% and 35.7% of the number of people employed in Tuolumne County (See Figure 2-3 & 2-4).[19]

The City's wastewater and potable water services electricity use was forecasted to increase 5.45% to 251,101 kWh (an increase of 13,078 kWh) and 481,985 kWh (an increase of 24,821 kWh) in 2035 respectively, based on the projected change in the number of households in the City of Sonora. The annualized growth rates for the number of households in the City were calculated based on the projected change in the number of households from 2010 to 2035 reported by the CalTrans Long-Term Socio-Economic Forecast of households for Tuolumne County.[20]

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[14] Caltrans Long-Term Socio-Economic Forecasts by County – Tuolumne County 2016. http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html, Households. (Accessed June 22, 2017).

[15] California Department of Finance E-4 Population Estimates – Tuolumne County and City of Sonora 2000 - 2010. http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-4/2001-10/. (Accessed January 11, 2018)

[16] California Department of Finance E-5 Population and Housing Estimates – Tuolumne County and City of Sonora 2011 – 2015. http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/. (Accessed January 11, 2018)

[17] California Employment Development Department, Labor Market Information Division, Industry Employment & Labor Force – by Annual Average (March 2016 Benchmark). http://www.labormarketinfo.edd.ca.gov/county/tuolu.html In-County Number of Employed, All Industries (Accessed June 22, 2017).

[18] Caltrans Long-Term Socio-Economic Forecasts by County – Tuolumne County 2016, http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html In-County Total Employment, All Industries. (Accessed June 22, 2017).

[19] US Census Bureau On the Map Web Tool - Tuolumne County and City of Sonora 2002 -2015. https://onthemap.ces.census.gov/. (Accessed January 11, 2018)

[20] Caltrans Long-Term Socio-Economic Forecasts by County – Tuolumne County 2016. http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html, Households. (Accessed June 22, 2017).

Figure 2-1: Department of Finance Population Data

Department of Finance Population Data					
	Tuolumne County Population	City of Sonora Population	Tuolumne nominal % change	City of Sonora nominal % change	Sonora % of Tuolumne
2000	54,957	4,493	-	-	8.18%
2001	55,619	4,578	1.20%	1.89%	8.23%
2002	56,177	4,662	1.00%	1.83%	8.30%
2003	56,407	4,718	0.41%	1.20%	8.36%
2004	56,411	4,740	0.01%	0.47%	8.40%
2005	56,506	4,829	0.17%	1.88%	8.55%
2006	56,347	4,875	-0.28%	0.95%	8.65%
2007	56,098	4,869	-0.44%	-0.12%	8.68%
2008	55,661	4,870	-0.78%	0.02%	8.75%
2009	55,291	4,894	-0.66%	0.49%	8.85%
2010	55,365	4,903	0.13%	0.18%	8.86%
2011	55,309	4915	-0.10%	0.24%	8.89%
2012	55,249	4906	-0.11%	-0.18%	8.88%
2013	54938	4880	-0.56%	-0.53%	8.88%
2014	55082	4902	0.26%	0.45%	8.90%
2015	54663	4885	-0.76%	-0.35%	8.94%
		Total % Change	-0.53%	8.72%	
		2010-2015 % change	-1.27%	-0.37%	

Figure 2-2: Sonora Population as a Percentage of Tuolumne Population

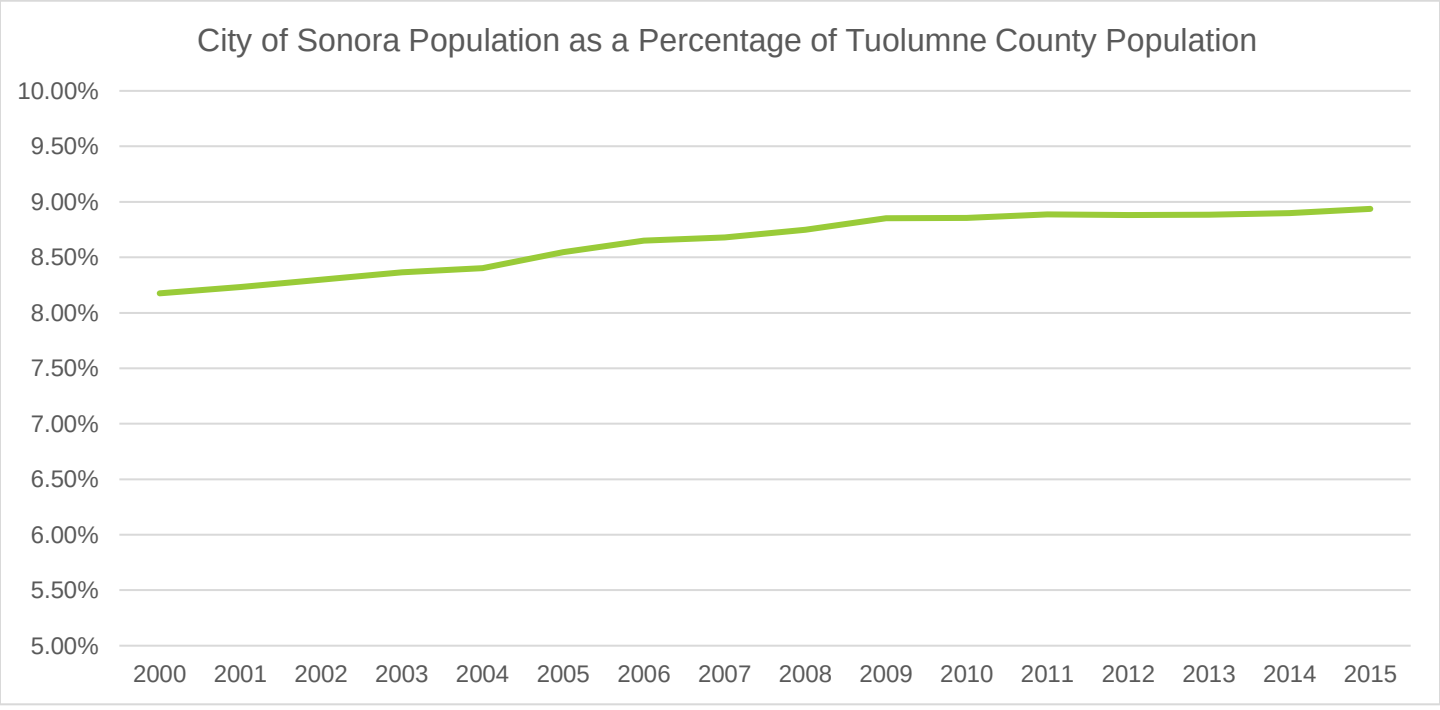


Figure 2-3: On The Map Number of Employees Data

On The Map Number of Employees Data					
	Tuolumne County Number of People Employed	City of Sonora Number of People Employed	Tuolumne Nominal % change	City of Sonora Nominal % change	Sonora % of Tuolumne
2002	15,261	5,046			33.1%
2003	15,397	5,077	0.89%	0.61%	33.0%
2004	15,468	5,232	0.46%	3.05%	33.8%
2005	15,966	5,324	3.22%	1.76%	33.3%
2006	16,253	5,316	1.80%	-0.15%	32.7%
2007	15,792	5,408	-2.84%	1.73%	34.2%
2008	15,817	5,645	0.16%	4.38%	35.7%
2009	15,363	5,218	-2.87%	-7.56%	34.0%
2010	15,226	5,139	-0.89%	-1.51%	33.8%
2011	15,540	5,338	2.06%	3.87%	34.4%
2012	14,764	5,040	-4.99%	-5.58%	34.1%
2013	15,005	5,116	1.63%	1.51%	34.1%
2014	14,540	4,644	-3.10%	-9.23%	31.9%
2015	14,970	5,043	2.96%	8.59%	33.7%
		Total % Change	-1.91%	-0.06%	
		2010-2015 % change	-1.68%	-1.87%	

Figure 2-4: City of Sonora Number of Employees as % of Tuolumne County Number of Employees

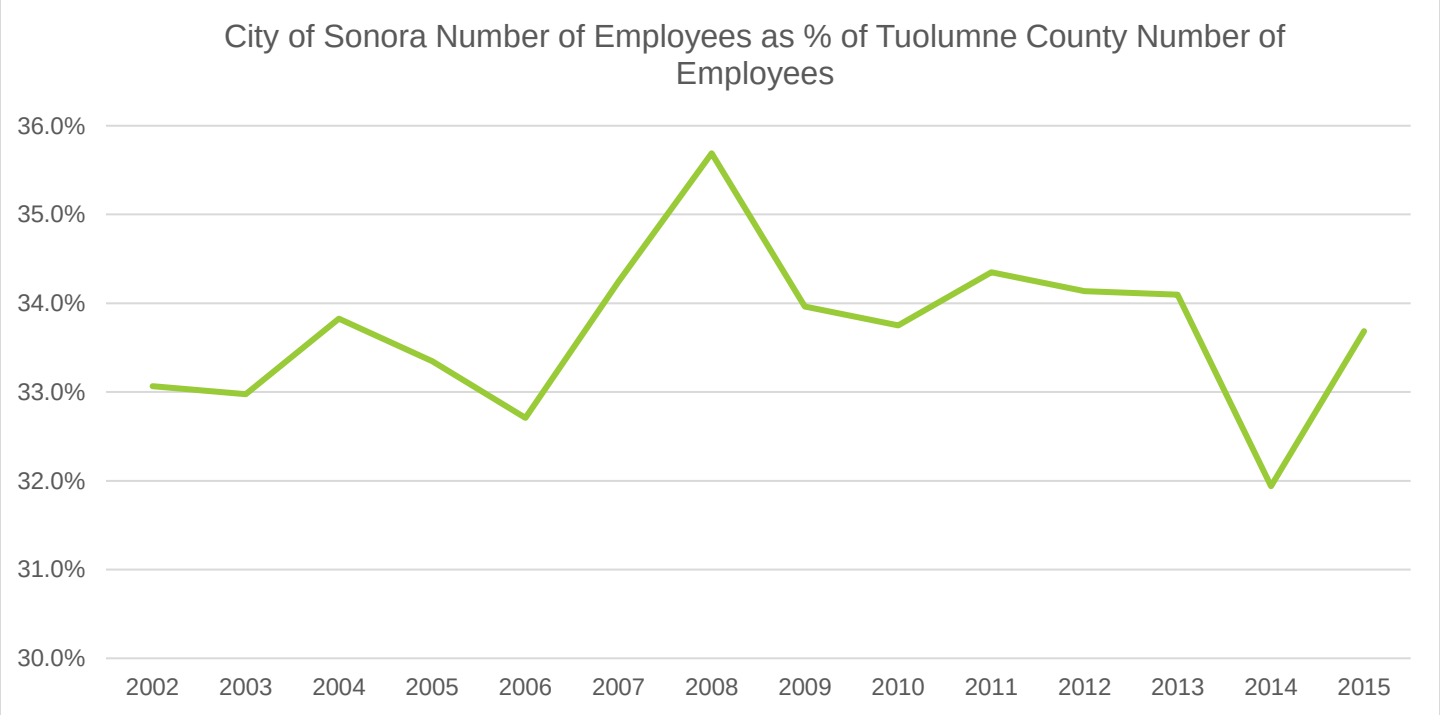


Figure 2-5: 2010 Baseline, 2015 Re-Inventory & 2035 BAU Forecast of Residential and Non-Residential Electricity and Propane Use

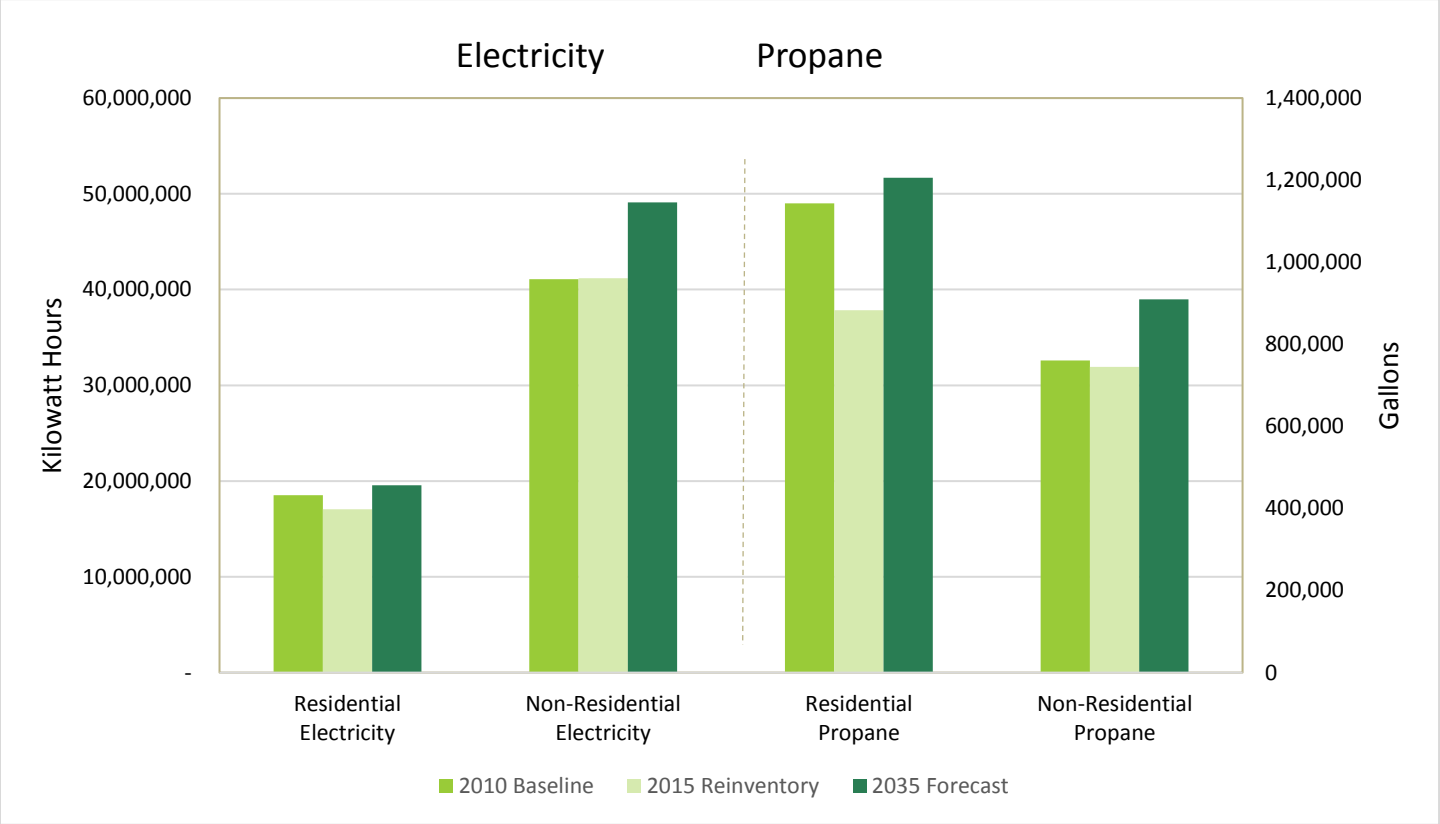
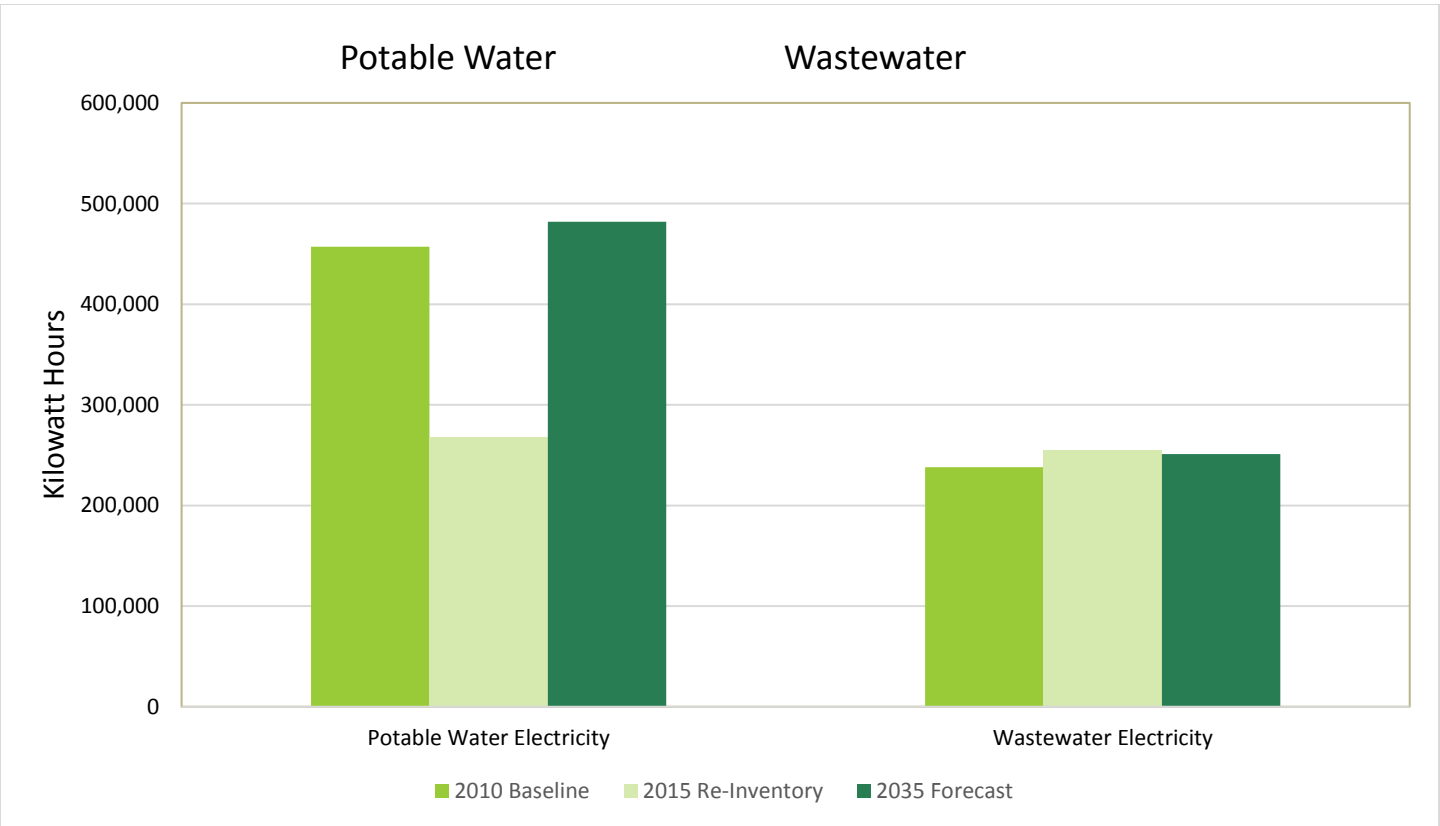


Figure 2-6: 2010 Baseline, 2015 Re-Inventory & 2035 Forecast of Water and Wastewater Services Electricity Use



2010 BASELINE AND 2015 RE-INVENTORY OF CITY OF SONORA'S FACILITIES ENERGY USE

The City of Sonora's facilities' main uses of energy, presented in Figure 2-7 and 2-8, are electricity and propane. Public lighting in Sonora, Sonora Police Department, Sonora City Hall and Sonora Fire Department used the most electricity of City facilities and the Sonora Fire Department, Public Works, and Sonora Opera Hall used the most propane. In 2010, the City of Sonora's facilities' propane consumption totaled 5,420 gallons and the City's facilities' electricity consumption totaled 640,735 kWh. In 2015, the City's facilities' propane consumption decreased by 30.1% to 3,786 gallons and the City's facilities' electricity consumption decreased by 0.9% to 634,856 kWh. These decreases in energy consumption reflect progress that has already been made toward meeting the energy reduction goals in this report. In 2010, the City facilities accounted for an estimated $104,038 worth of energy consumption. In 2015, City facilities' energy costs increased by 13.1% to $117,623. Detailed energy use is presented in Appendix A.

Figure 2-7: 2010 Baseline & 2015 Re-Inventory City of Sonora Facilities Electricity Consumption

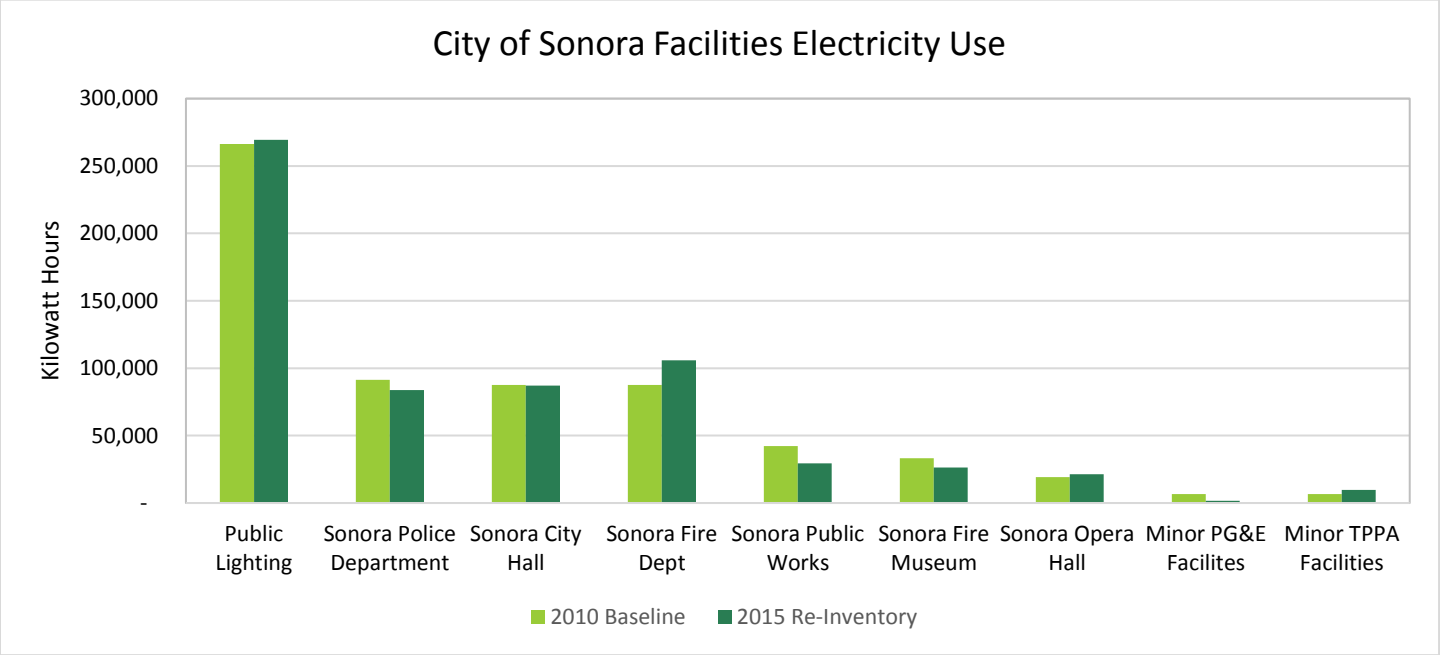
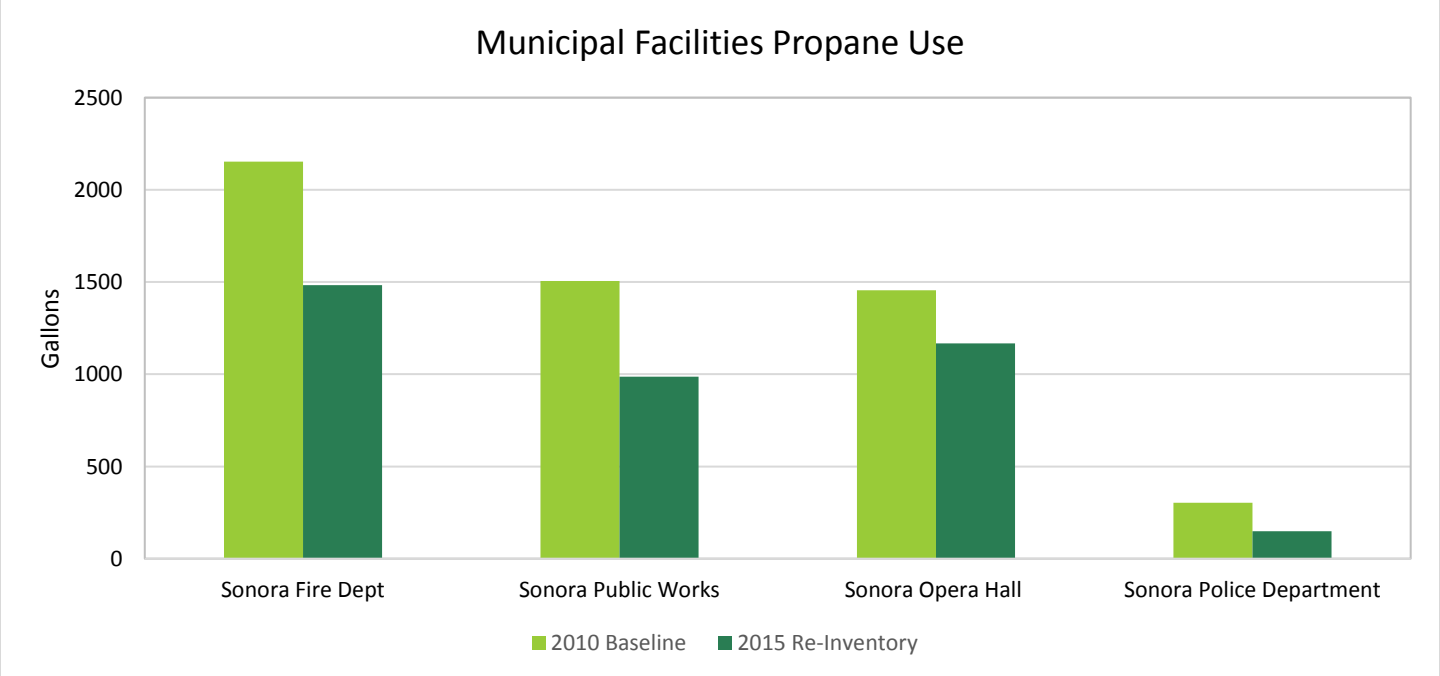


Figure 2-8: 2010 Baseline & 2015 Re-Inventory City of Sonora Facilities Propane Consumption



CHAPTER 3: GOALS & STRATEGIES

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

BASIS FOR ENERGY GOALS AND STRATEGIES

To identify the most appropriate energy-efficiency strategies for the City of Sonora the following documents and resources were reviewed:

- City of Sonora General Plan 2020[21] (Adopted May 2007)
- City of Sonora Municipal Code[22]
- Review of 2010-2015 community and municipal energy use
- Review of 2010-2016 energy efficiency PG&E program activity
- Review of 2010-2016 solar PV statistics
- Review of active energy efficiency and water conservation initiatives and programs
- Review of measures in other similar jurisdictions
- Meetings and consultation with City staff
- Public input received from community members and Planning Commission

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

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

The goals, strategies, and actions pertain to the energy consumed by buildings and facilities in the residential, non-residential and municipal sectors. Other sectors of energy usage, such as transportation, are not included in this report but could be addressed in future studies. The energy reduction potential was calculated for each goal using the baseline energy use data, the energy use forecasts, and the estimated energy savings associated with reaching specific targets. The annual energy reduction potential was calculated using top-down methods[23] to estimate energy savings achievable in 2035 by meeting the associated 2035 targets. Calculations are documented in Appendix C. The estimated potential annual energy savings in 2035 were calculated for each strategy and, where applicable, reported for residential and non-residential energy use. By implementing the EAP and through actions taken by community members and the City, the community can potentially reduce energy use by 38,184,137 kWh of electricity (55% reduction), 530,684 gallons of propane (25% reduction), and 287 cords of wood (18% reduction) in 2035. A portion of these reductions have already occurred, evidenced by the overall decreases in the consumption of most forms of energy from 2010 to 2015, as noted in chapter 2. Specifically, from 2010 to 2015 Sonora saw an 8.0% decrease in residential electricity use, 22.8% decrease in residential propane use, 0.3% increase in nonresidential electricity use, 2.0% decrease in nonresidential propane use, 6.6% increase in wastewater services electricity use and 41.5% decrease in potable water services electricity use, resulting in a total reductions of 1,542187 kWh of electricity and 275,505 gallons of propane.

[21] General Plan. Adopted May 30, 2007. City of Sonora. Accessed September 22, 2017. https://www.sonoraca.com/cityservices/commdevelop/generalplandocs/SonoraGeneralPlan2020.pdf

[22] Municipal Code. City of Sonora. Accessed September 22, 2017. https://www.sonoraca.com/cityservices/commdevelop/municipalcode.htm

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

ENERGY EFFICIENCY GOALS AND STRATEGIES

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

1st: Cost-effective energy efficiency

2nd: Cost-effective renewable energy

3rd: Conventional energy sources

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

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

The following table compares 2010 baseline energy use, 2035 business as usual forecasted energy use and potential energy use savings in 2035 with the successful implementation of the EAP strategies and actions. The majority of energy savings are attributed to existing structures and would have significant impact in the community regardless of the projected new construction. A critical way of achieving the energy savings estimated in this plan is by convening a Working Group that focuses on implementing the plan. In order to complete the actions in the Implementation Plan, it is recommended that with coordination assistance of the Local Government Commission's CivicSpark AmeriCorp fellow, the Working group can assist with implementation and alleviate the demand on City staff time. The Working Group should be comprised of representatives from the City, Tuolumne County, Tuolumne Utilities District, Tuolumne County Resource Conservation District, Amador Tuolumne Community Action Agency, Sonora School District, PG&E, Tuolumne County Association of Realtors, the business community, and residents.

Table 3-1: Summary of 2010 Baseline and 2035 BAU Forecast Energy Use and Potential 2035 Energy and Cost Savings

Energy Use	2010 Baseline	2035 BAU Forecast	2035 Potential Energy Savings	2035 Potential Cost Savings[24]	Percent Difference
Electricity	60,306,795 kWh	69,398,808 kWh	38,184,137 kWh	$8,018,669	55% reduction from 2035 BAU
Propane	1,903,951 gallons	2,115,239 gallons	530,684 gallons	$1,332,018	25% reduction from 2035 BAU
Wood	1,529 cords	1,612 cords	287 cords	$78,997	18% reduction from 2035 BAU

[24] Forecasted composite rate for 2035 of $0.21 per kWh based on SBC forecast of PG&E and TPPA Rates, 2035 average rate of $2.51 per gallon of propane based on 2010 Energy Information Agency West Coast Annual Average Retail Prices. Accessed September 22, 2017. http://www.eia.gov/dnav/pet/pet_sum_mkt_dcu_R50_a.htm, and 2010 average of $275 per cord estimated based on local listings for soft and hardwood.

Table 3-2: City of Sonora Energy Action Plan Goals and Strategies

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

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

Target Audience
Residents
Businesses
Public Agencies

Projected Energy Savings
11,792,741 kWh of electricity
326,097gallons of propane
235 cords of wood

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

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

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

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

Since 2010, City of Sonora residents and businesses have saved 4,794,107 kWh of electricity through PG&E rebate and incentive programs. As technology continues to improve, there is significant opportunity for residents and businesses to save more energy through efficiency improvements. Energy efficiency improvements make homes, offices, and facilities more comfortable, safe, and sustainable while reducing energy bills and operational costs. The improvements also increase the value of the property. The first way to encourage participation is by ensuring that community members, both residential and non-residential, understand the benefits of energy efficiency, simple ways they can practice being more efficient, and are informed of the wide variety of energy efficiency programs available for participation. The Implementation Program in Chapter 4 describes the actions that support this strategy in more detail.

Common energy efficiency practices for existing buildings include retrofitting indoor and outdoor lighting, refrigeration and Heating, Ventilation and Air Conditioning (HVAC) systems to more efficient technology. Other common practices include ensuring proper weatherization practices are in place, upgrading windows and insulation to maintain comfort without requiring significant energy use. Additionally, PG&E offers Time-of-Use rate plans, which helps support energy management by incentivizing energy use during times of low demand when energy costs are low and discouraging energy use during times of high demand when costs are high. By shifting behaviors to accommodate times of high demand, residents and businesses can save money.

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

There is significant opportunity to achieve high levels of energy performance in new development projects, and in large renovations through utilizing new technology, advanced materials, and holistic design. Since 1977, when the first California Energy Efficiency Standards were implemented, the required measures have saved Californians billions of dollars in reduced electricity bills.[25]

In Sonora, nearly 76% of the housing stock or 1,898 of the 2,497 housing units were built prior to the adoption of the state's first Title 24 Energy Efficiency Standards in 1978 and the non-residential building stock is likely similarly dated.[26] While there are certain challenges to renovating historic buildings, energy reduction goals for these buildings is feasible with well-planned and implemented energy efficiency improvements that take into account not only the potential energy savings, but

[25] Energy Efficiency Standards. California Energy Commission. Accessed September 22, 2017. http://www.energy.ca.gov/efficiency/savings.html

[26] U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates, Selected Housing Characteristics, City of Sonora, CA. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_DP04&prodType=table

also the protection of the historic property's materials. The number of historic and older buildings that make up a significant part of Sonora's housing and building stock presents a unique opportunity for energy efficiency renovations. Historic buildings can take advantage of the Federal Historic Preservation Tax Incentive program.[27] The National Park Service of the U.S. Department of the Interior prepared a Preservation Brief on Improving Energy Efficiency in Historic Buildings that details the inherent energy efficient features of historic buildings and the opportunities to improve the efficiency through minimal alteration of the buildings.[28] The City of Sonora General Plan identifies preserving and promoting the cultural heritage as an important goal for the City, and energy efficiency improvements can be incorporated into preservation efforts to reduce operational costs and help the City meet historic preservation goals.[29]

Due to a rapidly evolving field and advancements in technology, Title 24's Energy Efficiency standards are updated every 3 years, and it is important that designers, planners, building inspectors, and contractors maintain a current, working knowledge of the standards. Additionally, there are numerous opportunities in the design phase for new developments and renovation projects to achieve savings through holistic design.

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

STRATEGY 1.3: IMPROVE THE ENERGY EFFICIENCY OF CITY BUILDINGS, FACILITIES, AND OPERATIONS.

The 2010 baseline municipal operations inventory indicated that the City consumed 374,383 kWh of electricity for City facilities and 266,352 kWh of electricity for public lighting. The facilities using the most electricity were the Public Lighting (42%), Sonora Police Department (14%), the Sonora City Hall (14%), and the Sonora Fire Department (14%). Additionally the City consumed 5,419 gallons of propane. The three largest consumers were the Sonora Fire Department (40%), Sonora Public Works Facility (28%), and the Sonora Opera Hall (27%). Measures taken to improve the energy efficiency of these facilities will improve staff workspaces and reduce operational costs, thus allowing the City and public agencies to allocate money from savings elsewhere. The City has begun increasing the energy efficiency of public lighting by opting in to PG&E's LED streetlight retrofit program.

Best practice is to benchmark building energy use with the U.S. EPA's free online software, Energy Star Portfolio Manager. It allows users to track the energy use of buildings or facilities, determine their efficiency, and evaluate opportunities to save energy and money. The facilities with the greatest energy use or highest energy intensity should be targeted for energy audits and retro-commissioning[30] to optimize energy performance and identify opportunities for energy efficiency projects.

[27] U.S. Department of the Interior, National Park Service, Federal Historic Preservation Tax Incentives. https://www.nps.gov/tps/tax-incentives.htm

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

[29] Sonora General Plan 2020, Cultural Resources, 9.5: Goals, Policies, and Implementation Programs.

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

Case Study – Retail LED Light Upgrade

Benjamin Fig *Gift Shop*

129 South Washington Street | Sonora, CA 95370 | (209) 532-5081

"Everything went quite smoothly. We saved a ton of money and a ton of energy. [The Sierra Nevada Energy Watch staff] did a really good job, I was really impressed with how smoothly and quickly it all happened. I have recommended [the program] to colleagues."

- Mark Endicott, Manager

Benjamin Fig, located in downtown Sonora, features Eastern Indian-themed jewelry, clothing, gifts, incense, figurines, pet collars and leashes, as well as many other unique artifacts from around the world. A long-time local favorite, Benjamin Fig won the 2017 Lodestar Award for Best Gift Store in Tuolumne County.

In 2014, Manager Mark Endicott contacted the Sierra Nevada Energy Watch (SNEW) team after hearing about the program's no-cost audit and incentivized lighting retrofit services. The team completed the upgrade of roughly 100 halogen and track light bulbs to LEDs in March of 2015.

The total cost of the project before PG&E incentives was $2,506.20. With an incentive of $1,880.85 covering 75% of the cost, the final cost for the project was $625.35. Based off of kWh savings, this project paid for itself in roughly 4.5 months, with an estimated savings of 9,303 kWh (roughly $1,682.86) annually.

Endicott notes that the appearance of the merchandise and the store changed very little, as the LEDs were very similar to the color rendition and brightness of the previous lights. Though Endicott has also bought commercial Costco LEDs for his home, he says they are not nearly as well functioning and have a high failure rate – compared to the store's new LED bulbs, none of which have ever burnt out, despite the fact that some of the lights operate 24 hours, 7 days a week. Endicott estimates additional savings at $100/month just from the completely eliminated cost of replacing lights.

Ironically, some of the energy previously used to run the old lights is now used for running the heater in the winter months, as the old halogen and incandescent bulbs used to heat the store. Despite this, Mark still saves money on overall energy costs since the replacement, and he no longer has to run the AC as much in the summer months to cool off radiant heat from the light bulbs. He says the next step is upgrading the store's heat pump system.

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

Target Audience
Residents
Businesses
Public Agencies

Projected Energy Savings
26,096,462 kWh of electricity
204,587 gallons of propane
52 cords of wood

Benefits
Reduced Energy Costs
Increased Resiliency
Improved Air Quality

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

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

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

California's Zero Net Energy (ZNE) goals as part of the California Building Energy Efficiency Standards are for new residential construction to be built to achieve ZNE standards by 2020 and new commercial construction by 2030. A ZNE building produces as much energy through clean, renewable resources as it consumes over the course of a year.[31] These buildings are high performing, highly efficient, more resilient to economic and climate changes, offer more comfortable homes with higher resale value, and more productive workspaces. Achieving ZNE in new construction will help property owners and renters save money on energy costs, foster technological innovation, and improve the workforce skillset in Sonora and surrounding areas to meet these standards. The California Energy Commission's (CEC) Local PV Ordinance Cost Effectiveness Study determined that incorporating a solar PV system in all single family and multifamily new construction is currently feasible and cost effective in all climate zones in California.[32] The City should provide information from the CEC to developers of new construction projects on the feasibility and cost effectiveness of incorporating solar PV systems into the construction process.

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

Since 2010, 317 residential and 5 non-residential solar PV systems have been installed in the City of Sonora producing an estimated 3,640,474 kWh of electricity annually. The City has also taken steps to streamline the permitting process to reduce costs for installing solar PV systems as mandated by AB 2188. There is still significant opportunity for property owners and renters to benefit from local solar PV systems. The most common barriers to renewable energy include property ownership, site obstacles (i.e. shading and structural integrity), and financing. To address these barriers, the U.S. Department of Energy and State of California have launched initiatives to increase access to innovative financing mechanisms and ownership structures. The innovative financing mechanisms include the Residential Energy Efficiency Loan (REEL) Program which provides subsidized loans for energy efficiency projects and other home improvement projects and Property Assessed Clean Energy (PACE) programs which allow property owners to finance energy efficiency, water efficiency, and renewable

[31] California ZNE Communications Toolkit. July 2013. Energy Upgrade California. Accessed September 22, 2017. http://newbuildings.org/sites/default/files/ZNE_MessagePlatform.pdf

[32] California Energy Commission, Local PV Ordinance Cost Effectiveness Study, http://docketpublic.energy.ca.gov/PublicDocuments/17-BSTD-01/TN217290_20170425T110520_Model_Solar_Ordinance_Cost_Effectiveness_Study.pdf - Accessed October, 25, 2017.

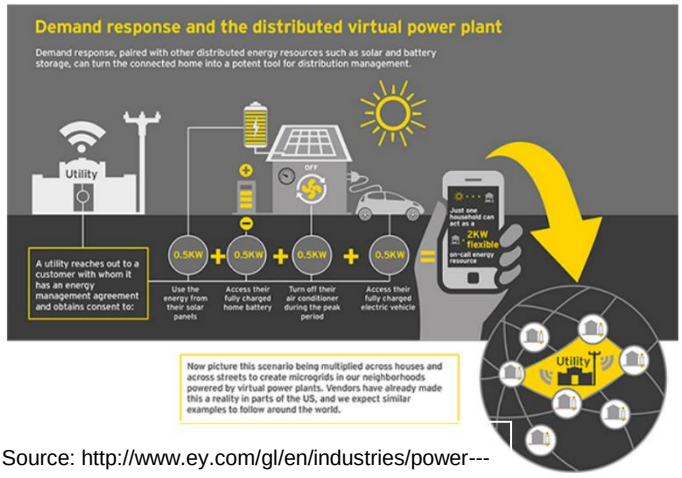
energy upgrades through low interest loans that are paid back through an assessment on their property taxes. Additionally, installing solar PV systems do not trigger a reassessment of home value which could otherwise increase property taxes. Finally, collaborative solar procurement and community solar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

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

The City should encourage other public agencies in the community to show leadership by installing solar at public facilities to offset their electricity use or by providing sites for community solar projects. While public agencies in Sonora already receive renewable electricity for most of their operations from the New Melones hydroelectric facility, the agencies could still benefit from local solar projects that would have guaranteed electricity costs for up to 30 years, stimulate the local economy by contracting with local businesses, and serve as a reminder to community members of the benefits of local solar projects. The projects would also give the agencies more local control over their energy, allow for integration with storage to increase resiliency, and free up the hydroelectric resources for other uses.

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

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



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

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

Case Study – Zero Net Energy Building

Greenlee Home

Zero Net Energy Building

16713 Greenlee | Truckee, CA 96161 | (530) 448 9692
Chris Worcester, Solar Wind Works | chris@solarwindworks.com

The goal of a zero net energy (ZNE) building is to create enough renewable energy on site to satisfy the building's annual energy needs. The "green home" on Greenlee in Truckee exemplifies a completely off-the-grid net-zero lifestyle through building, landscape, and lifestyle design. In the late 70's Chris Worcester and his brother applied their expertise in energy-efficient design and system services to construct the eco-conscious Greenlee home from scratch.

"It's so doable. You do earn it. You do have to put in your own sweat equity to live a sustainable lifestyle. But the reward is greater at the end of the day."

- Chris Worcester, Solar Wind Works

The Greenlee house is a 3000 square foot, 3 bedroom, 2 bathroom home on 5.7 acres. It features photovoltaic solar panels and high-efficiency appliances designed for off-grid use. The house is designed to optimize natural heat retention and cooling through passive solar design aspects. These include the solar gain through the abundant south-facing double and triple-paned windows, passive cooling in the daylight basement food pantry, and innovative thermal convection loops throughout the home that draw heat from the integrated stone and brick-insulated greenhouse.

Additional energy-efficient features include extra mass built into the tile floors, walls and exterior insulation around the basement's foundation for winter heat storage and summer cooling insulation. Heating is further retained during winter months with highly insulating thermal honeycomb window shades. The EPA II rated Lopi Wood Stove is supplied by sustainably harvested wood from the property and efficiently heats the house, while also supporting the innovative convective water heating system. Most all of the interior lights are compact fluorescent or LED. Industrial 20 year batteries, 120 VAC inverters and a backup propane generator supply uninterrupted power.

Water efficiency is achieved with a solar powered well pump, on-site spring water, and a pump free solar and wood fired hot water system which runs through a thermal syphon to the third floor hot water tank. Composting toilets and the septic system conserve water, and the home's greywater has occasionally irrigated the orchard.

All construction of the house was appropriately permitted with standards that exceed ZNE guidelines for increased longevity and stability/safety during natural disasters. Many eco-friendly high-end and repurposed construction materials and methods were also incorporated, such as organic oil-based finishes and salvaged wood from disassembled structures.

GOAL 3: **SUPPORT INCREASED EFFICIENCIES OF SOURCING, TREATING, DELIVERING, AND USING WATER RESOURCES**

Target Audience
Residents
Businesses
Public Agencies

Projected Energy Savings
294,934 kWh

Benefits
Reduced Energy Costs
Improved Drought Resiliency

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

STRATEGY 3.1: SUPPORT TUOLUMNE UTILITIES DISTRICT'S OUTREACH AND EDUCATION EFFORTS BY PROVIDING INFORMATION ON EXISTING AND FUTURE PROGRAMS.

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

Based on the 2013 California Water Plan Update, use of more water efficient toilets, showers, faucets, and washing machines in addition to leak detection could reduce water usage by 15 gallons per capita per day (GPCD), a 25% reduction from typical daily residential water usage of 62 GPCD. The City should provide information about the programs TUD provides to help customers save water and money including toilet and shower head rebates, water conservation information, and free advice from Master Gardeners in Tuolumne County.[34]

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

STRATEGY 3.2: ENCOURAGE TUOLUMNE UTILITIES DISTRICT TO REDUCE WATER LOSSES THROUGH PROACTIVE LEAK DETECTION PROGRAMS.

Old and aging water infrastructure often results in high water losses through leaks, inaccurate meters, and water theft. Studies have estimated that these leaky and outdated systems waste an estimated 14 to 18 percent (5.9 billion gallons) of daily water use in the United States.[35] A survey of California water agencies found water losses in California to range from

[33] California Water Plan Update, Chapter 3. Urban Water Use Efficiency. 2013. - Accessed September 22, 2017. http://www.water.ca.gov/calendar/materials/vol3_urbanwue_apr_release_16033.pdf

[34] Tuolumne Utilities District, Water Conservation Programs. http://www.tudwater.com/water-conservation/ - Accessed October 25, 2017

[35] "The Case for Fixing Leaks." November 2013. The Center for Neighborhood Technology. Accessed September 22, 2017. http://www.cnt.org/sites/default/files/publications/CNT_CaseforFixingtheLeaks.pdf

5% to 30%.[36] When systems are leaky, they also need more pressure to move water along the pipeline and into homes and businesses. Higher water pressure requires a significantly more energy and equally heavy costs. By addressing leaks proactively with a leak detection program, TUD can ensure that the community is receiving water efficiently, reduce the extra costs associated with treating and pumping the lost water, and identify customer side leaks or faulty meters. Typically water losses of greater than 5% can cost effectively be reduced through a proactive leak detection program.

In order to understand the scale of water losses, the City should encourage TUD to 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.[37]

STRATEGY 3.3: ENCOURAGE TUOLUMNE UTILITIES DISTRICT TO IMPROVE THE EFFICIENCY OF THEIR OPERATIONS.

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

As technology in water sourcing and water treatment equipment is becoming more efficient, water agencies should look into potential funding for retrofits of old, inefficient equipment. Improving the efficiency of high energy consuming equipment at the water and wastewater facilities can decrease the amount of energy required to source, treat, and deliver water as well as the energy required to collect, treat, and dispose of wastewater. Improving the agency's water use efficiency can be done by implementing automatic meter reading at water end uses to increase water efficiency monitoring, and by reusing treated wastewater in appropriate applications to avoid energy use associated with traditional water treatment and distribution practices. Wastewater facilities can produce some or all of their own electricity and space heating by capturing and burning the biogas produced in the wastewater treatment anaerobic digester process, effectively creating a closed-loop energy system.[38]

[36] California Department of Water Resources, Leak Detection Resources. http://www.water.ca.gov/wateruseefficiency/leak/ - Accessed November 16, 2017

[37] Resources & Tools. American Water Works Association. Accessed September 22, 2017. http://www.awwa.org/resources-tools.aspx

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

Case Study – LEED Certified Building

Briar Patch Co-op

Local Sustainable Food and Grocery Store

290 Sierra College Drive | Grass Valley, CA 95945

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

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

- Chris Maher, Manager

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

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

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

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

Notable sustainability measures built into construction include:

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

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

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

CHAPTER 4: IMPLEMENTATION PLAN

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

The implementation plan breaks the strategies into achievable steps and discrete actions, identifies if actions are specific to municipal agencies or the community at large, and lays out a timeline for completion of each action. The timeline for achievement of the actions outlined here is broken down into four years based on the priority and efficacy of the actions. Completion of actions should be tracked annually and the plan should be reevaluated for effectiveness at the end of the 4 year timeline. Through the Institute for Local Government's Beacon Program, SBC can assist the working group to track actions on an annual basis and evaluate their effectiveness. Finally, the implementation plan summarizes best practices in the energy action plan implementation field to provide context and additional guidance in achieving the goals of the EAP.

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

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

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

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

IMPLEMENTATION TIMELINE

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

The implementation actions in the following table also address suggestions brought forth by community members during the June 12, 2017 community meeting. These include actions that promote wood smoke mitigation, involve the realty sector and transient occupants, and utilize biomass.

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

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

Table 4-1: EAP Implementation Timeline

City Actions	
2018	☐ Promote existing energy-efficiency, water-efficiency & renewable-energy programs and best practices by providing information when available at city offices and on the City website. (1.1, 3.1, 2.2) ☐ Develop a public recognition system for businesses that audit & retrofit their facilities. (1.1) ☐ Join Institute for Local Government's Beacon Program in order to receive assistance in tracking community and municipal energy use and best practices (1.1, 1.3) ☐ Provide information regarding no-cost Title 24, Part 6 trainings for plans examiners, building inspectors, architects, designers, & contractors at city offices and on the City website. (1.2)
2019	☐ Conduct building audits to benchmark energy and water use in facilities & identify cost-effective retrofit projects. (1.3, 3.1) ☐ Encourage new construction & renovation projects to participate in the no-cost Savings by Design program offered by PG&E. (1.2) ☐ Provide heat gain mitigation information when available for streets & parking lots (i.e. light-colored building & paving materials, landscaping, green roofs, shade trees & other green infrastructure). (1.1) ☐ Provide information when available on incentives, resources, trainings, & funding opportunities for achieving Title 24 ZNE goals. (1.2, 2.1)
2020	☐ Retro-commission facilities to maximize energy performance & complete cost-effective retrofit projects. (1.3) ☐ Provide information when available on the benefits of incorporating renewable energy and storage systems into retrofit projects & new construction. (2.1) ☐ Consider adopting purchasing guidelines & energy-efficiency analysis requirements in RFPs. (1.3)
2021+	☐ Consider adopting on-site renewable energy at feasible City facilities. (2.2) ☐ Encourage and participate in bulk purchasing of energy storage systems to support grid reliability and community resilience. (2.3) ☐ Encourage broadband infrastructure in new development proposals to ensure optimal connectivity for IT controls & networks of operating systems. (2.3)

Working Group Actions	
2018	☐ Promote existing energy-efficiency, water-efficiency & renewable-energy programs and best practices through outreach events in the community. (All Strategies) ☐ Assist Sonora schools in offering an educational energy event, curriculum, or workforce training. (1.1) ☐ Assist ATCAA with a "weatherization blitz" targeting low income & older homes for upgrades. (1.1) ☐ Encourage tenants & landlords to incorporate elements of energy efficiency in lease agreements. (1.1) ☐ Identify funding for Tuolumne County Air Pollution Control District's wood stove rebate program & encourage residents to participate.(1.1) ☐ Promote no-cost Title 24 trainings and resources available (1.2)
2019	☐ Partner with realtors to encourage homeowners and commercial property owners to audit and retrofit their homes and commercial buildings to increase selling prices, comfort, and energy performance. (1.1) ☐ Encourage renters to collaborate with property owners on community renewable energy projects. (2.2) ☐ Encourage property owners to consider projects that utilize renewable energy & incorporate storage. (2.2) ☐ Encourage hotels and tourist organizations to educate visitors about water & energy efficiency. (1.1, 3.1) ☐ Assist TUD & Sonora High School to coordinate a water wise student education program. (3.1) ☐ Assist TUD to redesign water bills to reduce water waste, install demonstration gardens, develop new water-efficiency programs, & market programs. (3.1)
2020	☐ Partner with local organizations, other jurisdictions, & businesses to coordinate energy audits & for bulk purchasing of energy efficient equipment & appliances. (1.3) ☐ Assist TUD to complete Leak Loss detections on agency water systems. Recommend completion of Leak Loss detection to other water system operators. (3.2) ☐ Assist TUD to complete water audit and promote leak loss detection trainings for Tuolumne Utilities District staff. (3.2)
2021+	☐ Encourage businesses to participate in PG&E's Demand Response Program to reduce energy use during peak demand. (2.3) ☐ Work with internet service providers to support and expand broadband infrastructure projects. (2.3) ☐ Promote energy audits of potable water and wastewater systems. (3.3) ☐ Assist TUD to implement cost-effective energy-efficiency projects of potable water and wastewater systems. (3.3)

IMPLEMENTATION BEST PRACTICES

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

REGULAR EMISSIONS INVENTORIES

Community-wide emissions inventories provide the best indication of the overall effectiveness of the plan, although it will be important to reconcile actual growth in the City versus the growth projected in the forecasts developed for the EAP. Conducting these inventories periodically, instead of annually, will allow direct comparison to the 2010 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.

It will be important to understand the effectiveness of each strategy in order to prioritize future actions. Evaluating strategy performance will require data on community participation rates and the associated energy savings. With the support from PG&E, the City 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 City should be prepared to evaluate and revise the actions and approach to strategies over time. It is likely that new information, technology and programs will emerge; therefore, the City must be ready to take advantage of these opportunities. Additionally, the City should track progress on an annual basis through participation in the Institute for Local Government's Beacon Program.

PUBLIC OUTREACH

The greatest barriers to energy efficiency upgrades are lack of information about efficiency practices and scarcity of low-interest financing to offset initial costs. The Working Group can promote existing energy efficiency programs, and collaborate on activities such as hosting an energy fair event, or creating new outreach campaigns that encourage people to make energy-efficiency improvements within their living and work environments. Moreover, encouraging the community to reduce energy use during peak load periods can ensure that energy needs are met even in times of emergency, as in extreme heat conditions. Conservation tips for reducing peak load include: setting thermostats at 78° or higher and turning them off when away, cooling with fans and drawing drapes during hot summer days, turning off unnecessary lights and appliances, and using major appliances in the morning or late evening.

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

The City should also link to resources and tools available for making informed decisions on renewable energy, financing options, and the permitting process. PG&E offers customers an opportunity to participate in a Community Solar program in which they can utilize renewable energy if they lack the capacity to support renewable infrastructure. The Working Group should work with utilities, community organizations and local banks to expand and promote available renewable energy financing programs – many of which can be found on California's Go Green Financing website. Additionally, there are new financing mechanisms such as power purchase agreements, solar leases and Property Assessed Clean Energy (PACE) financing options available where property owners can receive the benefits of solar power with little to no upfront costs. The

federal renewable energy tax credit provides homeowners and commercial property owners with a tax credit for 30% of qualified expenditures through 2019 and then stepping down to 26% in 2020, 22% in 2021, and 10% after 2022.

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

TITLE 24 PART 6 – BUILDING ENERGY EFFICIENCY STANDARDS

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

The City should provide information from Energy Code Ace, which offers free tools, trainings and resources on Title 24, Part 6 to assist the building industry, related stakeholders, and the public in complying with the 2016 Building Energy Efficiency Standards. The Working Group, along with support from the CivicSpark fellow, should partner with local contractor associations and related building industry groups to provide opportunities for the building workforce to attend Title 24 energy efficiency and green building trainings.

HIGH PERFORMANCE & GREEN BUILDING EDUCATION AND RECOGNITION

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

Providing incentives for energy-efficient and green buildings, such as priority permit review, encourages developers to explore incorporating energy-efficient and green-building features into their projects, which can save the property owners and tenants money over the life of the building, improve the health of tenants and increase the value of buildings. Reduced permitting time can be an effective incentive because it can translate to significant savings for developers that are paying interest on construction or bridge loans during the permit approval process. Recognition by the City can also be an effective incentive for developers to pursue green building certification or exceed the Energy Efficiency Standards. According to the Appraisal Institute[39], green building certifications significantly increase the value of buildings through improved rental income, higher occupancy, lower operating costs, and lower risks.

STREETLIGHTS

Upgrading streetlights is one of the easiest, most cost-effective energy efficiency actions a municipality can take. The City of Sonora has already begun this process, and the city streetlight upgrade is an on-going project. In 2010, the City used

[39] Green Building Resources. The Appraisal Institute. Accessed September 22, 2017. http://www.appraisalinstitute.org/education/education-resources/green-building-resources/

266,352 kWh for public lighting. Typically, traditional street lights can be upgraded to LEDs and achieve savings between 50-70% of energy use – which could equate to more than 130,000 kWh saved in Sonora.

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. The City has opted in to PG&E's retrofit program for full turnkey LED replacement services for PG&E owned and operated street lights. For street lighting that are not owned or operated by PG&E, the City may be offered incentives for a lower rate change and LED replacement.

ZERO NET ENERGY

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

To make the ZNE design process easier, more efficient, and more affordable, the City and Working Group should encourage ZNE through actions such as: (1) remove barriers that hinder ZNE development and streamline permitting; (2) partner with organizations that can provide ZNE resources, trainings and assistance for planning and building staff, designers, and building contractors; (3) evaluate strategies to expand renewable systems through American Solar Transformation Initiative (ASTI)[40] and other DOE programs; (4) evaluate the potential for residential and non-residential sectors of the City to incorporate renewable energy; (5) create an awards-based recognition for achieving ZNE; and finally (6) the City should encourage building electrification and ultra-low energy performance design protocols, such as the following steps promoted by the American Council for an Energy Efficient Economy (ACEEE) [41].

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

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

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

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

GREEN INFRASTRUCTURE AND HEAT GAIN

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

The City can optimize these effects by providing information on the benefits of reducing cooling loads during summer months and optimizing heat gain in winter months. Examples include land use and new construction requirements, such as tree standards for existing streets and parking lots, heat gain mitigation requirements for new parking lots (through the use of shade structures, trees or cool pavement, etc.), and cool roofing requirements for new construction. Large shade structures can also accommodate solar panels, thus serving a dual purpose and creating a co-benefit for the community.

CROSS-SECTORAL AND INTER-JURISDICTIONAL PARTNERSHIP

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

The Working Group can facilitate the partnerships between public agencies and special districts in Sonora that are not under the jurisdiction of the City to reach the broader public that these agencies serve. For example, assisting the school district with the development of an energy efficiency education program, which can include educational presentations, hands-on learning activities, and energy fair events.

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

FINANCING AND ALTERNATIVE FUNDING PROGRAMS

The up-front costs of energy-efficiency improvements can be a considerable barrier for many homeowners and businesses. 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, and Property Assessed Clean Energy (PACE) programs.

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

PACE programs are financing tools that allow residential and non-residential property owners to receive financing for energy-efficiency, clean-energy and water-efficiency projects, which are repaid through a voluntary special assessment on property

tax bills. There are several organizations in California that provide access to PACE financing programs at no cost to local governments. By opting into multiple programs, the City can help establish a competitive marketplace for PACE financing.

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

THE PATH TO SUCCESS

Achieving the goals of the EAP will require collective action by the City, public agencies, residents and business owners. While there are significant costs associated with energy efficiency, renewable energy, and water efficiency projects, the long term savings and co-benefits to the community greatly outweigh the costs. Additionally, upfront costs can be deferred through financing and incentive programs that can make projects cash flow positive from day one.

In order to complete the actions in the Implementation Plan, it is recommended that the City designate a community Working Group to complete the implementation actions designated for the Working Group. The Working Group should be comprised of representatives from the City, Tuolumne County, Tuolumne Utilities District, Tuolumne County Resource Conservation District, Sonora School District, Amador Tuolumne Community Action Agency, Tuolumne County Association of Realtors, the business community, and residents.

The City has opted to take part in the Local Government Commission's CivicSpark AmeriCorps program and will receive assistance on implementation from a CivicSpark fellow through August 2018. The CivicSpark fellow will be able to coordinate the working group, provide capacity for City staff to complete implementation actions, and connect the City with outside agencies and regional organizations to leverage existing activities to assist with implementation.

APPENDICES

APPENDIX A: CITY OF SONORA 2010 BASELINE AND 2015 RE-INVENTORY ENERGY USE

Appendix A summarizes the 2010 baseline and 2015 re-inventory energy use data used in the development of the Energy Action Plan.

PG&E provided the majority of electricity used in the City of Sonora in 2010 and 2015 with Tuolumne Public Power Association (TPPA) providing electricity to public agencies. The 2010 and 2015 aggregated electricity consumption data was provided by PG&E and TPPA for all accounts within the City of Sonora. Note that due to meter change outs in 2010, TPPA electricity usage records for 2010 do not accurately reflect the actual amount of electricity used by TPPA accounts, so 2011 records are used as a proxy year. 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 2010 and 2015 direct-access electricity consumed in city was estimated from county-level, direct-access electricity data provided by the California Energy Commission (CEC). Additionally, transmission and distribution losses associated with electricity consumed in the city was estimated based on the Environmental Protection Agency's Emissions & Generation Resource Integrated Database (eGRID) Western Grid average loss factors for 2010 and 2014, respectively.

Residential and non-residential propane use was estimated using data from the 2010 Tuolumne County GHG inventory and scaled based on the number of occupied households and employer establishments in the City, and weighted using heating degree days. Wood use was estimated from state level average use per household from the U.S. Energy Information Agency (EIA) and U.S. Census Bureau American Community Survey. Propane used by municipal facilities for 2010 and 2015 was provided by regional suppliers serving municipal customers in Sonora.

Potable water and wastewater electricity use for 2010 and 2015 was estimated by scaling electricity use data provided by Tuolumne Utilities District for Tuolumne County wastewater and potable water facilities to the city based on population. The potable water and wastewater electricity use was subtracted from each utility's reported non-residential electricity use in order to provide additional context and develop potable water and wastewater electricity specific reduction strategies.

Table A-1: City of Sonora Community-Wide Residential Energy Use

Energy Source	Electricity Use (kWh)		Data Source
	2010	2015	
Electricity Use - PG&E	18,521,847	17,052,395	Pacific Gas and Electric Company
Electricity Use - Direct Access	17,624	9,318	California Energy Commission
Total Electricity Use	18,539,471	17,061,713	
Transmission & Distribution Losses	1,361,206	858,372	U.S. EPA's 2010 and 2014 eGRID
Energy Source	**Propane Use (gallons)**		**Data Source**
	2010	**2015**	
Total Propane Use	1,143,480	883,074	2010 Tuolumne County GHG Inventory
Energy Source	**Wood Use (Cords)**		**Data Source**
	2010	**2015**	
Total Wood Use	1,529	1,902	U.S. EIA and U.S. Census Bureau

Table A-2: City of Sonora Community-Wide Non-Residential Energy Use

Energy Source	Electricity Use (kWh)		Data Source
	2010	2015	
Electricity Use - PG&E	29,670,837	28,331,889	Pacific Gas and Electric Company
Electricity Use - TPPA	9,875,912	8,385,675	Tuolumne Public Power Agency
Electricity Use - Direct Access	1,525,388	4,463,016	California Energy Commission
Total Electricity Use	41,072,137	41,180,580	
Transmission & Distribution Losses	3,015,601	2,071,788	U.S. EPA's 2010 and 2014 eGRID
Energy Source	**Propane Use (gallons)**		**Data Source**
	2010	**2015**	
Propane Use - Special Districts	69,271	47,772	Regional Propane Provders
Propane Use - Business Establishments	691,200	697,600	2010 Tuolumne County GHG Inventory, US Census Bureau # of employer establishments.
Total Propane Use	760,471	745,372	

Table A-3: City of Sonora Community Wide Potable Water and Wastewater Operations Electricity Use

Energy Source	Electricity Use (kWh)		Data Source
	2010	2015	
Potable Water Operations	457,164	267,373	Tuolumne Utilities District
Wastewater Operations	238,023	254,942	Tuolumne Utilities District
Total Electricity Consumption	695,187	522,315	
Transmission & Distribution Losses	51,042	26,278	U.S. EPA's 2010 and 2014 eGRID

Table A-4: City of Sonora Municipal-Operations Energy Use

Facility	Electricity Use (kWh)		Propane Use (gallons)		Data Source
	2010	2015	2010	2015	
Sonora Police Department	91,413	83,699	304	149	Tuolumne Public Power Agency
Sonora Fire Department 201 S. Shepherd	87,467	105,920	2,154	1,483	Tuolumne Public Power Agency
Sonora Fire Museum 125 N Washington	33,214	26,440	0	0	Tuolumne Public Power Agency
Sonora City Hall	87,662	87,040	0	0	Tuolumne Public Power Agency
Sonora Public Works 111 School St	42,269	29,520	1,506	987	Tuolumne Public Power Agency
Sonora Opera Hall	19,200	21,280	1,456	1,168	Tuolumne Public Power Agency
Minor Facilities – TPPA	6,562	9,797	0	0	Tuolumne Public Power Agency
Minor Facilities – PG&E	6,596	1,735	0	0	Pacific Gas & Electric Company
Traffic Signals and Outdoor Lighting	45,967	49,643	0	0	Pacific Gas & Electric Company
LS-1 Street and Highway Lighting	220,385	219,782	0	0	Pacific Gas & Electric Company
Total Municipal Facilities Energy Use	640,735	634,856	5,420	3,787	Includes PG&E Owned Street Lights
Transmission and Distribution Losses	47,044	31,940	0	0	U.S. EPA's 2010 and 2014 eGRID

APPENDIX B: CITY OF SONORA BUSINESS-AS-USUAL (BAU) ENERGY USE FORECAST

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

Business-as-usual (BAU) community-wide energy usage was forecast using the Statewide Energy Efficiency Collaborative ClearPath California forecasting tool. Municipal energy use is included in non-residential energy use, thus was not forecasted separately. Residential energy use and potable water and wastewater energy use was forecast using the California Department of Transportation (CALTrans Long-Term Socio-Economic Forecast of households for Tuolumne County[42]. Non-residential energy use was forecast using the estimated 2010 and 2015 employment in Tuolumne County reported by the California Employment Development Department (EDD) [43] and the projected 2015 to 2035 employment in Tuolumne County from the CALTrans Long-Term, Socio-Economic Forecast.[44] Annualized growth rates for each time period were calculated using the standard formula.

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

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

Year	Occupied Households	Growth Indicator Source
2010	22,152	CALTrans Household Projections
2015	22,266	CALTrans Household Projections
2020	22,614	CALTrans Household Projections
2025	22,912	CALTrans Household Projections
2030	23,132	CALTrans Household Projections
2035	23,360	CALTrans Household Projections
Time Period	**Annualized Growth Rate**	
2010-2015	0.10%	CALTrans Household Projections
2015-2020	0.27%	CALTrans Household Projections
2020-2025	0.27%	CALTrans Household Projections
2025-2030	0.21%	CALTrans Household Projections
2030-2035	0.20%	CALTrans Household Projections

[42] Caltrans Long-Term Socio-Economic Forecasts by County – Tuolumne County 2016 http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html Households

[43] California Employment Development Department, Labor Market Information Division Industry Employment & Labor Force – by Annual Average (March 2016 Benchmark) http://www.labormarketinfo.edd.ca.gov/county/tuolu.html In-County Number of Employed, All Industries

[44] Caltrans Long-Term Socio-Economic Forecasts by County – Tuolumne County 2016 http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html In-County Total Employment, All Industries

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

Year	Employment	Growth Indicator Source
2010	16,040	CA EDD Employment Estimates
2015	17,350	CA EDD Employment Estimates
2015	17,240	CALTrans Employment Projections
2020	17,797	CALTrans Employment Projections
2025	18,243	CALTrans Employment Projections
2030	18,658	CALTrans Employment Projections
2035	19,059	CALTrans Employment Projections
Time Period	**Annualized Growth Rate**	
2010-2015	1.58%	CA EDD Employment Estimates
2015-2020	0.64%	CALTrans Employment Projections
2020-2025	0.50%	CALTrans Employment Projections
2025-2030	0.45%	CALTrans Employment Projections
2030-2035	0.43%	CALTrans Employment Projections

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

Growth Indicator	2010-2014	2015-2019	2020-2024	2025-2029	2030-2034	2035-2040
Occupied Households	0.1027%	0.2689%	0.2719%	0.2058%	0.1955%	0.1955%
Employment	1.5825%	0.8259%	0.5244%	0.4603%	0.4308%	0.4308%

Annualized growth rates for City of Sonora occupied households and employment are recalculated for the time periods required for forecasting in ClearPath California.

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

Energy Source	2010 Energy Use	2035 Energy Use	2010-2035 Change
Residential Electricity Use (kWh)	18,539,471	19,550,718	1,011,247
Residential Propane Use (Gallons)	1,143,480	1,205,848	62,368
Residential Wood Use (Cords)	1,529	1,612	83
Non-Residential Electricity Use (kWh)	41,072,137	49,115,004	8,042,867
Non-Residential Propane Use (Gallons)	760,471	909,391	148,920
Potable Water Electricity Use (kWh)	457,164	481,985	24,821
Wastewater Electricity Use (kWh)	238,023	251,101	13,078

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

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

Strategy 1.1: Expand outreach and education on existing energy efficiency practices, programs, and financing options for residential and non-residential utility customers		
Target: 50% of Existing Households Reduce Energy Use 30% by 2035		
Baseline Year	2010	
Target Year	2035	
Baseline Annual Residential Energy Use	18,539,471	kWh - Electricity
	1,143,480	Gallons - Propane
	1,529	Cords - Wood
Baseline Annual Non-Residential Energy Use (excludes municipal energy use)	40,431,402	kWh - Electricity
	755,277	Gallons - Propane
Baseline Number of Households	2,199	Housing Units
Target Percent of Households Participating	50%	of existing homes
Target Percent Energy Reduction From Baseline Year	30%	of energy use
2035 Participating Households = Baseline Households x Percent Participating =	1,100	Housing Units
2035 Residential Electricity Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	2,780,921	kWh - Electricity
2035 Residential Propane Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	171,522	Gallons - Propane
2035 Residential Wood Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	229	Cords - Wood
2035 Non-Residential Electricity Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	6,064,710	kWh -Electricity
2035 Non-Residential Propane Savings = Baseline Energy Use x Percent Participating x Percent Reduction =	113,292	Gallons - Propane

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

Strategy 1.2: Improve compliance with current California Building Energy Efficiency Standards (Title 24, Part 6) by providing informational materials when available.			
Target: 100% of New Construction meets Title 24 Green Building and Energy Efficiency Standards			
Baseline Year	2010		
Target Year	2035		
Residential			
Forecasted Energy Use Increase Without Title-24 Compliance	Electricity (kWh)	Propane (gallons)	Wood (cords)
2010-2016	176,490	10,890	14
2017-2019	151,481	9,337	13
2020-2035	683,276	42,141	56
Non-Residential			
Forecasted Energy Use Increase Without Title-24 Compliance	Electricity (kWh)	Propane (gallons)	Wood (cords)
2010-2016	4,028,418	67,918	0
2017-2019	1,110,763	20,565	0
2020-2022	720,487	13,348	0
2022-2024	702,028	12,989	0
2025-2027	651,925	12,076	0
2028-2030	632,587	11,717	0
2031-2035	837,394	15,500	0
2010 Housing Stock (DOF)	61.67%	Single Family	
	38.33%	Multi-Family	
2010 Percent of Residential Energy Use Associated with Space Heating, Cooling, Indoor Lighting and Water Heating (2010 CEC)	Electricity	Propane	Wood
	32%	86%	86%
2013 Title 24 Energy Savings Associated with Space Heating, Cooling, Indoor Lighting and Water Heating (2013 CEC)	Electricity	Propane	Wood
Single Family (SF)	36.4%	6.5%	6.5%
Multi-Family (MF)	23.3%	3.8%	3.8%
Non-Residential (Non-Res)	21.8%	16.8%	16.8%
Residential	Electricity (kWh)	Propane (gallons)	Wood (cords)
2035 Residential Energy Savings from 2013 Title 24	20,558	609	1
2035 Residential Energy Savings from 2016 Title 24	19,774	570	1
2035 Residential Energy Savings from 2019 Title 24	115,951	3,347	4
Non-Residential	Electricity (kWh)	Propane (gallons)	Wood (cords)
2035 Non-Residential Energy Savings from 2013 Title 24	878,195	11,410	-
2035 Non-Residential Energy Savings from 2016 Title 24	278,468	3,973	-
2035 Non-Residential Energy Savings from 2019 Title 24	207,720	2,966	-
2035 Non-Residential Energy Savings from 2022 Title 24	232,758	3,319	-
2035 Non-Residential Energy Savings from 2025 Title 24	248,568	3,548	-
2035 Non-Residential Energy Savings from 2028 Title 24	277,374	3,959	-
2035 Non-Residential Energy Savings from 2031 Title 24	422,254	6,023	-

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

Strategy 1.3: Improve the energy efficiency of City buildings, facilities, and operations		
Target: Reduce Energy Use in City Buildings by 30% and Public Lighting by 50% by 2035		
Baseline Year	2010	
Target Year	2035	
Baseline Annual Municipal Buildings Energy Use	374,383	kWh - Electricity
	5,194	Gallons - Propane
2035 Target Municipal Buildings Percent Energy Reduction	30%	of energy use
Baseline Annual Municipal Public Lighting Energy Use	266,352	kWh - Electricity
2035 Target Municipal Public Lighting Percent Energy Reduction	50%	of energy use
2035 Municipal Buildings Electricity Savings = Baseline Energy Use x Percent Reduction =	112,315	kWh - Electricity
2035 Municipal Buildings Propane Savings = Baseline Energy Use x Percent Reduction =	1,558	Gallons - Propane
2035 Street and Other Lighting Savings = Baseline Energy Use x Percent Reduction =	133,176	kWh - Electricity

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

Strategy 2.1: Prepare for the inclusion of renewable energy systems in new construction and large retrofit projects in order to meet California Zero Net Energy Goals by providing informational materials when available.			
Target: 100% of New Developments Meet Required Zero-Net-Energy Standards by 2035			
Baseline Year	2010		
Target Year	2035		
Residential	Electricity (kWh)	Propane (gallons)	Wood (cords)
Forecasted Energy Use Increase after meeting Title 24	567,325	38,794	52
Non-Residential	Electricity (kWh)	Propane (gallons)	Wood (cords)
Forecasted Energy Use Increase after meeting Title 24	529,540	11,994	0
2035 Target Percent Participation of new construction after Zero Net Energy standard implementation	100%	Residential	
	100%	Non-Residential	
Residential	Electricity (kWh)	Propane (gallons)	Wood (cords)
2035 Energy Savings Meeting Zero Net Energy Goals: = Forecasted Energy Use after meeting Title 24 x Percent Participation =	567,325	38,794	52
Non-Residential	Electricity (kWh)	Propane (gallons)	Wood (cords)
2035 Energy Savings Meeting Zero Net Energy Goals: = Forecasted Energy Use after meeting Title 24 x Percent Participation =	529,540	11,994	-

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

Strategy 2.2: Encourage renewable energy projects through education, outreach, and local leadership		
Target: 55% of Existing Households and 30% Businesses Install Solar PV by 2035, 15% of Households and 5% of Businesses Install other form of renewable energy		
Baseline Year	2010	
Target Year	2035	
2035 Target Potential Installations	2,199	Residential HH 200
	432	Non-Residential 2010
Number Solar Systems Installed 2010 - 2016	317	Residential
	5	Non-Residential
Total kW of Solar Installed 2010 - 2016	2,111	kW Residential
	316	kW Non-Residential
Target Participating Solar Installations per Year (1.205 x the 2005-2016 Residential Average, 6.75 X 2005-2016 Non -Residential Average)	41	Residential Households per Year
	7	Non-Residential Installations per Year
2035 Number of Solar Participants = Target Participation Installations per Year x 19 years + Number of Existing Installations 2010-2016 =	1,099	Residential Participants
	136	Non-Residential Participants
2035 kW Solar Installed = Number of Participants x Total Size of Existing Installations / Number of Existing Installations =	7,321	kW Residential Installed
	8,603	kW Non-Residential Installed
2035 Solar-Produced Electricity Calculated using PVWatts Calculator[45]	10,980,395	kWh Residential Electricity Produced
	12,902,602	kWh Non-Residential Electricity Produced
2035 Wind-Produced Electricity = 142 Residential and 8 Non-Residential Participants x 7,444 kWh Estimated Average Annual Power Output of 90' Rotor Hub Calculated using Open EI[46] =	1,054,567	kWh - Residential Electricity
	62,033	kWh - Non-Residential Electricity
2035 Propane Offset by geothermal heating = 5% Participants x Baseline Propane Use =	57,174	gallons – Residential Propane
	37,764	gallons - Non-Residential Propane
2035 Propane Offset by solar water heating = 5% Participants x Baseline Propane Use x 62% of energy savings from solar hot water system[47] =	35,448	gallons - Residential Propane
	23,414	gallons - Non-Residential Propane

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

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

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

Table C-3.1: Support Tuolumne Utilities District's outreach and education efforts by providing information on existing and future programs.

Strategy 3.1: Support Tuolumne Utilities District's outreach and education efforts by providing information on existing and future programs..		
Target: 100% of Households and Businesses Reduce Indoor Water Use by 35% by 2035		
Baseline Year	2010	
Target Year	2035	
Baseline Year Population served by Water Systems	4,903	People
2035 Estimated Population served by Water Systems	5,175	People
2010 TUD System Average Gallons Per Capita Per Day (GPCD)	123	Gallons / Capita / Day
Percent of Urban Water Demand (2013 CA WPU[48])	31%	Residential Indoor
	44%	Landscape Irrigation
	20%	Non-Residential Indoor
	5%	Water Losses
2035 Target Percent Reduction in Indoor and Outdoor Water Use	35%	of water use
2035 Estimated Reduced Indoor Water Use = 2010 GPCD * (Percent Res + Percent Non-Res) * Percent Reduction * 2035 Estimated Population * 365.25 Days Per Year / 1,000,000 =	41	Million Gallons
2035 Estimated Reduced Outdoor Water Use = 2010 GPCD * Percent Landscaping * Percent Reduction * 2035 Estimated Population * 365.25 Days Per Year / 1,000,000 =	36	Million Gallons
2035 Potable Water Energy Savings = Target Year Reduced Indoor and Outdoor Water Use * 2035 Estimated Potable Water Energy Use Intensity =	64,215	kWh - Electricity
2035 Wastewater Energy Savings = Target Year Reduced Indoor Water Use * 2035 Estimated Wastewater Energy Use Intensity =	34,473	kWh - Electricity

[48] 2013 California Water Plan Update.- Accessed September 22,2017. http://www.waterplan.water.ca.gov/docs/cwpu2013/2013-prd/Vol3_Ch03_UrbanWUE_PubReviewDraft_Final_PDFed_co.pdf

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

Strategy 3.2: Encourage Tuolumne Utilities District to reduce water losses through proactive leak detection programs.		
Target: 100% of Potable Water Systems Reduce Water Losses by 50% by 2035		
Baseline Year	2010	
Target Year	2035	
Baseline Year Population served by Water Systems	4,903	People
2035 Estimated Population served by Water Systems	5,175	People
2010 TUD System Average Gallons Per Capita Per Day (GPCD)	123	Gallons / Capita / Day
Percent of Urban Water Demand (2013 CA WPU)	31%	Residential Indoor
	44%	Landscape Irrigation
	20%	Non-Residential Indoor
	5%	Water Losses
2035 Target Percent Reduction in Water Losses	50%	of water losses
2035 Estimated Reduction in Water Losses = 2010 GPCD * Percent Water Losses * Percent Reduction * 2035 Population * 365.25 Days Per Year / 1,000,000 =	6	Million Gallons
2035 Potable Water Energy Savings from Reduced Water Losses = 2035 Reduced Water Losses * 2035 Estimated Potable Water Energy Use Intensity =	4,828	kWh / Year

Table C-3.3: Encourage Tuolumne Utilities District to improve the efficiency of their operations

3.3: Encourage Tuolumne Utilities District to improve the efficiency of their operations		
Target: Reduce Energy Intensity at Potable Water and Wastewater Facilities by 40% by 2035		
Baseline Year	2010	
Target Year	2035	
Baseline Annual Potable Water Energy Use	457,164	kWh - Electricity
Baseline Annual Potable Water Energy Intensity	2,081	kWh / Million Gallons
Baseline Annual Wastewater Energy Use	238,023	kWh - Electricity
Baseline Annual Wastewater Energy Intensity	1,355	kWh / Million Gallons
2035 Target Percent Energy Intensity Reduction	40%	of energy intensity
2035 Reduction in Potable Water Energy Intensity	832	kWh / Million Gallons
2035 Reduction in Wastewater Energy Intensity	542	kWh / Million Gallons
2035 Estimated Potable Water Use	143	Million Gallons
2035 Estimated Wastewater Generation	134	Million Gallons
2035 Potable Water Electricity Savings = 2035 Potable Water Use * 2035 Reduction in Potable Water Energy Intensity =	118,650	kWh - Electricity
2035 Wastewater Electricity Savings = 2035 Wastewater Use * 2035 Reduction in Wastewater Energy Intensity =	72,767	kWh - Electricity

APPENDIX D: EXISTING ENERGY EFFICIENCY PROGRAM ADMINISTRATORS

Appendix D documents the existing energy efficiency program administrators in City of Sonora with relevant links.

Table D-1: Existing Energy Efficiency Program Administrators

EXISTING PROGRAM ADMINISTRATORS	DESCRIPTION
Pacific Gas & Electric Company (PG&E)	PG&E offers incentives, rebates, financing options, and educational resources to residents, businesses, and non-profits in the City of Sonora. http://www.pge.com/
Sierra Business Council (SBC)	SBC administers the Sierra Nevada Energy Watch (SNEW) program, delivering cost effective energy-efficiency projects and benchmarking services to businesses and non-profits in City of Sonora. SBC also offers consulting services to governments on energy and climate planning. http://sierrabusiness.org/
Amador Tuolumne Community Action Agency (ATCAA)	ATCAA is involved in a variety of programs based on community needs and available funding in order to improve the lives of residents in the region. ATCAA provides assistance for low–income residents in Tuolumne, Calaveras, and Amador counties with utility bill assistance, budget counseling, and no-cost energy and water saving improvements that reduce energy and water expenses. Water conservation improvements at no-cost to income eligible clients include: high-efficiency washers, dishwashers, leak repair, low-flow showerheads and toilets. http://atcaa.org/energywater/
Tuolumne County Resource Conservation District (TCRCD)	The Tuolumne County Resource Conservation District (TCRCD) is an organization that identifies and meets the natural resource conservation needs of all the people of Tuolumne County and its future generations by providing leadership through educational, technical, and financial support for valuable, voluntary services and programs that promote conservation and sustainable agriculture, while maintaining the county's rural heritage. http://www.tcrcd.org/
GRID Alternatives	GRID Alternatives is a nonprofit organization that brings the benefits of solar technology to communities that would not otherwise have access, providing needed savings for families and preparing workers for jobs in the fast-growing solar industry. GRID Alternatives can also provide energy-efficiency education and help mission-aligned non-profits and multi-family communities reach their solar technology goals. http://www.gridalternatives.org/
TRC Energy Services	TRC Energy Services administers the California Advanced Homes program, which highlights best practices in energy efficiency, green building and sustainability, and offers generous financial incentives to help builders and architects create environmentally friendly, energy-efficient communities for potential home buyers. http://cahp-pge.com/
U.S. Environmental Protection Agency	The U.S. EPA provides grants to support environmental education projects that promote environmental awareness and stewardship and help provide people with the skills to take responsible actions to protect the environment. This grant program provides financial support for projects that design, demonstrate, and/or disseminate environmental education practices, methods, or techniques. To see current grant opportunities, please check the EPA website for more information. https://www.epa.gov/
U.S. Department of Energy (DOE)	The U.S. DOE provides formula grant funding and technical assistance for state and local governments to manage weatherization and clean energy programs including the

EXISTING PROGRAM ADMINISTRATORS	DESCRIPTION
	Weatherization Assistance Program, State Energy Program and the Energy Efficiency and Conservation Block Grant Program. https://energy.gov/
California Energy Commission (CEC)	As the state's primary energy policy and planning agency, the California Energy Commission is committed to reducing energy costs and environmental impacts of energy use - such as greenhouse gas emissions - while ensuring a safe, resilient, and reliable supply of energy. The CEC offers financing to public institutions to help fund energy-efficiency and energy generation projects at attractive low interest rates. The CEC also manages other useful programs such as the Energy Partnership Program, Energy Upgrade California, and other technical assistance resources. http://www.energy.ca.gov/
Energy Upgrade California	Energy Upgrade California is a statewide initiative committed to uniting Californians to strive toward reaching the state's energy goals, and help increase energy efficiency for the future of California. Energy Upgrade California provides tools and knowledge to residents and small businesses for energy management. https://www.energyupgradeca.org/
California Statewide Communities Development Authority (CSCDA)	The CSCDA is a joint powers authority with more than 500 cities, counties, and special districts as Program Participants. CSCDA provides California's local governments with an effective tool for the timely financing of community-based public benefit projects. CSCDA was created by and for local governments in California, and is sponsored by the California State Association of Counties and the League of California Cities. CSCDA helps local governments build community infrastructure, provide affordable housing, create jobs, and make access available to quality healthcare and education. CSCDA programs include Total Road Improvement Program, Water & Wastewater Bond Program, GO SAVERS, and OPEN PACE program. http://cscda.org/
California Infrastructure and Economic Development Bank (IBANK)	The IBank finances public infrastructure and private development that promotes opportunities for local jobs, contributes to a strong economy, and improves the quality of life in California communities. IBank has broad authority to issue tax-exempt and taxable revenue bonds, provide financing to public agencies, provide credit enhancements, acquire or lease facilities, and leverage State and Federal funds. IBank's current programs include the Infrastructure State Revolving Fund (ISRF) Loan Program, California Lending for Energy and Environmental Needs (CLEEN) Center, Small Business Finance Center and the Bond Financing Program. http://www.ibank.ca.gov/
School Project for Utility Rate Reduction (SPURR)	SPURR can manage the complex procurement process for utility services and equipment by leveraging its expertise in public utility procurement to help ensure that clients can quickly implement the right solution at the best price. http://spurr.org/
ICLEI (International Council for Local Environmental Initiatives) Local Governments for Sustainability	ICLEI Local Governments for Sustainability is the leading global network of local governments dedicated to sustainability, resilience, and climate action. Creating connections between leaders to share solutions and accelerate progress through cutting-edge tools and technical guidance helps local governments to reach their goals of deep reductions in carbon pollution and tangible improvements in sustainability. http://icleiusa.org/
Statewide Energy Efficiency Collaborative (SEEC)	The Statewide Energy Efficiency Collaborative (SEEC) provides support to cities and counties to help them reduce greenhouse gas (GHG) emissions and save energy. SEEC is an alliance between three statewide non-profit organizations (ICLEI - Local Governments for Sustainability, USA, the Institute for Local Government, and the Local

EXISTING PROGRAM ADMINISTRATORS	DESCRIPTION
	Government Commission) and California's four Investor-Owned Utilities. It builds upon the unique resources, expertise and local agency relationships of each partner. http://californiaseec.org/about-seec/
Municipal Sustainability and Energy Forum (MSEF)	Municipal Sustainability & Energy Forum is designed as a venue that brings experts together to facilitate the most effective renewable energy and energy efficiency solutions for communities, municipalities, states, and utilities. http://mseforum.com/
New Buildings Institute (NBI)	The New Buildings Institute takes leading-edge practices and technology applications for high performance buildings and translates them into innovative and practical solutions for the energy efficiency and commercial building industries. NBI works collaboratively with industry market players, such as governments, utilities, energy efficiency advocates and building professionals. https://newbuildings.org/

APPENDIX E: EXISTING ENERGY EFFICIENCY PROGRAMS IN CITY OF SONORA

Appendix E documents the existing energy-efficiency programs in City of Sonora with links to relevant programs.

Table E-1: Existing Residential Energy Efficiency Programs

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

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

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

INCOME-QUALIFIED ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
Amador Tuolumne Community Action Agency (ATCAA) Home Weatherization	The Home Weatherization program provides no-cost services to residents, and can permanently lower energy bills and enhance the comfort of resident's homes. The energy-saving home improvements may include weatherizing repairs or upgrades to the home which help to conserve energy, as well as education on reducing energy costs. The program is open to homeowners of most dwelling types (single family home, town home, condo, apartment, mobile home, etc.), and authorization is required for renters. http://atcaa.org/home-weatherization/
Amador Tuolumne Community Action Agency (ATCAA) Utility Assistance	The Utility Assistance services include payment of some or all of the current PG&E or propane services bill for tenants, landlords, or home owners. Depending on the circumstance, ATCAA can pledge to the utility provider or propane vendor on the customers behalf in order to help make a bill payment, or prevent utilities from being shut off. http://atcaa.org/utility-assistance/
PG&E Energy Savings Assistance Program (ESAP)	PG&E's Energy Savings Assistance Program provides income-qualified customers with energy-saving improvements at no charge. https://www.pge.com/en_US/residential/save-energy-money/help-paying-your-bill/energy-reduction-and-weatherization/energy-savings-assistance-program/energy-savings-assistance-program.page

INCOME-QUALIFIED ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
PG&E Multi-Family Program	PG&E's Multi-Family Program is for property owners and managers of existing residential dwellings or mobile home parks with five or more units. The program encourages owners to install qualifying energy-efficient products in individual tenant units and common areas of residential apartments, mobile home parks and condominium complexes. A full list of available rebates and incentives is available online. http://www.pge.com/multifamily/
Relief for Energy Assistance through Community Help (REACH)	REACH provides solutions for projects that reduce energy vulnerability such as PG&E's one-time emergency financial assistance. REACH provides an energy credit for up to $300 to help low-income families keep their PG&E services turned on in times of hardship. http://www.pge.com/reach/
PG&E California Alternate Rates for Energy (CARE) Program	Qualified low-income customers that are enrolled in the CARE program receive a 30-35 percent discount on their electric and natural gas bills. The CARE program is administered by PG&E. http://www.pge.com/care/
PG&E Family Electric Rate Assistance (FERA)	The FERA program provides a monthly discount on electric bills for income-qualified households of three or more persons. FERA is administered by PG&E. http://www.pge.com/fera
PG&E Medical Baseline Allowance	Residential customers with a qualified physician certified medical condition can receive additional quantities of energy at the lowest (baseline) price. The program is administered by PG&E. http://www.pge.com/medicalbaseline
Single Family Affordable Solar Housing (SASH)	The Go Solar California SASH program provides qualifying low-income homeowners up-front rebates to defray the costs of installing a solar electric system. Depending on the income level, homeowners may be eligible for an entirely free system, or a highly subsidized one. The SASH program is structured to provide access to solar technology while also providing green jobs training, employment, and community engagement opportunities. The SASH program is administered by GRID Alternatives. http://www.gridalternatives.org/learn/sash

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

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
TPPA Energy Conservation Program for Public Agencies	The energy conservation activities are: Energy audits of facilities and operations; Financial assistance, by way of low interest loans and grants; Energy usage profiles; and Dissemination of energy conservation material. Financing is made available for all these programs through a special fund established in the TPPA budget, as required by State Law AB 1890. https://www.tuolumnecounty.ca.gov/DocumentCenter/View/6858
PG&E Streetlight Upgrade and Rebate Programs	PG&E offers money-saving LED streetlight replacement installation incentives, such as rebates and a rate change to offset cost of upgrading LED fixtures. Additionally, 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. https://www.pge.com/en_US/business/save-energy-money/business-solutions-and-rebates/lighting/led-street-lighting/led-street-lighting.page

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
PG&E Rebates and Incentives for Businesses	PG&E offers non-residential customers rebates and incentives for power management software, occupancy sensors on lights, steam traps, HVAC motors and pumps, electric water heaters, process cooling, data center airflow management, boiler economizers, refrigeration, boiler heat recovery, refrigeration control, VSD pumps, boilers and fans. A full list of current rebates can be found using the PG&E money back tool. www.pge.com/businessrebates
PG&E Commercial HVAC Optimization Program	PG&E's Commercial HVAC Optimization Program offers generous incentives for enrolling in a three-year air conditioning quality maintenance service agreement and installing optional unit retrofits. The business owner will lower their operating, repair and replacement costs; optimize unit performance and efficiency; improve the indoor air quality and thermal comfort for employees and customers; help prevent HVAC unit failures that can threaten business operations; and reduce their carbon footprint. http://www.commercialhvacqm.com/
PG&E Lighting Rebates	PG&E offers rebates for high-efficient replacement lights as well as rebates to help cover the costs of qualifying fixtures and retrofit kits. http://www.pge.com/en/mybusiness/save/rebates/lighting/index.page
PG&E Solar Water Heating	PG&E's Solar Water Heating program saves energy and money for customers by up to an 80% reduction in water-heating bill, and almost 75% savings for solar water heating system with the PG&E rebate and tax credit. http://www.pge.com/csithermal
PG&E Retrocommissioning (RCx) Program	RCx is a systematic process for identifying less-than-optimal performance in your facility's equipment, lighting, and control systems, and making the necessary adjustments. While retrofitting involves replacing outdated equipment, RCx focuses on improving the efficiency of what's already in place. PG&E's RCx Program provides incentives and connects businesses with experts to make sure their facilities — and the equipment and systems within them — are running in peak condition for optimal energy savings. RCx projects can improve a facility's work environment and extend the service life of equipment. http://www.pge.com/en/mybusiness/save/rebates/retrocommissioning/index.page
PG&E Savings By Design (SBD) Program	SBD is a statewide program offered by PG&E to encourage high-performance new building design and construction for non-residential (commercial, school, facility, etc.) buildings. The program offers building owners and their design teams a wide range of services, such as design assistance, design team incentives, owner incentives, business solutions, and educational resources. SBD can help exceed California's Title 24 energy-efficiency standards, and engineers can analyze your building's energy design to help it rise above the standard and you can earn financial incentives for doing so. www.pge.com/savingsbydesign
PG&E and Ecology Action Hospitality Program	The Hospitality Program provides energy efficiency recommendations, project oversight, and rebates at no cost to customers in PG&E territory including hotels and motels, dining and restaurants, casinos, health clubs and more. Free services provided include: facility audit, project proposal, installation oversight, and rebate fulfillment. Energy specialists will conduct a free assessment of your facility and identify site specific opportunities to save you energy and money. Projects include upgrading old inefficient lighting to LEDs and replacing old refrigeration motors. http://ecoact.org/thehospitalityprogram/

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
PG&E LED Accelerator Program (LEDA)	The LED Accelerator Program (LEDA) incentivizes high performance LED retrofit and new installations in conjunction with networked controls or a new lighting design layout for multi-site commercial businesses. LEDA's Implementation Team helps businesses through every step of the project, and provides audits, application support, economic analysis, product demonstration, and product selection assistance. http://ledaccelerator.com/
PG&E Food Service Technology Center	The PG&E Food Service Technology Center (FSTC) provides nationally-recognized energy efficiency consulting services to the commercial food service industry. The program includes kitchen equipment testing, design consultation, on-site facility surveys for energy efficiency, educational seminars for energy performance in commercial kitchens, and equipment testing services to determine the energy and performance characteristics of food service equipment. https://www.pge.com/en_US/business/services/training/training-centers/food-service-technology-center/food-service-technology-center.page
PG&E Advanced Pumping and Efficiency Program (APEP)	PG&E's Advanced Pumping Efficiency Program (APEP) is an educational and incentive program intended to improve overall pump and booster efficiency and encourage energy conservation. The program subsidizes pump tests and provides cash-back incentives for pump overhaul above 25/hp. http://www.pumpefficiency.org/
PG&E K-12 Schools Programs and Rebate Catalog	There are a couple programs for K-12 schools including the Solar Energy Efficiency (SEE) Program which helps public school districts identify, evaluate, and process incentives on energy efficiency retrofit measures. (http://schoolenergyefficiency.com/), and CLEAResult analytics enabled RCs for school facilities (http://www.aercx.com/). The rebates, discounts, and expert advice can help make it easier for K-12 schools to save energy and money.
Bright Schools Program	Provides technical assistance to schools for improving building energy efficiency and clean energy generation. Up to $20,000 available to successful applicants to fund professionally-prepared feasibility study for the most effective energy efficiency measures. http://www.energy.ca.gov/efficiency/brightschools/
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 technical assistance to public agencies, which includes cities, counties, special districts, public hospitals, and public care facilities, in identifying the most cost effective energy efficient upgrades. The program targets existing facilities with energy audits, and new construction with energy efficient design reviews. http://www.energy.ca.gov/efficiency/partnership/
Energy Efficiency Financing	The California Energy Commission (CEC) provides 0-1% interest loans to public entities for projects with proven energy and/or demand cost savings. http://www.energy.ca.gov/efficiency/financing/index.html

ENERGY EFFICIENCY PROGRAMS	DESCRIPTION
Federal Business Energy Investment Tax Credit (ITC)	A taxpayer may claim an investment tax credit of 30% of qualified expenditures for solar, fuel cells, small wind systems; or 10% of qualified expenditures for geothermal, microturbines, and combined heat and power systems (CHP), aka co-generation systems. Expenditures include labor costs for on-site preparation, assembly or original system installation, and for piping or wiring to interconnect a system. http://energy.gov/savings/business-energy-investment-tax-credit-itc
Tax Exemption for Farm Equipment and Machinery	In November 2012, The California State Board of Equalization determined the partial exemption from state sales and use tax applies to solar photovoltaic systems that are primarily used to power farm equipment and machinery. The system does not need to be directly connected to the equipment to qualify--it can be connected to the local electricity grid and used to offset the farm's electricity use via a net metering agreement with the local utility. Applicants will need to demonstrate that at least 50% of the electricity generated by the solar PV system is used by farm equipment annually. This tax exemption is also applicable to wind machines and could apply to other energy efficient farm equipment. http://www.boe.ca.gov/sutax/exemptfem.htm http://www.boe.ca.gov/news/pdf/l330.pdf

Table E-4: Existing Educational Programs

EDUCATIONAL PROGRAMS	DESCRIPTION
PG&E Energenius® Educational Series	The PG&E Energenius® Educational Series program offers interactive, engaging programs for pre-kindergarten through eighth grade (pre K-8). These programs correlate to Common Core State Standards and include lesson plans, activity books, and take-home materials. https://www.pge.com/en_US/residential/in-your-community/education-programs/education-programs/educational-resources/energenius-program/energenius-program.page
PG&E Educational Resources for Teachers	PG&E offers resources for educators, including free curriculum materials to use in the classroom in order to help students to understand energy efficiency, conservation, safety, and more. https://www.pge.com/en_US/residential/in-your-community/education-programs/education-programs/educational-resources/for-students/for-teachers.page
PG&E Educational Resources for Students (K-12)	Students can learn more about energy, conservation and other important information through the activities and resources PG&E has compiled and organized for students. https://www.pge.com/en_US/residential/in-your-community/education-programs/education-programs/educational-resources/for-students/for-students.page?
PG&E Training	Learn about energy efficiency for your business through classes on renewable energy, food service technology, and other resources to keep businesses competitive. https://www.pge.com/en_US/business/services/training/training-centers/training-centers.page
PG&E Solar Education and Workshops	PG&E offers free classes, workshops, and webinars from PG&E to learn about selecting renewable energy systems to use for business, and benefits of running a green business. Find in-person classes and workshops, or download presentations created by PG&E instructors. https://www.pge.com/en_US/business/services/training/solar-education/solar-education.page or see Energy Education Class schedule: http://usi.pge.com/

EDUCATIONAL PROGRAMS	DESCRIPTION
PG&E Business Resource Center	PG&E offers articles and resources to help business owners make energy-efficiency decisions and plans for innovating, implementing best practices, increasing profitability, and creating a greener profile. https://www.pge.com/en_US/business/resources/tips-trends-and-incentives/energy-insights/business-resource-center.page
NEED Project (National Energy Education Development)	The National Energy Education Development Project is dedicated to promoting an energy conscious and educated society by creating effective networks of students, educators, business, government and community leaders to design and deliver objective, multi-sided energy education programs. http://www.need.org/
PEAK Energy (The Energy Coalition)	PEAK is a comprehensive standards-based educational program designed to empower elementary and middle school students with the knowledge to manage energy use in their homes, schools and communities. Through hands-on learning, students are inspired to pursue green careers and motivate themselves and others to take action to create a more sustainable world. http://www.peakstudents.org/
PowerSave Schools (Alliance to Save Energy)	The Alliance to Save Energy believes that students have the power to create a culture of energy efficiency in their schools and communities. PowerSave Schools reduce consumption an average of 5-15% in one year through no-cost operations and behavior changes. Empowered with STEM-based efficiency training, hands-on experience, and result to show for their work, students become ambassadors for energy conservation in the classroom and at home. http://www.powersaveschools.org/about.html
Strategic Energy Innovations (SEI) Eco Smart Education Curriculum	SEI partners with K-12 schools and universities on a variety of greening approaches to help them save money by making their buildings more energy efficient while fostering a culture of conservation and resource efficiency among students and teachers. By developing curriculum, empowering students and staff to make sustainable changes and implementing innovative and measurable initiatives, SEI creates environmental stewards and community leaders of tomorrow. SEI provides curriculum and teacher training in the areas of energy and resource efficiency, climate change science, renewable energy, green transportation and green careers. https://www.seiinc.org/programs/eco-smart-schools
Energy Literacy (Office of Energy Efficiency & Renewable Energy)	Energy Literacy is an interdisciplinary approach to teaching and learning about energy and understanding the role of energy. It presents energy concepts that will help individuals and communities make informed energy decisions. The Framework for Energy Education is an educational resource for learners of all ages and is meant to guide formal and informal energy education, standards development, curriculum design, assessment development, and educator trainings. https://energy.gov/eere/education/energy-literacy-essential-principles-and-fundamental-concepts-energy-education
Alliance for Climate Education (ACE)	The Alliance for Climate Education's mission is to educate young people on the science of climate change and empower them to take action. Through several education outlets including the ACE Assembly, online signature multimedia resources, and teacher classroom resources, the ACE program seeks to reach as many students and teachers as possible with climate science information and opportunities for action.

Table E-5: Water Efficiency Programs

WATER EFFICIENCY PROGRAMS	DESCRIPTION
Tuolumne Utilities District (TUD)	All Tuolumne County residents are now eligible for the Watersense Toilet and Showerhead Rebate! TUD, and Twain Harte Community Service District (THCSD), in partnership with the Tuolumne County Resource Conservation District, are offering a rebate of up to $100 for one Watersense labeled toilet and up to $25 for one Watersense labeled showerhead. https://tudwater.com/regional-water-conservation-rebate-program-available-residents/
Tuolumne County Resource Conservation District's Water Toolkit	The Water Toolkit helps landowners across Tuolumne and Southern Calaveras County reduce their water usage. The toolkit features best management practices to use at home or in a business to reduce water use by utilizing a variety of techniques including greywater reuse, rainwater harvesting, and indoor water efficient technology. Through a grant-funded water conservation program, the program also offers rebates for residential and commercial water-saving installations. https://www.watertoolkit.org/
Amador Tuolumne Community Action Agency (ATCAA) Water Conservation	Water Conservation services include the repair or replacement of water appliances and devices, all at no cost, This service will lower your water bill and help conserve water. Most water conservation services include installing low-flow faucets, toilets, and showerheads, installing high-efficiency dishwashers and washing machines, fixing leaks, and upgrading irrigation systems. http://atcaa.org/water-conservation/
Water Energy Grant Program	This program funds residential, commercial and municipal water efficiency projects that reduce GHG emissions and reduce water and energy use. Eligible applicants include local agencies, JPA's, and non-profits. Eligible projects include residential and commercial water efficiency, municipal water efficiency programs, or projects that reduce greenhouse gas, reduce water and reduce energy use. Available funding is currently $19 million. The program is funded through the Cap and Trade legislation (specifically SB 103, Sec.11) and administered by California Department of Water Resources. http://www.water.ca.gov/waterenergygrant/
Electric Program Investment Charge (EPIC) Program Funding Opportunities	The Energy Commission's electricity innovation investments follow an energy innovation pipeline program design, funding applied research and development, technology demonstration and deployment, and market facilitation to create new energy solutions, foster regional innovation, and bring clean energy ideas to the marketplace. Water efficiency projects, including research and technology, can be found on EPIC's website, check regularly for new water program offerings. http://www.energy.ca.gov/contracts/epic.html

APPENDIX F: ENERGY EFFICIENCY FINANCING PROGRAMS

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

Table F-1: Community-Wide Financing Programs

FUNDING SOURCE	DESCRIPTION
Go Green Financing	Go Green Financing allows California residents and businesses browse the GGF database of financing solutions to find a lender that fits the unique needs and preferences of each energy efficiency project. http://www.gogreenfinancing.com/
Open PACE: Property Assessed Clean Energy	The Open PACE program provides local governments with a turnkey resource for residential and commercial property owners to finance energy efficiency, renewable energy and water conservation. Open PACE provides local governments with a competitive marketplace for PACE Program Administrators that meet specific qualifications. Program Administrators will develop managed contractor networks within the community, provide 100% financing and file repayment obligations through property tax bills. http://cscda.org/Open-PACE
Solar Power Purchase Agreement (PPA)	A solar power purchase agreement (PPA) is a financial agreement where a developer arranges for the design, permitting, financing and installation of a solar energy system on a customer's property at little to no cost. The developer sells energy to the host customer at a fixed rate that is typically lower than the local utility's retail rate. The lower price offsets the purchase of grid electricity while the developer receives the income from these sales of electricity as well as any tax credits and other incentives generated from the system.

Table F-2: Residential Financing Programs

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

Table F-3: Non-Residential Financing Programs

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

Table F-4: Municipal Financing Programs

FUNDING SOURCE	DESCRIPTION
California Energy Commission (CEC) Energy Efficiency Financing	The CEC offers school districts, charter schools, City offices of education, state special schools, and community college districts 0% loans for energy efficiency and energy generation projects. CEC offers cities, counties, special districts, public colleges, universities and public care institutions/hospitals 1% loans for energy efficiency and energy generation projects. http://www.energy.ca.gov/efficiency/financing/

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

APPENDIX G: IMPLEMENTATION RESOURCES

Appendix G documents implementation resources, programs, and tools.

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

ENERGY EFFICIENCY, RENEWABLE ENERGY, AND WATER EFFICIENCY	DESCRIPTION
PG&E Utility Marketplace for Energy Efficient Products	Utility Marketplaces for Energy Efficient Products: As part of the implementation of AB793, the CPUC has mandated all regulated utilities to have energy management technology marketplaces online for their customers by the end of 2017. Local governments can leverage existing marketplaces to help engage their citizens. These marketplaces are a great resource to transform markets and help residents shop energy smart. The sites have many categories including electronics, heating and cooling, kitchen appliances, and laundry appliances. They provide shoppers with full market coverage across retailers, brands and models; a daily updated, relative energy efficiency score on a zero to 100 scale; energy bill savings and total cost of ownership implications of product choices – combined with price drop alerts, online rebate sign-up, local store information and other modern tools that make the energy efficient choice the easy choice. PG&E's Marketplace: https://marketplace.pge.com/
PG&E Tool Lending Library	Tool Lending Library: PG&E provides a library of tools that can be borrowed without purchase. The library includes data loggers, infrared cameras, and much more testing equipment for building energy efficiency. PG&E's Tool Lending Library: https://pge.myturn.com/library/
Statewide Energy Efficiency Collaborative (SEEC)	SEEC provides no-cost resources to support the energy and climate initiatives of California Local Governments. SEEC provides the following at no cost: education and tools for climate action planning and reducing energy use, opportunities for peer-to-peer networking, technical assistance and recognition for local agencies that reduce GHG emissions, save energy and adopt policies and programs that promote sustainability, and demonstration that "the whole is greater than the sum of its parts" through leveraging resources and expertise from seven partners, to help local agencies. SEEC trainings and resources are tailored to the needs of California local governments and are available to representatives of local governments within California, as well as state and reginal government agencies, districts, and school districts. http://californiaseec.org/
Municipal Sustainability and Energy Forum (MSEF)	Municipal Sustainability Forum connects communities, governments, utilities, universities, organizations and experts together to explore today's most effective energy efficiency and renewable energy-related solutions. The goal of Municipal Sustainability Forum is to create a collaborative environment that facilitates problem solving, economic growth and a sustainable energy future. Each month, webinars are hosted at no cost for anyone who is involved in advancing energy-related sustainability in their areas or states. In addition, conference calls are held on a variety of topics in which top experts can interact, discuss important issues and possibly connect later for collaboration. http://mseforum.com/
California's Local Government Energy Efficiency Portal (EE Coordinator)	This site serves as a hub for energy efficiency and sustainability news, information, best practices and resources relevant to California's local governments. http://eecoordinator.info/
Smart Growth America	Smart growth is a way to build cities, towns, and neighborhoods that are economically prosperous, socially equitable, and environmentally sustainable. Smart Growth America works with everyone involved in the process of urban planning and development to think strategically about building better towns and cities. Smart Growth America is

ENERGY EFFICIENCY, RENEWABLE ENERGY, AND WATER EFFICIENCY	DESCRIPTION
	dedicated to researching, advocating for and leading coalitions to bring smart growth practices to communities. https://smartgrowthamerica.org/
Institute for Local Government's Beacon Program	The Beacon Program provides a framework for local governments to share best practices that create healthier, more vibrant and sustainable communities. The program honors voluntary efforts by local governments to reduce greenhouse gas emissions, save energy and adopt policies that promote sustainability. http://www.ca-ilg.org/beacon-award-program
New Buildings Institute – Zero Net Energy Support	Zero net energy (ZNE) buildings are ultra-efficient new construction and deep energy retrofit projects that consume only as much energy as they produce from clean, renewable resources. The New Buildings Institute will be offering a variety of customized services to assist jurisdictions on their way to ZNE. Services may include: answering general ZNE questions, supporting ZNE code and policy, strategic planning, project charrette facilitation, ZNE building policy analysis, staff training, building portfolio assessment. https://newbuildings.org/hubs/zero-net-energy/
California Codes and Standards (C&S) Reach Codes Program	The California Codes and Standards (C&S) Reach Codes program provides technical support to local governments considering adopting a local ordinance (reach code) intended to support meeting local and/or statewide energy and greenhouse gas reduction goals. The program facilitates adoption and implementation of the code, by providing resources such as cost-effectiveness studies, model language, sample findings, and other supporting documentation. Key resources available on the site include cost-effectiveness studies, ordinance summaries for internal communications, model language, and document templates. http://www.localenergycodes.com/
Building Operator Certification (BOC)	BOC is a competency-based training and credentialing program for building operators providing skill sets to reduce energy consumption in their facilities through operational and maintenance practices for HVAC, lighting, and controls systems. Facility Personnel earn an industry-recognized, professional credential after completing technical training and testing, and by performing energy efficiency project assignments in their facilities. The Northwest Energy Efficiency Council (NEEC) is the national administrator of BOC, NEEC partners with California utilities throughout the state to bring this valuable training to you. http://www.theboc.info/
EnergySage Solar Marketplace	EnergySage is an online marketplace that helps consumers research and shop for solar energy systems. ICLEI and EnergySage have developed a solution that makes it fun and easy for municipalities to promote solar in their community. The Marketplace offers a comparison of solar options, educational and cost-saving resources, promotes the growth of solar companies and programs, and other tools to assist the transition to renewable energy. http://www.energysage.com/
School Project for Utility Rate's (SPURR) Renewable Energy Aggregated Procurement (REAP) Program	An innovative aggregated solar buying program that leverages the collective purchasing power of SPURR's very large membership to secure pre-negotiated "piggy-backable" solar project pricing and terms for California public agencies. The goals of the REAP Program are as follows: streamline the solar buying process for California public agencies, drive down solar project pricing for California public agencies, and improve solar project terms and conditions for California public agencies. Any public agency in California can participate in SPURR's REAP Program. To date, sixteen California public agencies have utilized the REAP Program to contract over 40 MW-DC of solar projects. The REAP Program issued a new RFP for solar and solar + storage in 2017. Public agencies interested in the REAP Program can receive, at no cost or obligation, a solar project feasibility study for their potential solar projects. Please contact solar@spurr.org for more information. http://spurr.org/Services/Solar-Services

ENERGY EFFICIENCY, RENEWABLE ENERGY, AND WATER EFFICIENCY	DESCRIPTION
SolarResilient	This first-of-its-kind solar and storage sizing tool enables building managers, energy managers, architects, sustainability, and energy professionals to size their buildings for solar PV and battery storage systems nationwide. This tool estimates the required rating and physical size of grid-connected PV and battery energy storage to provide power for extended periods during a large-scale grid power outage. SolarResilient is designed for buildings that form part of a cities resilience strategy - it allows building owners and city departments to develop equipment sizing before embarking on more detailed studies. When used on a portfolio of buildings, optimum performing scenarios can be selected to provide a holistic energy security strategy for a city or county. https://solarresilient.org/
Go-Biz Guide for Funding of Electric Vehicle Charging Stations	The Governor's Office of Business and Economic Development (GO-Biz) has created a guide to help state agencies navigate the funding options for plug-in electric vehicle charging infrastructure. It is designed to make the procurement of electric vehicle (EV) charging infrastructure on state-owned or leased property as seamless as possible. The guide offers direction for the prioritization of facilities and the process of securing funding for the stations and associated infrastructure costs. It includes a comprehensive list of utility and local incentive programs, all of which are designed to cover or offset the cost of station installation. The guide is available online at: http://eecoordinator.info/wp-content/uploads/2017/08/Funding-for-Electric-Vehicle-Charging-Stations-Quick-Reference-Guide.pdf

APPENDIX H: OUTREACH AND PUBLIC ENGAGEMENT SUMMARY

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

PUBLIC OUTREACH EFFORTS

Public outreach was a key part of the process during the development of the Energy Action Plan (EAP). To this effort, one publicly noticed study session was hosted by the Planning Commission on June 12th, 2017 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 and strategies highlighted in Chapter 3 and used to prioritize the implementation actions Chapter 4. The online survey was kept open from May 25th, 2017 to June 30th, 2017 and received 28 responses. Both the survey and study session were publicized in the Union Democrat, at the City Hall offices, and directly distributed to more than 100 local businesses. A summary of this input is detailed below.

JUNE 12TH, 2017 STUDY SESSION WORKSHOP

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

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

Table H-1: Comments from Study Session Workshop

Topic	Comments
General	• Supportive of plan, but certain barriers that relate to Sonora will have to be addressed. These barriers include education/awareness, financing/affordability, public engagement, housing market limitations, and Title 24 standards.
Energy Efficiency	• Supportive of reducing energy consumption • Town has developed and new buildings meet Title 24 standards • Interest in weatherization, low-cost home improvements such as insulation, double-paned windows, and other small adjustments for easy and substantial savings • Interest in replacing/upgrading inefficient and outdated appliances, HVAC (energy efficient swamp coolers) – suggest looking into appliance drop-off programs, incentivizing energy efficient appliances (residential and commercial) • Residents are concerned about energy bills, many have switched to LED lighting
Renewable Energy	• Supportive of solar – residential and commercial can use financing and other incentives to install, City and County have advantage of leading community by example with solar installation. • In real estate – resale value of houses with solar and energy efficiency is high • Take advantage of viable space for solar, such as on government buildings, parking lots, and other “solar deserts” • Solar + storage is worth looking into, battery storage is important to renewable energy management. • Other renewable technology options: hydroelectric, wind (if wind is sporadic, hydro can make up for the difference), and biomass • Wood products – wood is abundant resource, efficient woodstoves for heating, (what are air quality restrictions?), take advantage of excess wood with proper utilization of biomass.

Barriers	• Sonora experiences extreme weather – space heating and cooling are a substantial energy usage issue • Historic value and conservation • Title 24 is extreme and costly, going beyond will be difficult – concerns on how to pay, and codes are very technical • Retail customers will pay the burden of increased costs • Solar is often costly, especially without subsidies • Consider burden of diesel, propane, and wood burning – Sonora does not have access to natural gas • Streetlights are expensive to replace/upgrade • Burden of space heating and transportation hurdles • High number of 2nd homeowners, transient/tourist population
Implementation	• Identify most interested/best beneficiaries: Home and business owners are concerned about energy bills, have outdated technology, likely to participate in plan when upgrades, energy efficiency technology, and behavior changes to make a difference in the community are financially incentivized. City has opportunity to lead by example and to show people the incentives by putting money back into the community. • Education on new technologies, benefits, energy efficiency, school programs such as energy efficiency curriculums. • No expected new development (built out), may be opportunities for major renovations
Community Engagement and Outreach	• Education and outreach most important way for habit/behavior change and participation, and to spark value of savings • Educating public on plan by having meetings (attendance), going on radio and local television to get message out, using social media/internet to reach people.

ONLINE SURVEY

In an effort to expand outreach to local residents and businesses, Sierra Business Council developed an online survey to garner input on the proposed goals and strategies. This survey was activated May 25, 2017 and closed June 30, 2017. A series of questions about the goals, strategies, and focus of the plan were asked and respondents were provided multiple choices for an answer plus an opportunity to provide additional written comments. A summary of the survey responses follows.

Table H-2: Online Survey Summary for City of Sonora

Survey Questions	Responses
Respondent Profile	28 total responses 86% from City of Sonora residents 4% age 19 to 24 25% age 25 to 44 64% age 45 to 64 7% age 65+ 64% homeowners 46% business owners 46% own business space
Have you used utility rebates for energy efficiency measures or participated in utility efficiency programs?	58% Yes 42% No
If you answered 'Yes' to the previous Question, have you seen cost savings or other benefits from participating in these programs?	50% Yes 4% No 46% N/A
If you are a plans examiner, building inspector or contractor, could you benefit from a local, no-cost Title-24 Training?	8% Yes 8% No 84% N/A
What is your average monthly home electrical bill?	15% $80-100 25% $100-125 60% Over $125
Are you familiar with energy efficiency practices that can reduce energy usage (and costs associated with energy use) in your home?	90% Yes 10% No Comments: My home does not have central air or heat and I am dependent on space heaters and window A/C units. If I don't use them, my bill is less than $50 / mo. If I do, then bill is $150+/mo. Windows are single-pane last replaced in early 1900s. Landlord has no incentive to make home energy efficient.
If applicable, what steps have you taken to lower energy usage and associate costs?	50% Participate in PG&E/Utility programs 50% Other (please specify):

Survey Questions	Responses
	Comments: - Solar, LED's, EV's, insulation, efficient appliances - Replace lighting, thermostat settings - Bought Energy efficient appliances, light bulbs - Change light bulbs to more energy efficient led - Less usage - Turning off lights, setting my thermostat to a higher setting in the summer and lower in the winter. My appliances are energy efficient. - Cut usage. Conserve. - Temp increase on thermo. New lights, energy efficiency curtains, pellet stove, skylights - Installed solar hot water and pool heating
What area of your home uses the most energy?	From highest to lowest response: 1. HVAC (heating and cooling) 2. Electronics (large) 3. Kitchen 4. Laundry 5. Compressors, electric vehicle space, water heating, appliance (other)
Are you interested in completing an energy audit of your home?	25% Yes 75% No
What is the average monthly electricity bill at your business?	11% Under $80 6% $100-125 39% Over $125 44% Not sure
Are you familiar with energy efficiency practices that can reduce energy usage and associated costs for your business?	56% Yes 44% No
Have you heard of or participated in the Sierra Nevada Energy Watch (SNEW) program?	11% Yes, participated 11% Have heard of SNEW, but have not participated 78% No
What area of your business uses the most energy?	Ranked from highest to lowest response: 1. HVAC 2. Lights 3. Computers 4. Automobiles
Are you interested in a free energy audit of your business?	22% Yes 78% No

Survey Questions	Responses
Please rank the following forms of renewable energy generation in the order of the most viable to least viable in Sonora:	Ranked from highest to lowest: 1. Solar 2. Biomass 3. Hydro-electricity 4. Wind 5. Geothermal
Do you currently own or lease a renewable energy system?	12% Yes 88% No
If you are interested in having a renewable energy system, what barriers do you face?	1. Cost 2. Rent/leasing property 3. Space, exposure 4. Blocked by agency 5. Bills not high enough
Are you interested in a site assessment of your home or business for solar?	18% Yes 82% No
What is your average monthly water and sewer bill?	18% Under $35 24% $35 to $70 24% $70 to $100 34% Over $100
Are you aware of any programs that exist to help you save water, lower your bill, and/or reduce water consumption?	41% Yes 59% No
Have you participated in any utility rebate or incentive programs for water efficiency or conservation?	12% Yes 88% No
Are you interested in getting an assessment of your indoor or outdoor water use?	18% Yes 82% No
What would help you achieve further water savings?	1. Don’t know/NA 2. Lower rates 3. Better designs (tankless water heaters, flushless toilets, water-saving appliances) 4. New landscaping with local plants and rocks 5. Storm water collection 6. Drought monitoring 7. Grey water systems