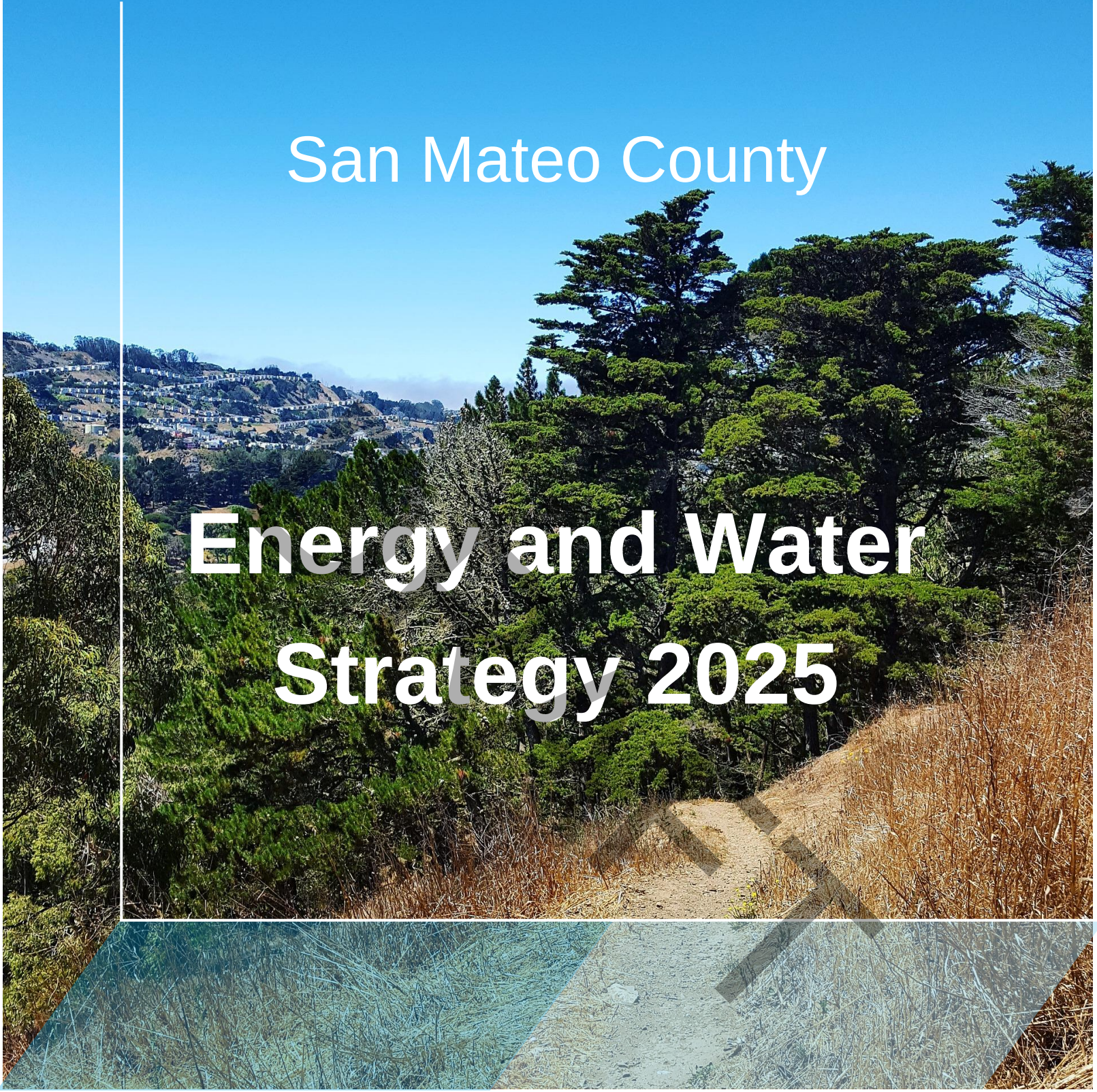
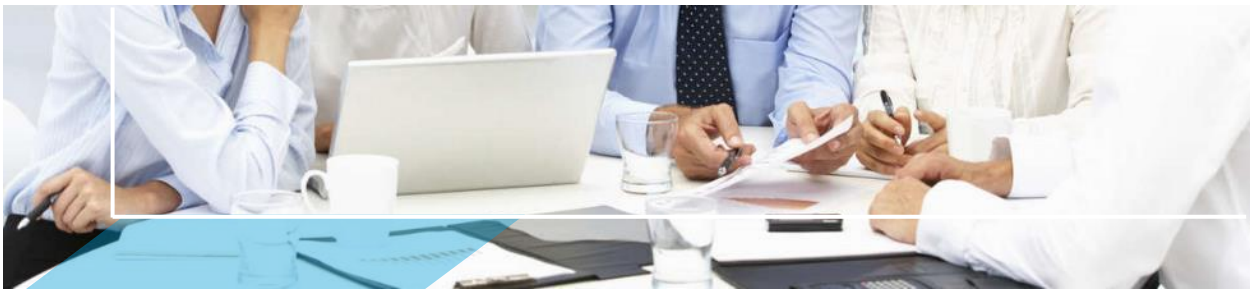


San Mateo County

Energy and Water Strategy 2025

DRAFT November 2018

Table of Contents



Executive Summary

[TBD]

1. Introduction

In December 2008, San Mateo County published the San Mateo County Energy Strategy 2012 document to address the future energy and water needs of the county and recommend how to address the needs in an environmentally, socially and fiscally responsible manner. The Strategy was subsequently adopted by every city in San Mateo County in calendar year 2009. Since that time, much has changed with the prevalence of energy efficiency and water conservation programs, falling cost of renewable energy, the launch of Peninsula Clean Energy, and more prevalent extreme weather affecting water supply and use.

Throughout San Mateo County, all 20 cities and the County are developing new programs and policies to use energy more efficiently and to conserve water resources, which are aligned with state targets to reduce greenhouse gas emissions for 2030 and 2050. A key driver for updating the Couny's Energy and Water Strategy is to identify how to further support and engage stakeholders countywide on meaningful climate action, which will require not only conservation and efficiency, but aslo a transition of energy and water infrastructure, and broader coordination amond stakeholders.

There has been a lot of forward progress since 2009, and local governments across California are becoming important players in energy markets, building upon a long history of leadership in water supply and conservation programs. Given the urgency of climate action, stakeholders across San Mateo County are forging new paths to address the climate imperative, including taking significant action to move from centralized fossil fuels sources to cleaner, distributed and renewable resources.

The San Mateo County Energy and Water Strategy 2025 reflects the commitments and priorities of diverse stakeholders across the county. Together, we can each do our part to ensure that our energy and water policies and programs continue to promote a high quality of life, sustainability and resilience for future generations.

1.1 Desired Outcomes

San Mateo County is a world renowned center for innovation in an area with a rich variety of natural beauty. As a region, San Mateo County has always benefited from the talent and diversity of its residents and industries. These attributes are a critical foundation for ensuring that the *San Mateo County Energy and Water Strategy 2025* captures the many initiatives already underway related to new energy and water technologies, programs, policies, financing and business models.

As a county, we seek to foster regional partnerships between policy makers, private sector partners and the public. By convening this strategic plan, we will increase collaboration and impact in achieving local and state climate goals, while working together to preserve the diverse natural and cultural beauty that exists here. Elimination of greenhouse gases (GHG) caused by fossil fuels will require participation from all sectors of the community, local governments, and other regional agencies. Through this plan, San Mateo County will steward the clean energy transition and protect our water resources through shared programs, outreach and education, and coordination of funding opportunities.

1.2 Vision and Guiding Principles

Vision: [In progress]

The guiding principles for San Mateo County's Energy and Water supply include:

- **Sustainable:** Support positive environmental impact with the lowest possible carbon footprint for delivered and consumed energy and water
- **Equitable:** Ensure energy and water is accessible to all, regardless of socioeconomic or other status
- **Abundant:** Provide water and energy at a capacity to serve current and future needs
- **Reliable:** Build and maintain infrastructure so that energy and water is there when you need it
- **Resilient:** Prepare for the effects of climate change or other potential disasters to ensure that energy and water is there when you need it

- **Affordable:** Provide energy and water at a cost that is competitive and economically stable
- **Safe:** Ensure energy and water is safe to consume, cybersecure, and does not pose a hazard for the community

2. Background and Context

Energy and water are the foundation of modern life. In recent years, San Mateo County has seen significant changes related to energy and water: in its availability, how it is supplied and managed, and how residents and businesses use these resources. The issues related to energy and water are similar in some ways, but different in many others.

2.1 Energy

San Mateo County, California and the world at large have arrived at a critical juncture in our energy transition away from fossil fuels. Driven by the urgency of climate action, stakeholders across the county are leveraging new opportunities to become key players in the energy transition, driven by recent trends in three areas:

- **Technology:** Energy technology is changing quickly, presenting new opportunities for residents and businesses to both consume and produce energy in new ways to promote sustainability and cost savings. New distributed energy technologies include integrated solutions such as microgrid applications and energy storage for community resiliency. New smart building controls support the aggregation of multiple sites to provide meaningful grid services and new revenue streams for residents and businesses.

- **Markets:** The falling cost of renewable energy technologies combined with the rise of community choice aggregators (CCAs) is fostering local control of electricity supply in whole new ways. With the launch of Peninsula Clean Energy, all 20 cities and the County can now procure cleaner, more renewable energy on behalf of their citizens.

- **Policy:** Local governments and other agencies are increasingly using their established powers to enact new policies and programs to accelerate adoption of energy efficiency and incentivize cleaner, more local renewable sources of energy. Local policies include building reach codes, energy disclosure, procurement practices, and innovative land use and zoning requirements that support sustainable development.

All levels of government are being called to appropriately respond to the global impacts of climate change, primarily by the sourcing and use of renewable energy in our buildings and transportation, in order to significantly reduce greenhouse gas emissions and limit global warming to 1.5 degrees Celsius. Federal, state and local government policymakers alike have recognized the need for smarter, more robust clean electricity infrastructure if we are to achieve our GHG reduction goals.

Our clean energy future will require relying on greater amounts of renewable generation, use of electricity as a fuel for vehicles and buildings' heating/cooling systems. Electrification is becoming a key priority in the energy transition, resulting in a convergence of transportation and clean vehicle policy with electricity usage associated with buildings. This transformation also includes empowering the community to become active participants in the energy markets, while continuing to grow the local clean energy economy.

2.1.1 Regulatory Framework

The regulatory framework in California is rapidly expanding in support of a renewable energy future. The following regulations and commitments are shown to highlight the sea change happening in the state's energy transition:

- **Senate Bill100**: In September 2018, California committed to 100% GHG-free electricity by 2045 leading alongside Hawaii in statewide renewable energy goals.
- **Greenhouse Gas Reduction Imperatives**: Through Senate Bill 32 cities are required to reduce GHG emissions 40% by 2030 and following Executive Order B30-15, 80% by 2050, as compared to 1990 levels. The primary sectors for GHG emissions in San Mateo county are transportation and building energy use. Therefore, to meet these state requirements cities are swiftly moving to decarbonize buildings and transportation through electrification.
- **Renewable Portfolio Standard (RPS)**: California's 50% Renewables Portfolio Standard by 2030 has positioned the state as a global leader in renewable energy, with an interim requirement of 33% by 2020. The increasing amount of renewable energy has been the most significant driver of GHG reduction in buildings for many cities and counties.
- **CAFÉ standards:** Transportation emission reductions since 1990 are largely due to the state improvements of the Corporate Average Fuel Economy, or "CAFÉ" standards, improving the average fuel economy of cars and light trucks through standards and regulations.

- **5,000,000 Electric Vehicles Target**: California has set its sights on incentivizing the adoption of electric vehicles and electric vehicle charging infrastructure in order to meet the goal of getting 5 million EVs on the road by 2030.
- **Zero Net Energy (ZNE):** California building code requires all residential new construction to be built to ZNE standards by 2020, with a stated goal that all commercial buildings are ZNE by 2030.

All of these regulatory signals are moving toward GHG free electricity and drastically reducing fossil fuel consumption in buildings and transportation. Achieving this shift away from fossil fuels will require the County to work on behalf of our stakeholders, with the governing energy agencies who regulate California's energy system: California Independent System Operator (CAISO) which operates and manages the overall transmission system also known as "the grid"; California Public Utilities Commission (CPUC) which regulates the local distribution system; the California Energy Commission (CEC) which tracks historical use, forecasts future needs, sets energy efficiency standards, and supports development of new energy technologies; our local investor-owned utility, Pacific Gas and Electtric (PG&E); Peninsula Clean Energy (PCE), and the many stakeholders across San Mateo County who can support this transition.

2.1.2 San Mateo County Energy Data and Trends

Across San Mateo County, overall energy consumption has continued to decrease even as population and jobs have increased. As shown below in Figure 1 and Figure 2, overall electricity consumption has decreased 8% and natural gas consumption has decreased 13% between 2005 and 2015, based on PG&E data.

Figure 1. Electricity Consumption by Sector

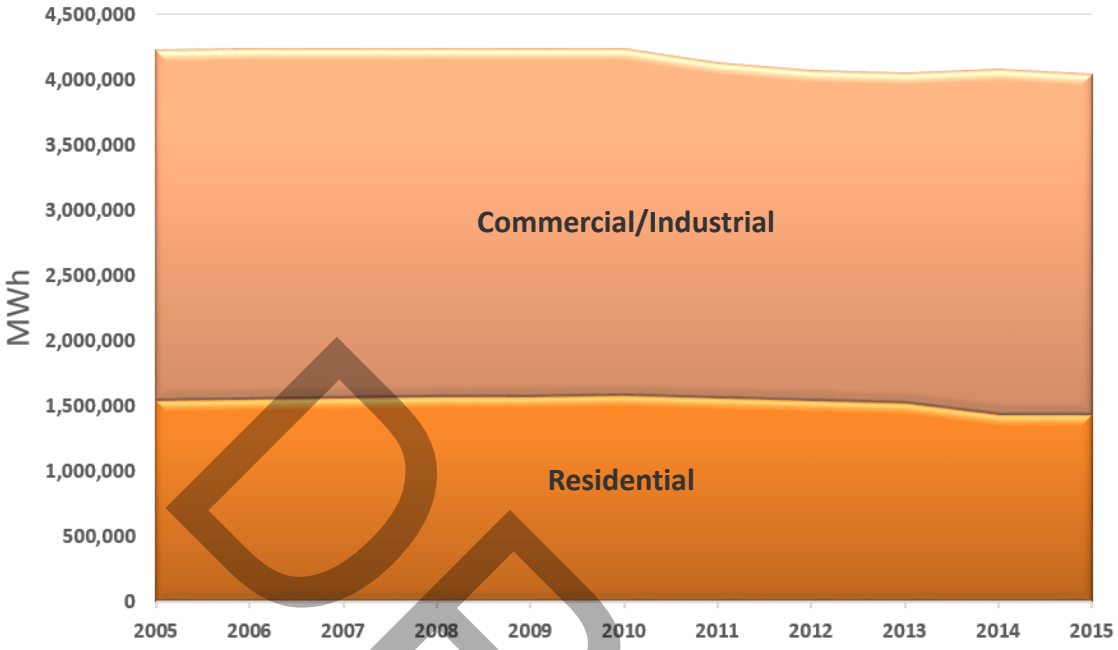
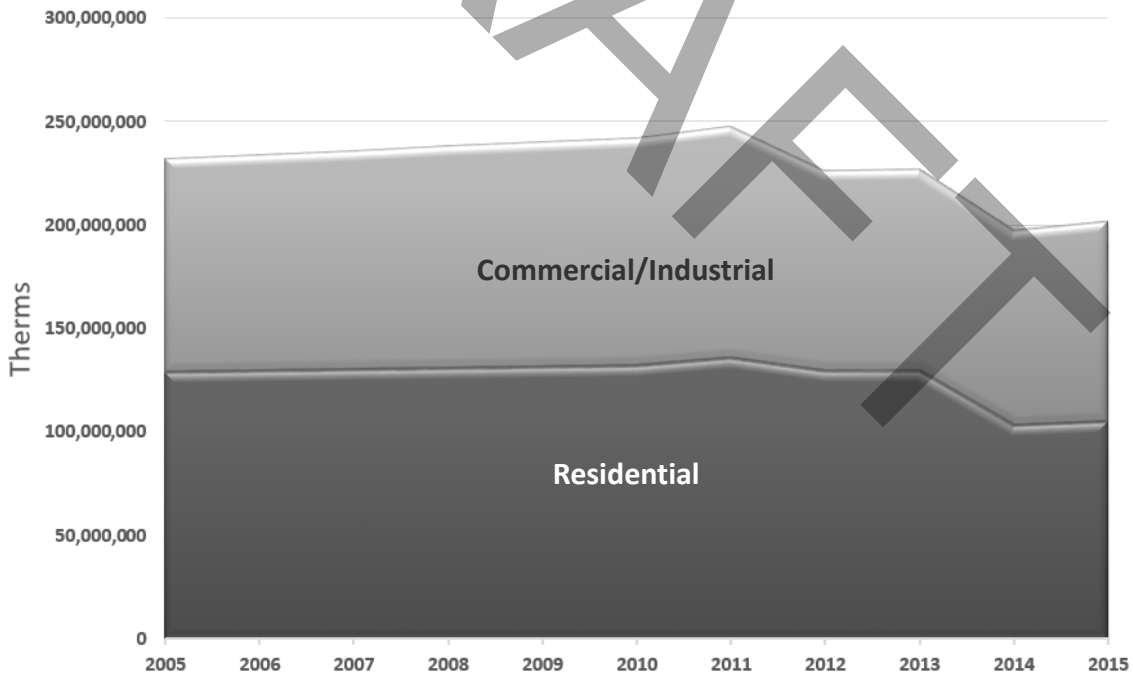


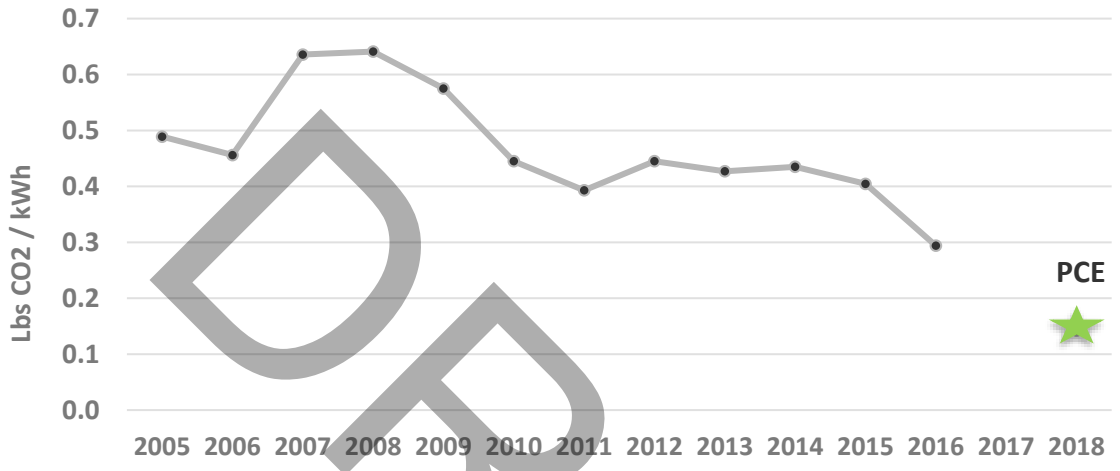
Figure 2. Natural Gas Consumption by Sector



While electricity consumption has decreased slightly, the greenhouse gas emissions factor associated with PG&E supplied electricity has decreased 40% since 2005, largely driven by the State's renewable portfolio standard (RPS). As shown in **Figure 3**, with the launch of PCE an

additional 30% decrease in emissions is expected based on PCE's 2018 emissions factor, with PCE setting a goal to supply 100% GHG-free electricity by 2021 and source 100% CA RPS eligible renewable energy by 2025.

Figure 3. Electricity Emissions Factor (PG&E 2005 – 2016)



In addition to energy consumption, there has been an increasing trend for distributed energy such as solar PV, as well as increased electric vehicle adoption. As of January 2018, approximately 2% of vehicles registered in San Mateo County with Department of Motor Vehicles are estimated to be battery electric (BEV), or plug-in hybrid (PHEV) electric vehicles.

Figure 4. Cumulative Solar Capacity Installed by Sector

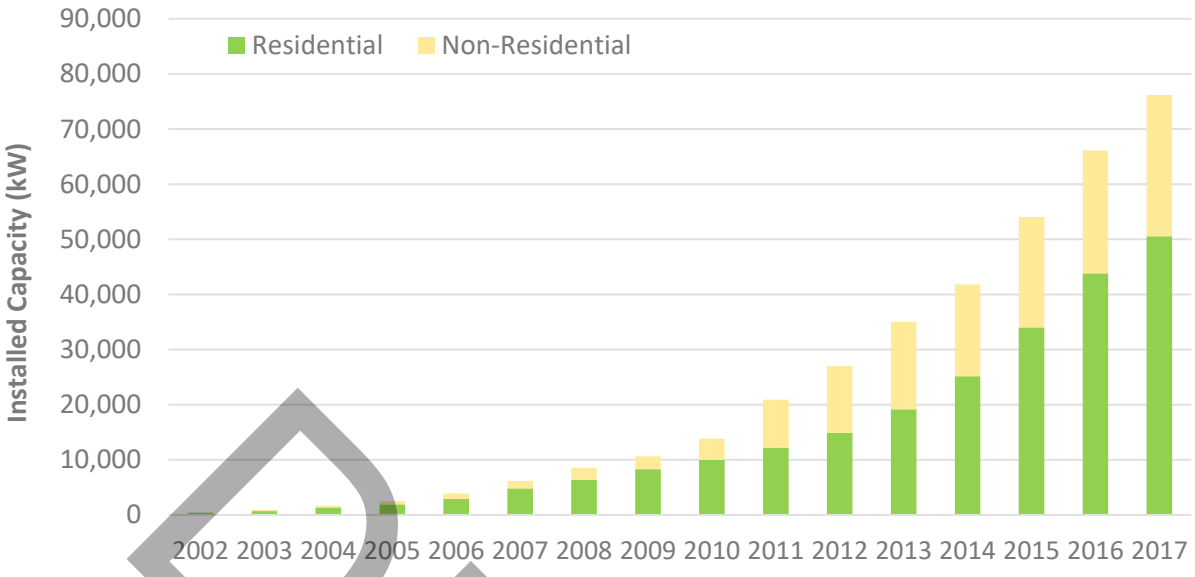
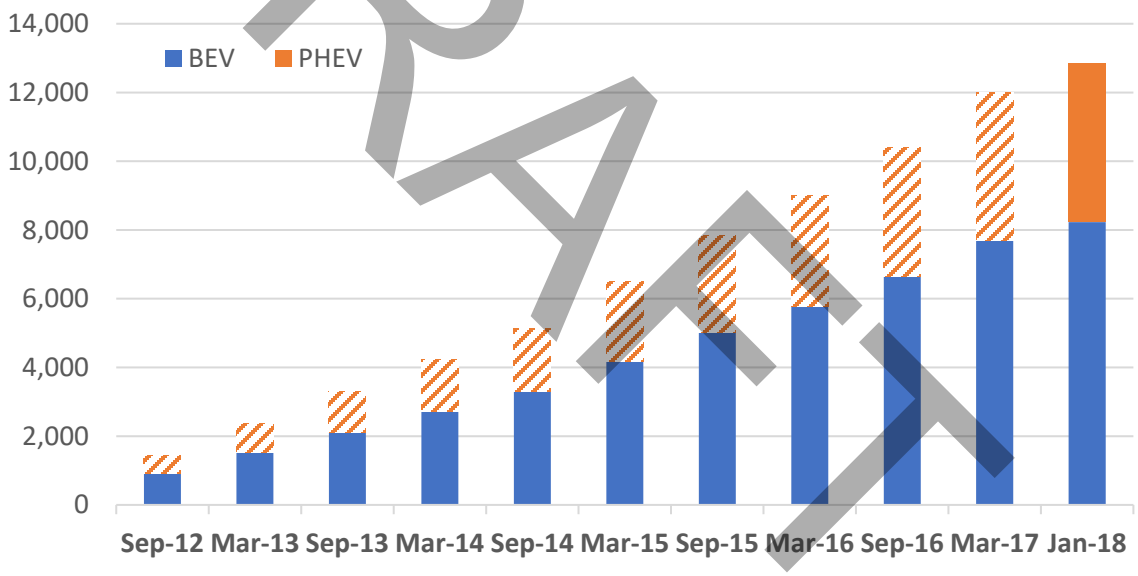


Figure 5. Electric Vehicles Registered in San Mateo County (Passenger Vehicles)



In summary, substantial progress is being made countywide to reduce energy consumption, and shift to cleaner sources of energy in vehicles and to power our homes and businesses. However, more work remains in order to meet the State of California's ambitious climate goals for 2030 and beyond.

2.1.3 Challenges and Opportunities

In the transition from centralized fossil-fuel based energy to optimizing distributed and renewable resources, many issues and challenges remain. These include:

- **Grid infrastructure to support electrification and distributed energy resources.** As our communities increasing electrify both transportation and buildings, the grid infrastructure must be upgraded to ensure adequate capacity for increased loads.
- **Data access for stakeholders and community partners.** With smart grid and smart building technologies, more and more data is now available in real-time for managing consumption and generation. This includes data associated with grid capacity. Currently, the data is held by disparate entities, and restricted by conservative data privacy rules. More work is needed to identify how data can be better utilized to support various energy initaitives and priorities.
- **Existing buildings and opportunities for upgrades.** The biggest issue holding back the transformation of the building sector is the rate at which existing buildings can be retrofitted for building envelope and electrification of space and water heating systems. While building codes have continued to increase in stringency for new construction, existing buildings form the vast majority of the built environment and further innovations are needed for decarbonization of existing buildings.
- **Need for new partnerships.** The energy landscape in the County is changing with more players, and more coordination is needed across various partners, including the County, PCE, PG&E, the 20 Cities, private sector partners and regional agencies to incentivize and accelerate the adoption of efficient, electric technologies and transition the fuel of our buildings and fleets to clean electricity.
- **Community engagement for all sectors, including communities of concern.** The energy transition necessitates individual action, in addition to government and private sector action. Therefore, deep engagement with community members across San Mateo County is needed in the development of new programs and policies. In particular, particular focus is needed on equity, encompassing racial and social justice, to support our most vulnerable populations

2.2 Water

Water is an essential resource for life, and is inextricably linked to energy. While modern society can (arguably) live without electricity and natural gas, water is the lifeblood of humanity – constituting 60% of the adult body and every living cell in the body needing water to function.

Even though the San Mateo County community has responded well to the drought in terms of water conservation, Climate change is foremost the largest issue of concern impacting water availability and how our communities will adapt to changing water supply issues. According to State of California's 4th Climate Change Assessment Report (2018):

> "Current management practices for water supply and flood management in California may need to be revised for a changing climate. This is in part because such practices were designed for historical climatic conditions, which are changing and will continue to change during the rest of this century and beyond. As one example, the reduction in the Sierra Nevada snowpack, which provides natural water storage, will have implications throughout California's water management system."

Adapting to changing precipitation patterns requires managing water and balancing supply, as well as consumption and how water is used to support modern society. The concept of "One Water" emphasizes the continuous movement of water through the hydrological cycle, including from drinking water to wastewater. Therefore, a sustainable future requires managing our water resources to reduce water consumption, leverage alternative supplies and promote innovation across the water industry.

2.2.1 Regulatory Framework

In contrast to energy, which is primarily supplied by two entities (PG&E and PCE), there are numerous water retailers operating across San Mateo County as part of city services. In 2003, the Bay Area Water Supply & Conservation Agency (BAWSCA) was created to represent the interests of 24 cities and water districts, and two private utilities, in Alameda, Santa Clara and San Mateo counties that purchase water on a wholesale basis from the San Francisco Regional Water System.

In addition to serving as water retailers, several cities and joint powers of authorities across San Mateo County provide wastewater treatment and services, including Silicon Valley Clean Water, Sewer Authority Mid-Coastside and others.

The regulatory framework for water supply and use is largely driven at the state level, providing oversight of disparate urban water suppliers to drive conservation efforts and ensure adequate statewide management of water resources. Key regulations include:

- **SB 606 and AB 1668**, which establish a framework for the implementation of new standards around efficient water use. Together the bills will require cities and water districts to establish strict annual water budgets and set a water use target by 2022. Agencies not meeting their goals by 2027 may face fines of up to $10,000 per day. The water use standards will be developed based on indoor and outdoor residential water

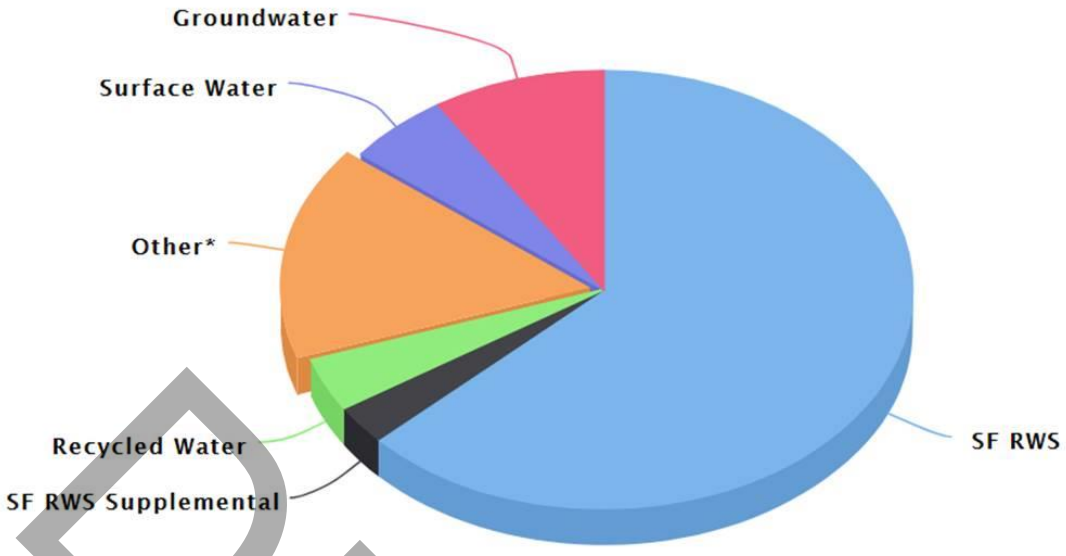
use, commercial, industrial, and institutional outdoor water use, water loss, and other regional variances. The indoor water standard will be 55 gallons per person per day in 2022, falling to 50 gallons per person in 2030. The bills also provide incentives to water suppliers for recycling water .

- **AB 1739, SB 1168 and SB 1319, collectively known as the Sustainable Grounwater Management Act (SGMA),** requires governments and water agencies to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans.
- **National Pollutant Discharge Elimination System (NPDES),** is a U.S. Environmental Protection Agency permit program addressing water pollution by regulating point sources that discharge pollutants. The San Mateo Water Pollution Prevention Program (SMCWPPP) is a partnership of C/CAG, each incorporated city and town in the county, and the County of San Mateo, which share a common NPDES permit to comply with federal and state requirements.
- **Water Reclamation Requirements for Recycled Water Use (General Order)** were adopted in 2016 by the California State Water Resources Control Board to establish standard conditions for recycled water use and further encourage recycled water use statewide. The General Order acknowledges recycled water as a resource through water reclamation requirements, and allows recycled water programs to be permitted by the State Water Board.

2.2.2 San Mateo County Water Data and Trends

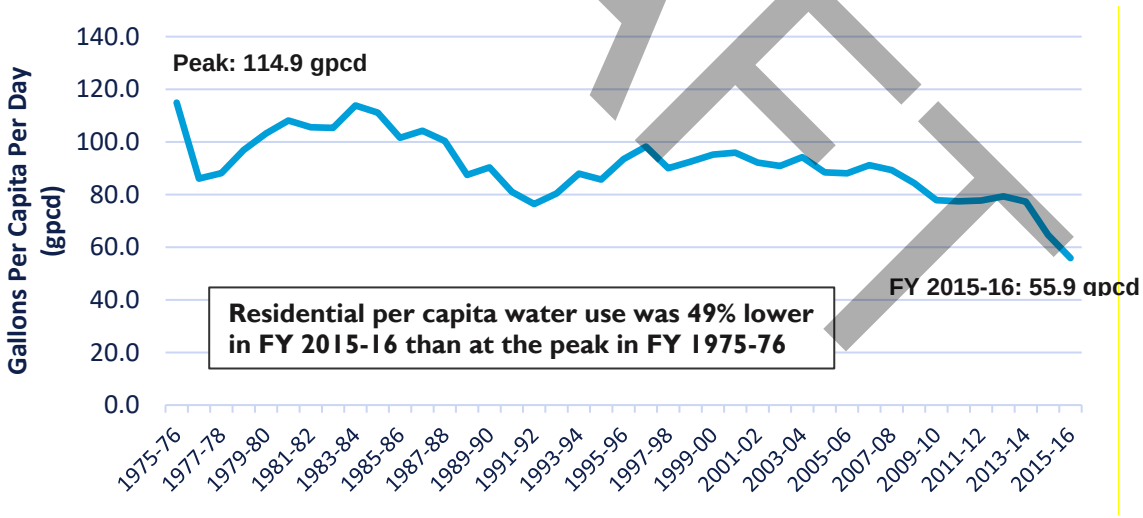
According to BASWCA, the majority of water supplied across its service area of San Mateo, Alameda and Santa Clara counties is provided by San Francisco Regional Water Supply (RWS), followed by groundwater and other sources as shown in Figure 6. Among the BAWSCA member agencies, however, sources of supply vary considerably. In San Mateo County, a very small portion of water is supplied by groundwater in contrast to other counties.

Figure 6. Water Use by Source (FY 2016-2017) for BAWSCA Service Area



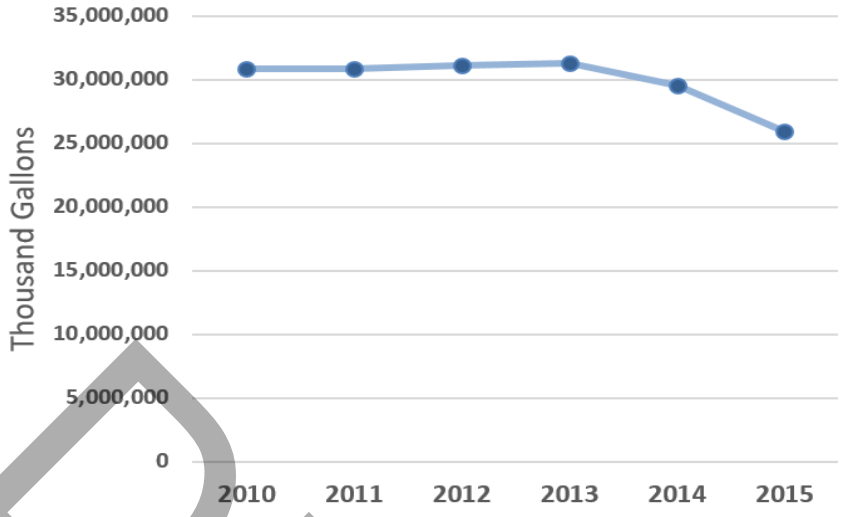
Over the past four decades, overall water consumption has decreased across San Mateo County consistent with trends in decreasing residential per capita water use across BAWSCA's service area. As shown below in Figure 7, across BAWSCA's service territory for Alameda, Santa Clara and San Mateo counties, the average residential gallons per capita per day (gpcd) decreased 49% from 1975 to 2015.

Figure 7. BAWSCA Residential Per Capita Water Use



While per capita water consumption has decreased across San Mateo County, Figure 8 shows that total water consumption has largely remained flat despite significant population and jobs growth. Additionally, after Governor Jerry Brown issued a proclamation declaring a Drought State of Emergency in January 2014, total water consumption in San Mateo County decreased by approximately 15% countywide, an impressive achievement.

Figure 8. Total Water Consumption in San Mateo County



2.2.3 Challenges and Opportunities

Similar to energy, the water sector is facing numerous issues and challenges moving forward related to ensuring reliable water supply, high-quality water, fair costs and minimizing environmental impacts. These include:

- **Water and wastewater infrastructure withstanding seismic and other hazards.** Continued investments are needed to upgrade aging infrastructure, including identifying risks associated with seismic and other hazards such as sea level rise, changes in precipitation and extreme weather. In particular, regional wastewater treatment plants are identified as critical infrastructure and face risks associated with backflow due to sea level rise.
- **Water supply management that accounts for uncertainties of climate change.** Largely driven by BAWSCA, numerous strategies are needed to identify water supply management projects and/or programs (projects) that can be developed to meet regional water reliability needs. Recent trends include indirect potable water reuse, which introduces recycled or reclaimed water into an environmental buffer such as groundwater aquifer or surface water reservoir.
- **Innovation in water conservation strategies.** In contrast to energy, there are limited dedicated funding streams for water conservation and more work is needed to leverage opportunities for innovation, including real-time metering of water use data, app-enabled water monitoring and aggressive policies and programs at the local level.

- **Working across a large number of diverse stakeholders, agencies and community-based organization.** Many of the water supply management strategies, including conservation and alternative supplies, requires engaging with a large number of water retailers across San Mateo County. This includes a need to engage community-based organizations and communities of concern to ensure an equitable distribution of resources, programs and opportunities for clean, reliable water.

2.3 Energy-Water Nexus: Collaborative Impact

This strategic plan focuses on energy and water resources as foundational to modern life and prosperity across San Mateo County. Energy is inextricably linked to water in many ways. First of all, energy is required to extract, treat and deliver water. Reducing water use, especially hot water use, reduces energy use in San Mateo County. Similarly, water is used for energy and electricity generation, including for hydropower and geothermal energy, cleaning solar photovoltaic panels, and as cooling water for power plants.

Engagement with diverse stakeholders across both energy and water, will address the issues and challenges facing the county faces over the responsible supply and use of both energy and water resources.

2.3.1 How to Use this Strategic Plan

Partnering to bring about a sustainable energy and water future is more promising than ever. The county, the cities, Peninsula Clean Energy (PCE), PG&E, BAWSCA, local joint powers of authorities (JPAs) and the dedicated NGOs and businesses in the region, are all key partners. These implementation and resource partners have collaborated to identify countywide priorities for expanding programs and policies to support sustainable, reliable, and equitable management of energy and water resources.

The result is a coordinated *San Mateo County Energy and Water Strategy 2025* which focuses on goals, strategies and actions to guide all our efforts and priorities for the next several years. In the process of developing this strategic plan, we also foster a deeply connected cross-sectoral working group of local experts acting together to advance innovative energy and water solutions to benefit our communities.

This strategic plan supports all stakeholders to prioritize high impact actions, by highlighting how different organizations can work together, and builds upon the exemplary efforts of diverse stakeholders throughout San Mateo County. Together, we can promote environmental sustainability, reduce greenhouse gas emissions, increase the supply of clean energy and water, and address the guiding principles mentioned earier in the Strategy document. .

2.3.2 Roles and Responsibilities

This strategic plan identifies many goals, strategies and actions that are needed to steward the clean energy transition and protect our water resources throughout San Mateo County. For both energy and water, key partners were identified for implementation as listed in

Figure 9. We also seek to engage with non-governmental organizations (NGOs). These include local environmental organizations, sustainability advocacy organizations, community-based organizations, local student groups and other entities active in implementing and promoting energy and water initiatives.

Figure 9. Key Partners for Implementation

Energy	Water
• San Mateo County (SMC) • City government • Peninsula Clean Energy (PCE) • Pacific Gas & Electric (PG&E) • Resource Conservation District (RCD) • Non-government organizations (NGO)	• San Mateo County (SMC) • Bay Area Water Supply and Conservation Agency (BASWCA) • Water retailers (cities) • City (other departments) • Resource Conservation District (RCD) • Non-government organizations (NGO)

Since each action described in this strategic plan is multi-faceted, different roles were further identified. As shown in Figure 10, responsibilities associated with key partners and the specific types of actions envisioned for each partner have been indicated (denoted by the corresponding icon).

Figure 10. Key to Categorizing Actions

Category	Example Actions	Icon
Policy or Policy support	Adopt reach codes, ordinances and new policies to influence community behavior, retrofits and upgrades	
Outreach/Marketing	Launch education campaigns to increase awareness of resources, desired behaviors and trainings	
Programs and Partnerships	Provide technical assistance, pilot programs, and facilitate engaging with partners	
Utility Infrastructure	Invest in and upgrade energy and water infrastructure at the utility-scale.	
Technology	Supporting technology dissemination and development, as well as foster commercialization of new technologies	
Financing/ Incentives	Provide funding, financial incentives, financing and loans	

3. Opportunities in a Changing Energy Landscape

Driven by new state policy, technology and market opportunities, the way local governments manage, supply and interact with energy is changing rapidly. In this chapter, we identify how San Mateo County, Peninsula Clean Energy, PG&E, cities and others must work together to navigate the energy transition to the greatest benefit for our local communities.

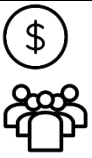
Goal E1. Optimize and reduce

Strategy E1.1: Leverage passive design and smart building technologies to optimize and reduce energy use in existing buildings

	Actions	SMC	City	PCE	Other
1.	Provide financial and technical resources, and workforce development trainings for installers and building owners/operators to learn to analyze building energy use through a combination of measures.				PG&E RCD
2.	Pursue development of local benchmarking and energy use disclosure ordinances, with County support for cities to develop policies and set EE goals.				
3.	Leverage utility and PCE program incentives for energy efficiency and demand side management, including monitoring based commissioning programs and energy (and water) audits of agricultural and industrial operations.				RCD

4.	Develop programs which encourage retrofits and smart home, real-time monitoring including sub-metering, along with passive (efficiency) design features for major remodels.				
5.	Engage real estate and property management to address split-incentive issues, including developing tenant improvement guidelines and green lease contracting templates.				
6.	Leverage public-private partnerships and multisector resources support efforts like innovative pilots including a smart/efficient building design competitions. Secure partnerships with partners such as Nest, Mynt, OhmConnect.				PG&E 

Strategy E1.2: Promote policy and high efficiency design approaches for zero net carbon in new construction

	Actions	SMC	City	PCE	Other
1.	Support regional approaches to promoting reach codes for new construction to go beyond state ZNE goals, including templates, pilots and case studies focusing on Net Zero Carbon (NZC), also known as all-electric. Partner with utilities around all electric infrastructure planning.				PG&E 
2.	Adopt local reach codes, streamline permitting and other green building policies focusing on Net Zero Carbon, beyond state ZNE codes. County to provide templates for NZC reach codes and outreach materials.				
3.	Aggressively promote all-electric new buildings including accessory dwelling units and funding for net zero carbon pilots.				
4.	Increase customer education and training for the trades around net zero carbon buildings, including efficiency, heat-pump (all-electric) heating/cooling systems, on-site renewables and other distributed energy resources.				Regional 
5.	Integrate resilience assessments, upcoming AB 262 assessment of project materials for global warming potential, and energy audits for planning with new developments to ensure longevity, including				

	consideration of future climate impacts (increasing heat, flooding, etc).				

Strategy E1.3: Leverage new technologies related to existing building electrification such as heat pumps for thermal loads

	Actions	SMC	City	PCE	Other
1.	Create heat pump water heater (HPWH), space heating and electric stoves/dryers program. County will support cities and PCE to create education, training and outreach for electrification measures.				
2.	Create public private partnership around mid-stream incentives and/or group buy of HPWH (similar to Sunshares). Work with utility or PCE to set up on-bill or easy financing solution.				 Regional & State
3.	With utility and PCE, explore opportunity to pilot a fleet of grid-enabled heat pump water heaters in multi-family new construction or large scale retrofit.				 Developer, Manufact.
4.	Provide/Promote workforce development opportunities related to building electrification, including cross-training of plumbing and electrical trades; engage manufacturers to provide trainings for all electric technologies (including stoves, heaters, etc), and educational resources for inspectors/ permit/ plan checkers.				
5.	Develop model reach codes and incentives for all electric building measures and streamline permitting processes for heat pump technology.				

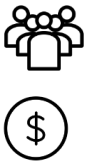
Strategy E1.4: Align energy demand (loads) with renewable energy generation for grid stability

	Actions	SMC	City	PCE	Other
1.	Analyze buildings for demand response and load shaping opportunities; considering rolling out alongside Energy Benchmarking program launch.				
2.	Promote permanent shifts of load to times when renewable energy is plentiful through energy and thermal storage, load timing/controls, precooling/pre-				 Utility

	heating and other measures				
3.	Promote automated demand response solutions/technologies to curtail customer demand (e.g., AC load control, etc)				

Goal E2. Decarbonize and shift to clean energy

Strategy E2.1: Support rapid community shift to 100% GHG-free electricity

	Actions	SMC	City	PCE	Other
1.	Create partnerships, awareness campaigns and incentives to maximize opportunities for local rooftop PV and carport PV systems combined with energy storage for residential and commercial buildings. For the agricultural sector, promote solar-powered pumps (for water).				 RCD
2.	Enhance building reach codes to support community scale smart solar projects with energy storage, and multifamily dwelling units electric vehicle charging infrastructure.				
3.	Encourage all consumers to move towards 100% renewable energy, through PCE's ECO100 supply option and its 100% renewable energy by 2025, as well as regional power purchase agreements and bulk buy programs.				
4.	Research seasonal and time dependent impacts on grid				
5.	Plan for regional or municipal emergency centers to site battery storage.				

Strategy E2.2: Electrify transportation

	Actions	SMC	City	PCE	Other
1.	Initially focus on fleet electrification opportunities (e.g., school buses, transit, municipal fleets, etc). Work with TDMs, transportation network companies to electrify commuter fleets. Provide fleet manager trainings.			 	
2.	Accelerate adoption of electric vehicles in the community: Provide incentives and expand bulk buy opportunities. Promote through municipal channels as well as ride and drive events				 State
3.	State and regional partnerships to promote and incentivize EVs, and include low emission biofuel for existing vehicles, and off-road equipment alternatives, including electric tractors.				 PG&E  RCD

Strategy E2.3: Increase EV charging infrastructure countywide

	Actions	SMC	City	PCE	Other
1.	Develop an organized charging infrastructure strategy that incorporates expansion throughout the region including curbside, workplace, fast chargers and at home charging. Include tools for assessment and policy templates				
2.	Partner with PCE, PG&E and technology providers to implement EV2Grid strategies for load shaping and resilience.			 	
3.	Provide model consumer payment policies at charging stations to support cities and local businesses to install public and workplace charging infrastructure.			 	
4	Develop model ordinances and policies for EVCI in multi-unit dwellings and low income communities.				

Strategy E2.4: Participate in building electrification advocacy

	Actions	SMC	City	PCE	Other
1.	Support building electrification through regional and statewide advocacy				 NGOs
2.	Research gas line issues, gas data and policy pathways to expose the facts on methane leaks and dangers, and true costs				

Strategy E2.5: Foster innovative local energy sources and carbon offset projects

	Actions	SMC	City	PCE	Other
1.	Explore waste-to-energy (including food waste-to-energy and landfill methane capture) and pyrolysis of unrecyclable plastic waste.				
2.	Explore opportunities for renewable gas, including biogas, digester gas and landfill gas, and more efficient district energy systems.				
4.	Study wind, tidal and other renewables in region				
5.	Develop a partnership program or regional collaboration for R&D, investments and opportunities in local alternative/clean energy businesses				
6.	Develop and implement Carbon Farm plans on coast side for carbon sequestration, including agricultural waste and food waste (compost).				RCD  

Goal E3. Modernize the grid for resilience and decarbonization

Strategy E3.1: Support integrated distributed energy resources (DER) solutions for resilience and optimization

	Actions	SMC	City	PCE	Other
1.	Streamline permit processes (city, county, state, utility) for new DER technologies including for storage and electric vehicle charging infrastructure.				 PG&E
2.	Establish pilot projects of microgrids at critical facilities across San Mateo County (e.g., schools, hopsitals, fire, police), prioritizing opportunities to serve low-income and vulnerable populations.		 Public works		
3.	Advocate to address regulatory barriers to cost-effective multiple use applications for solar+storage, microgrid and other DER project opportunities.				 PG&E
4	Integrate DER measures into existing utilty programs providing financial and technical assistance, including on-bill repayment.				 PG&E

Strategy E3.2: Utilize equity tools to expand access to clean energy projects and job opportunities

	Actions	SMC	City	PCE	Other
1.	Leveraging existing network across San Mateo County (e.g., County Office of Health & Human Services, energy financing, community-based organization) to target new energy programs and workforce development opportunities for communities of concern.				NGO
2.	Identify core resources and local San Mateo County barriers to energy efficiency, microgrid, electric vehicle and DER project opportunities.				NGO
3.	Partner with San Mateo Community College District, PCE, PG&E and other organizations to develop new training and workforce development programs.				

4.	Ensure that all incentive programs include an equity component (e.g., income-related adders for incentives) and assess opportunities to better channel resources to communities of concern.				

Strategy E3.3: Leverage open data and big data opportunities to transform energy systems locally

	Actions	SMC	City	PCE	other
1.	Develop an integrated map of DER project feasibility parameters on easy to access shared platform (e.g., with multiple information layers related to solar potential, hosting capacity, and other grid analyses).				
2.	Utilize utility distribution system capacity maps to prioritize microgrid, solar+storage and other DER project opportunities				PG&E NGO
3.	Develop localized metered data (AMI interval data) to understand existing conditions for energy efficiency, demand response and resilience.				PG&E
4.	Develop utility partnership to push strategic planning around electrification and grid modernization, including prioritization of improvements (in lieu of new 50-year gas distribution strategy)				PG&E CPUC

Strategy E3.4: Explore and develop innovative financing and funding models for advanced energy community solutions

	Actions	SMC	City	PCE	Other
1.	Pursue grants aggressively with California Energy Commission, BAAQMD, Office of Planning and Research, federal agencies, as well as local philanthropic organizations with focus on low-incoem and communities of concern.				NGO PG&E RCD
2.	Promote existing financing vehicles including property-assessed clean energy (PACE), on-bill financing/repayment, power purchase agreements (PPAs) and energy savings performance contracts.				PG&E RCD
3.	Consider local carbon bonds or carbon taxes to support local clean energy projects that serve all members of the community.				NGO

4.	Advocate for new gas and utility user taxes (UUT) to incentivize electrification and shifting from fossil-fuel based energy sources.				
5.	Explore new opportunities to leverage private capital for decarbonization initiatives, including utilizing public match funding to de-risk private sector investments.				NGO Private

4. Realizing the Vision of One Water

A countywide effort is required, as with energy, to ensure a safe, reliable and affordable water supply for all community members. In this chapter, we identify how San Mateo County, BAWSCA, water retailers, cities and others must work together to protect our water resources. The one water approach views all water – drinking water, wastewater, stormwater, greywater and more – as resources that must be managed holistically and sustainably.

Goal W1. Enhance water use efficiency

Strategy W1.1: Expand use efficiency programs for indoor water

	Actions	SMC	BAWSCA	Retailer	City	Other
1.	Promote third-party and self-auditng approaches to identifying water efficiency opportunities including agricultural greenhouse efficiency improvements.	RCD				RCD
2.	Implement and evaluate cost-effective commercial/industrial water efficiency measures					RCD
3.	Evaluate and design programs for remaining residential water efficiency opportunities					
4.	Work with city inspectors to ensure enforcement of state requirements for water efficient fixtures and appliances for new buildings and retrofits					
5.	Update mandatory ordinances for water efficiency above state requirements					

Strategy W1.2: Expand programs for outdoor water use efficiency

	Actions	SMC	BAWSCA	Retailer	City	Other
1.	Provide standardized landscape conversion designs (e.g., Lawn-Be-Gone programs) for residential customers	RCD				
2.	Provide efficient irrigation standards to assist commercial property owners with landscape decisions					
3.	Promote Bay Friendly Landscape Guidelines and other resources for new buildings and landscape replacement	RCD				
4.	Expand programs to educate landscape professionals on technologies and strategies for water conservation					
5.	Promote agriculture irrigation efficiency for row crop and other irrigated agriculture	RCD				RCD

Strategy W1.3: Provide real-time water use data

	Actions	SMC	BAWSCA	Retailer	City	Other
1.	Support advanced metering infrastructure (AMI) and smart meters for water					RCD
2.	Develop new programs to provide real-time water consumption data to residents and business owners to influence behavioral usage					
3.	Support pilots for utilizing app-enabled home water monitoring approaches					
4.	Encourage submetering in new construction					
5.	Fund and develop leak detection at the building level					

Goal W2. Expand alternative sources of water

Strategy W2.1: Encourage water reuse

	Actions	SMC	BAWSCA	Retailer	City	Other
1.	Increase education and outreach related to potable and non-potable reuse opportunities.	RCD				NGO
2.	Support development of on-site non-potable reuse regulatory/implementation framework, including model ordinances for new construction					
3.	Provide additional incentives and resources for non-potable reuse (e.g., greywater, rainwater, stormwater) for landscape irrigation, and tailwater recycling for greenhouses, including both demonstration projects and trainings					RCD

Strategy W2.2: Support expanded use of utility-supplied recycled water

	Actions	SMC	BAWSCA	Retailer	City	Other
1.	Promote use of recycled water in pre-plumbing and landscape					
2.	Bring awareness and outreach for potable reuse (opportunity to leverage local NGOs)					
3.	Promote potable reuse pilot projects and advancement of regional potable reuse projects.					

Strategy W2.3: Continue to explore new innovative technologies for alternative water

	Actions	SMC	BAWSCA	Retailer	City	Other
1.	Support investigation of innovative brackish groundwater desalination projects					
2.	Explore opportunities related to surface water management and integrated water management on the coast side					RCD

						
3.	Support innovative water technologies (e.g., fog, condensation, recycled water and energy)					NGO

Goal W3. Support systemic improvements

Strategy W3.1: Engage stakeholders countywide on Integrated Regional Water Management

	Actions	SMC	BAWSCA	Retailer	City	Other
1.	Support awareness and community outreach related to water supply, wastewater treatment, flood and stormwater management and impacts of climate change					RCD SWCB NGO
2.	Promote school programs focused on water efficiency and conservation	SMCOE 				NGO
3.	Expand green infrastructure for stormwater management including permeable pavement, vegetated stormwater features, streetscape improvements and incorporating stormwater/flood conveyance into city planning					RCD

Strategy W3.2: Support resilience of regional wastewater treatment plants to mitigate environmental health impacts

	Actions	SMC	BAWSCA	Retailer	City	Other
1.	Identify and mitigate highest priority facility risks at wastewater treatment plants across the county, including consideration of countywide sea level rise projections and hazards	RCD 				BACWA
2.	Encourage new technologies for wastewater treatment plan resilience (e.g., horizontal levees to address backflow risks)			WWTP agencies		BACWA

Strategy W3.3: Encourage innovation for water utilities

	Actions	SMC	BAWSCA	Retailer	City	Other
1.	Assess water rates and ensure true cost of water as part of stakeholder engagement					
2.	Improve leak detection on utility side of the meter					
3.	Explore opportunities for open data related to water consumption to spur innovation in water efficiency programs and management practices					RCD
4.	Utilize real-time water use data for machine learning, including other data sources such as inspection records					

5. Looking Ahead

While many important and noteworthy actions are identified in this strategic plan, implementation and next steps requires continued coordination amongst key players and stakeholders. Prioritization of efforts was discussed at stakeholder meetings during the development of this Strategy. Policy affecting change that will reduce use of less sustainable resources and energy and water resources in general, in buildings that will have a useful life of many years, is a priority. Setting up tools and processes that will allow stakeholders to collaborate most effectively is also a priority.

5.1 Innovation and the Green Economy

The *San Mateo County Energy and Water Strategy 2025* next steps must harness the power of innovation and collaboration, working with the private sector and across governmental agencies to create a thriving, regenerative ecosystem and green economy. Innovation is a major part of San Mateo County, home to industry leading companies in biotechnology, computer software, green technology, financial management, health care, education and transportation solutions.

> The green economy is defined as an economy that reduces environmental impacts, and aims for sustainable development without degrading the environment.

In this strategic plan, we have identified many additional opportunities for innovation that align with clean, reliable energy and water. These include leading innovation opportunities related to:

- **Data analytics and real-time optimization.** Building systems are increasing in sophistication and controllability, with the ability to provide preventative maintenance. With smart meters providing real-time energy and water data, as well as two-way communication capabilities, new opportunities are emerging to optimize consumption based on market signals to provide new services to grid operators. Data at the community level must also be leveraged for new programs and policy adoption.

- **Distributed resources.** Where many utilities were centralized, increasingly we are seeing the "democratization" of energy and water resources, where buildings are self-generating electricity through solar and reusing water on-site through greywater and rainwater catchment systems.

- **Technology.** In the energy sector, battery storage is rapidly falling in cost, with much innovation occurring at the intersection of solar PV, buildings and electric vehicles. New infrastructure such as microgrids and aggregated distributed energy resources, are creating new players in energy markets.

- **App-enabled devices.** Some of the most recent exciting developments are related to app-enabled programs for energy management, renewable generation, water conservation and leak detection. New app-enabled transportation solutions related to carshare, rideshare, electric scooters and bicycles have already disrupted transportation behavior across the region.

- **Financing and Financial Opportunity.** New financing innovations are also essential to transforming our energy and water systems, including crowdfunding, utility/sustainability as a service, power-purchase agreements, bulk buy programs and leveraging private capital in new ways.

- **Making the Financial Case.** At the end of the day, ensuring a strong financial and business case for action is essential to supporting the transition to a clean energy and water future. Return on investment and ensuring proper lifecycle costing is needed in evaluating investments for new programs and policies.

Green jobs are growing steadily in the region. With clear state climate targets, combined with state and federal tax credits and incentives, the Bay Area now leads the nation in clean tech jobs, with 11% of all US clean tech jobs located in the region[1]. Our region now exports more than $1 billion in clean tech exports, including building control systems and electric vehicles. Finally, as part of our commitment to social equity and justice, we seek to promote middle wage "green collar" jobs that offer better pay for low and middle-skilled workers.

5.2 Priority Workstreams

This plan identifies many important strategies and actions to achieve a collective vision for the transition to a clean energy and water future. As described in

[1] http://www.bayareacouncil.org/economy/green-jobs-actually-are-sprouting-in-bay-area/

Figure 11 and Figure 12, a number of foundational actions are identified in this strategic plan as priorities.

Figure 11. Foundational Actions for Energy

Goal	Foundational Actions
E1. Optimize and reduce	
E2. Decarbonize and shift to clean energy	
E3. Modernize the grid for resilience and decarbonization	

Figure 12. Foundational Actions for Water

Goal	Foundational Actions
W1. Enhance water use efficiency	
W2. Expand alternative sources of water	
W3. Support systemic improvements	

5.3 Monitoring and Tracking

Our key implementation and resource partners have collaborated to develop this strategic plan. This cross-sectoral working group of local experts will continue acting together and individually to advance innovative energy and water solutions, policies and programs.

As shown in

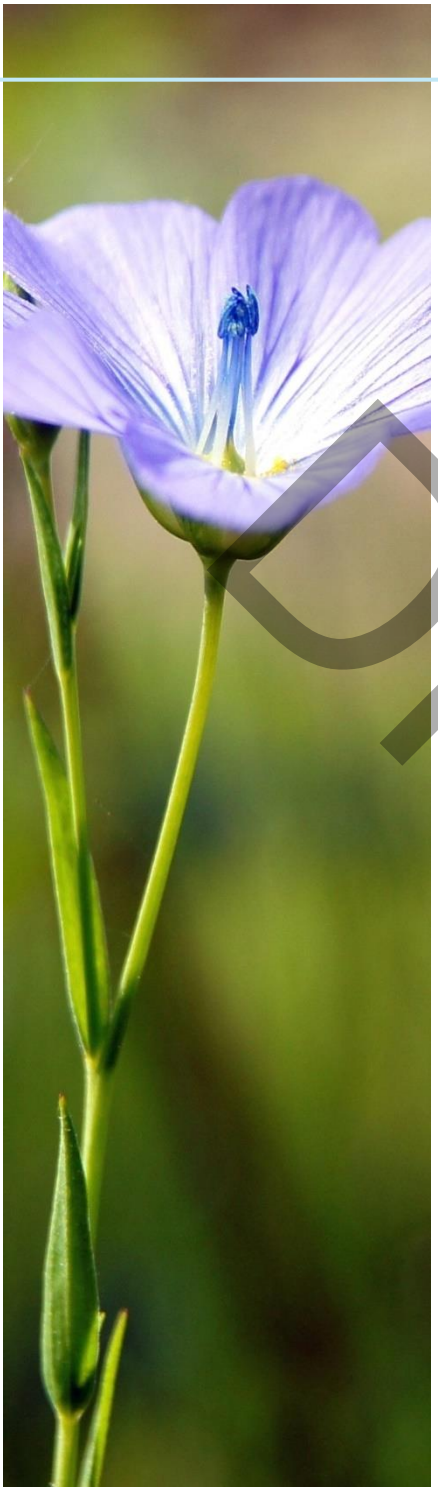
Figure 13 and Figure 14, a number of key performance indicators (KPIs) are identified for energy and water to track progress towards the vision and guiding principles set forth in this plan. Many of these KPIs and associated metrics are already being tracked by various partners, including the County through its open data portal, PG&E/PCE and BAWSCA.

Figure 13. Tracking Progress on Energy

Key Performance Indicator	Metric
Energy consumption (electricity and natural gas)	kWh therms
Electricity supply (renewable energy, local distributed energy resources)	kW of local solar PV, battery storage % renewable energy, or GHG -free electric supply
Electricity emissions factor	MTCO2e/kWh
Electric vehicle registrations and infrastructure	Electric vehicle registrations (BEV and PHEV %) # of electric vehicle charging infrastructure

Figure 14. Tracking Progress on Water

Key Performance Indicator	Metric
Water consumption	Total gallons per year Gallons per capita per year
Water supply	%



6. Conclusion

San Mateo County is a leader in providing solutions for the efficient management of energy and water resources. These programs include energy efficiency, energy innovations such as microgrids, as well as in zero net energy building projects. In the water sector, numerous energy conservation programs are being implemented by BAWSCA, water retailers and local government partners, including laundry-to-landscape, and lawn-be-gone initiatives. As a county, we wish to continue to lead by intently focusing on regional partnerships between policy makers, private sector partners and the public, to increase collaboration and ease around achieving energy and water management goals, while working together to preserve the diverse natural and cultural beauty that exists here.

Supporting the transition to a clean energy and water future will require participation from all sectors of the community, local governments, and other regional agencies. San Mateo County will continue to steward the transition through shared programs, outreach and education, and coordination of funding opportunities; all fundamental steps for collaborative effort toward a 100% renewable energy future that protects and enhances our local water resources.

Through this strategic plan, we connect key partner agencies with sometimes overlapping jurisdictions and responsibilities, including the County and the twenty cities within its boundaries, PCE, PG&E, BASWCA and other key stakeholders. The identified goals, strategies, and actions in this plan represent a pathway for San Mateo's transition to a clean, renewable energy and water future. .

Acknowledgements

County of San Mateo – Project Originators

Kim Springer
John Allan
…

Energy Working Group
..

Water Working Group
..

Resource Management and Climate Protection (RMCP) Committee
…

With assistance from DNV GL
Betty Seto, Sarah Isabel Moe