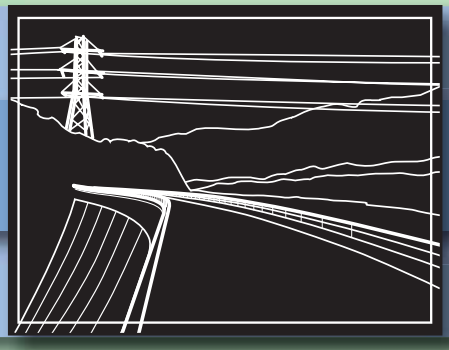
San Mateo County Energy Strategy 2012

City/County Association of Governments



Prepared by the Utilities & Sustainability Task Force

ACKNOWLEDGMENTS

We appreciate the participation, input and feedback of all the task force members and other interested parties.

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EXECUTIVE SUMMARY

SAN MATEO COUNTY ENERGY STRATEGY

San Mateo County, its cities, residents and businesses have three critical reasons to develop an energy strategy, 1) the ever-increasing financial costs of energy and water, 2) the impact that creating additional energy related infrastructure will have on local communities, and 3) the increasing concern about climate change and its effects. As the State Legislature continues to develop new climate protection legislation, it is in our joint best interest to implement a strategy that puts us in control of the situation rather than being controlled by it.

The Utilities Sustainability Task Force (USTF), an ad hoc energy working group of the Congestion Management and Environmental Quality Committee (CMEQ), is composed of six elected officials and six stakeholder representatives, a project consultant, county staff and others. In February of 2006, the USTF was chartered to consider the future needs of San Mateo County in regards to both energy and infrastructure.

At a time when the cities and the County find themselves under pressure to adopt initiatives to protect the environment, the Energy Strategy shows that energy efficiency and water conservation are still the most effective ways to save money as well as both our precious resources and the environment.

The objective of the San Mateo County Energy Strategy is to frame the discussion and to define practical actions for the cities and the County about energy, water, alternative generation, and climate protection. It will also recommend a countywide effort including goals, strategies, actions and resources. Energy usage as it relates to transportation is not in the scope of this report or its recommendations and it will be addressed separately.

…ENERGY EFFICIENCY AND WATER CONSERVATION ARE STILL THE MOST EFFECTIVE WAYS TO SAVE MONEY AS WELL AS OUR PRECIOUS RESOURCES AND THE ENVIRONMENT.

This Executive Summary emphasizes the need for the county and the individual cities, as a whole, to act on issues related to Energy, Water, and Climate Change.

ENERGY:

Overall, energy use is increasing.

Pacific Gas and Electric Company (PG&E) estimates that a one percent annual increase in overall electricity use for the Peninsula area (which includes San Mateo County) is expected for each of the next five years. This extra one percent annually represents an additional 9.8 megawatts of energy that must be generated and delivered to the region every year. Meeting this demand would require approximately one small new power plant every five years. Additionally, PG&E expects the Peninsula's peak demand to grow by 11 percent in the next decade and San Francisco's peak demand to increase by 12 percent in the next decade.

TRANSMISSION AND GENERATION:

Additional transmission and generation infrastructure will impact cities and the county physically and environmentally.

> ...AN ADDITIONAL 9.8 MEGAWATTS OF ENERGY...WOULD REQUIRE APPROXIMATELY ONE SMALL NEW POWER PLANT EVERY FIVE YEARS.

Keeping in mind that power lines to San Francisco run through San Mateo County, if both counties continue to use more energy every year as expected, the state may require PG&E to develop new power sources and to add new transmission lines through San Mateo County. Some portion of the increased demand may be offset by alternative energy systems such as solar and wind, but the remainder will likely come from natural gas power plants causing potential environmental impact. Meeting peak demands generally requires the use of Peaking Power Plants, which generate higher emissions.

WATER:

The demand for water is increasing.

The demand for water is increasing. The communities in San Mateo County support the efficient use of water to meet its current and future water needs. At the same time, these communities are highly dependent upon a single water supply, the Hetch Hetchy regional water system. The system is vulnerable to shortages due to drought and changing weather patterns. A countywide effort is required, as with energy, to ensure a safe, reliable and affordable water supply.

> USING LESS WATER, ESPECIALLY HOT WATER, SAVES A LOT OF ENERGY.

Water and energy use are closely related. A significant amount of energy is used in the county to pump, heat and treat water. Using less water, especially hot water, saves a lot of energy. This and other factors, especially the potential of drought conditions, favor water conservation.

ECONOMIC IMPACTS:

The costs of energy and water are rising.

The rising cost of energy and water to residential, commercial and industrial consumers and their resulting economic implications cannot be ignored. Energy and water costs continue to increase as the need for greater infrastructure and demand increases. On the other hand, conservation and efficiency can reduce demand, and save current and future economic, social and environmental costs while providing opportunities for other conservation investment.

CLIMATE CHANGE:

There is increasing concern and awareness of climate change.

As carbon dioxide and other greenhouse gases are released into the atmosphere from the burning of fossil fuels such as natural gas, coal and petroleum in the production of energy, the gases trap solar rays inside the earth's atmosphere and cause the temperature of the air, land and oceans to rise. Energy and water consumption are directly tied to greenhouse gas emission.

Energy and water consumption are directly tied to greenhouse gas emissions.

LEGISLATION:

State legislation such as AB32 will impact city and county governments.

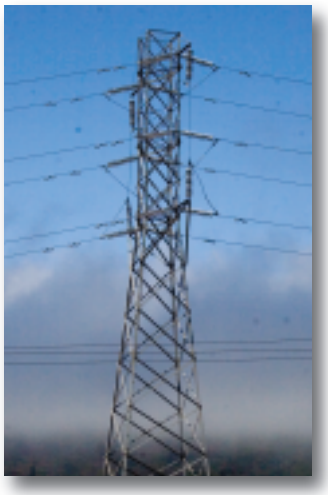
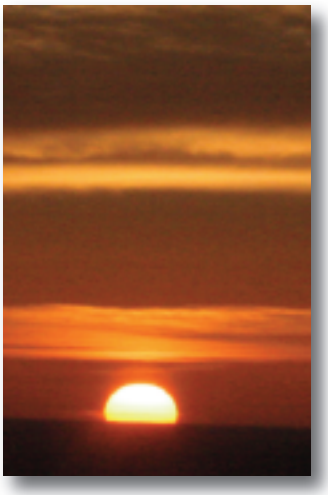
California legislation, AB32, calls for a return to 1990 greenhouse gas levels by the year 2020, which represents a 25 percent drop from today's emission rates. Long-term, the law calls for emissions to be reduced to 80 percent below 1990 levels by 2050.

THE STRATEGY:

A countywide strategy, involving the cities and the County, is the most effective approach to guaranteeing sufficient utility infrastructure, to preserve natural resources and to achieve greenhouse gas emission reduction goals.

The following general outline provides the Goals and Strategies contained in the San Mateo County Energy Strategy document. In the document, actions are divided into categories of Easy/Short-term, Intermediate/Medium-term, and Advanced/Long-term.



ENERGY

GOAL - To support the state's greenhouse gas emission reduction targets, San Mateo County will reduce the amount of power it purchases from utilities to 25 percent below 2005 levels through conservation, efficiency and increased local production of clean energy.

STRATEGY - Make energy efficiency standard practice.

POTENTIAL ACTIONS:

- Assess, and where feasible, implement energy-saving opportunities with the latest energy-efficient technologies in government facilities.
- Assign staff, hire consultants, a climate action coordinator, and/or enlist the aid of volunteers to create an inventory of government operations emissions and develop a plan to save energy and conserve water.
- Develop your city's plan to reach these energy reduction goals; this may include the creation of an Energy Element, updating General and Strategic Plans, and a climate action plan.

REDUCE THE AMOUNT OF POWER PURCHASES TO 25 PERCENT BELOW 2005 LEVELS

STRATEGY - Research, promote and invest in cleaner and greener sources of energy.

POTENTIAL ACTIONS:

- Install solar electric panels, wind turbine and solar hot water systems, develop cogeneration and alternative fuels at city facilities.
- Encourage investment in clean energy systems such as solar electric, wind and solar hot water by providing rebates and either reducing or eliminating permit fees altogether.
- Adopt green building standards and ordinances. (The State adopted a statewide Green Building Standards Code, which is voluntary starting in 2009 and becomes mandatory in 2011. The code establishes a minimum level of green building standards and does not preempt local governments from adopting and enforcing their own more stringent policies.)

WATER

GOAL - The San Francisco Public Utilities Commission estimates that San Mateo County will need an additional 5 million gallons of water per day by 2018 to meet projected demands. In order to meet this demand, San Mateo County will need to implement cost-effective and feasible water conservation and recycling programs and develop other local water supplies. San Mateo County will also need to strongly support local water utilities' efforts towards the goal of meeting local water demand.

STRATEGY - Through BAWSCA, support activities in the lower Tuolumne River basin (e.g. additional agricultural conservation) such that projected water needs for San Mateo County in 2030 can be met with no net increase in water diversions from the lower Tuolumne River.

POTENTIAL ACTIONS:

Establish ongoing communication with BAWSCA and promote dissemination of information related to legislation and other efforts to encourage agricultural conservation in the lower Tuolumne River basin.

STRATEGY - Make water conservation and reuse of water standard practices.

CONSERVE WATER BY 14 GALLONS PER CAPITA PER DAY

POTENTIAL ACTIONS:

Recommend that city facilities and businesses use drought-tolerant plants and appropriate water conserving infrastructure through drip irrigation, intelligent water controllers and high efficiency toilets.

Develop a recycled water system for city facilities and adopt tougher water conservation ordinances including a water-conserving rate structure. Also increase public awareness of the value of water and the importance of water conservation and landscape water use efficiency.

Offer financial incentives and rebates to offset the purchase price of water conserving products such as high-efficiency washing machines and low flow water fixtures.

Update General Plans, (land use, circulation, housing, conservation, open space, noise and safety), and municipal codes to include water conservation policies and support the new state-mandated landscape guidelines.

COLLABORATION

GOAL - San Mateo County will partner with the public utilities and work across city boundaries to address environmental challenges more effectively and efficiently.

STRATEGY - Collaborate with public utilities for mutual benefit.

POTENTIAL ACTIONS:

- Review quarterly updates from PG&E about future utility projects and take action as required.
- Support passage of net-metering legislation to allow cities to "sell" their excess self-generated energy to the utility and apply the credits to other government accounts. (In 2008, the Governor signed AB2466 which authorizes net metering. Cities and the County will follow the implementation of this bill).
- Establish a San Mateo County Energy Watch program through a Local Government Partnership with PG&E.

STRATEGY - Collaborate with other jurisdictions to save time and resources.

POTENTIAL ACTIONS:

- Collaborate with other jurisdictions that have similar results from their baseline inventories.

PARTNER WITH THE PUBLIC UTILITIES AND WORK ACROSS CITY BOUNDARIES

ECONOMIC OPPORTUNITIES

GOAL - Support the clean technology sector to strengthen the long-term economic health of San Mateo County.

STRATEGY - Encourage clean technology businesses to locate in San Mateo County.

POTENTIAL ACTIONS:

- Invite venture capitalists to speak at local forums to educate the broader community about the importance of the clean and green technology sectors.
- When in the market for alternative energy or energy-saving products, buy from local companies and take advantage of technical evaluations and group discounts.

STRATEGY - Help accelerate the adoption of clean technologies, both locally and globally.

POTENTIAL ACTIONS:

- Recognize or feature local green businesses at City Council meetings or other public venues.
- Consider incentives if businesses achieve Green Business Certification.
- Initiate competition among different retail districts or office parks to encourage businesses to become certified as a Green Business. Urge consumers to patronize local green businesses.

ACCELERATE THE ADOPTION OF CLEAN TECHNOLOGIES TO SUPPORT ECONOMIC GROWTH

LEADERSHIP FROM THE TOP

GOAL - San Mateo County will encourage environmental leadership from the top in the public sector, the business community and with its residents to achieve the goals of the Energy Strategy.

STRATEGY - Invest in environmental expertise in local government.

POTENTIAL ACTIONS:

- Identify and train a point person for environmental issues on City Council and on staff. Take advantage of free or low-cost training opportunities offered by Energy Watch, the Pacific Energy Center, RecycleWorks, Build It Green and other organizations.
- Share resources among several cities with a similar energy profile.
- Establish a staff task force to identify, analyze, plan, prioritize, and implement energy-saving measures in civic facilities. Consider convening a citizen's committee to work on issues in the community.
- Secure resources for additional staff rather than making this part of existing staff responsibilities. (From energy savings, grants, and collaboration).

ENCOURAGE LEADERSHIP FROM THE TOP IN ALL SECTORS

STRATEGY - Recruit and support community leaders at every level.

POTENTIAL ACTIONS:

- Partner with residents, businesses, local Chambers of Commerce, nonprofits, schools and other groups to influence resource-efficient behavior in all parts of the community.
- Leverage and support state and regional public outreach and education programs.
- Post energy efficiency information and materials available through all venues and encourage a competition between neighborhoods for the most innovative energy and water saving ideas.

NEXT STEPS:

The City/County Association of Governments (C/CAG) proposes the following next steps to move this important project forward:

C/CAG will provide presentations to the cities, asking that they adopt this document, commit to working collaboratively with the cities and the County, and release energy use information to support these goals.

C/CAG will work with County staff to fund a position to support the cities in this effort.

C/CAG will schedule quarterly, relevant educational presentations, bi-monthly information sharing meetings, and an annual progress report to the C/CAG board of directors.

C/CAG will provide incentives to promote the completion of government operation inventories for all cities in the County by the end of March 2009.

CONCLUSION:

The San Mateo County Energy Strategy recommends immediate action to promote energy efficiency and water conservation measures. Working collaboratively, we can do a lot to reduce costs, save our resources and the environment. Critical to achieving the goals set forth in the San Mateo County Energy Strategy is to engage all the cities and the County in adopting and implementing the proposed strategies. The San Mateo County Energy Strategy also strongly urges the creation of new sources of alternative energy generation and the exploration of new water sources including recycled water.

TABLE OF CONTENTS

NOTE TO READERS:

Glossary, Appendix B contains definitions of terms which are marked with an asterisk (*) within the context of this document.

Appendix C contains detailed staff reports for much of the information provided within Section 3:Findings.

Appendix D offers additional information supporting the recommended actions found in **Section 6: Resources** which is a 34 page selection of useful website links on a variety of topics related to this document.

Each section of this document builds upon prior material so the document is most valuable when read from start to finish. Each section, however, has been developed to stand on its own if needed.

SECTION 1
BACKGROUND

In 2005, San Mateo County Board of Supervisors President Jerry Hill proposed the need for a countywide task force to investigate and recommend how best to meet the county's current and future energy needs.

In February 2006, the Congestion Management and Air Quality Committee[1] (CMAQ) authorized the creation of an ad hoc energy working group to develop an energy strategy for San Mateo County. The group was chartered to consider the future energy needs of the county and recommend how to address the needs in an environmentally, socially and fiscally responsible manner. This resulting Energy Strategy focuses primarily on electricity use but also covers natural gas use and water consumption as it relates to energy use. Forms of energy used for transportation are not in the scope of this report or its recommendations.

The working group was composed of six elected officials and six stakeholder representatives who first met in June 2006. The group chose the name Utilities and Sustainability Task Force (USTF) in case it was later asked to address other utility or environmental issues after completing its initial work on the Energy Strategy.

The task force started by defining the desired outcomes and guiding principles for the Energy Strategy.

Desired Outcomes

- Energy is consistently available and affordable for all residential, commercial and industrial users in San Mateo County.
- Energy will consistently be available and affordable for future generations of San Mateo County residents as well as businesses.
- The environmental impact of energy production is minimized to the greatest extent possible.
- Local officials are involved in Pacific Gas & Electric's (PG&E's) planning process regarding local production, transmission and distribution of energy, for both centralized and distributed generation.
- Policy makers and the public understand the impact of their actions, make wise energy choices and utilize existing and future energy efficiency programs.
- The linkage between water and energy use is understood and recognized.
- San Mateo County is a leader in providing solutions for energy efficiency and greenhouse gas reduction.
- San Mateo County communities will, to the greatest possible extent, establish standards that are consistent within the county and across the Bay Area, sharing programs and educational materials. Applicable actions from the California Energy Action Plan II[2] will be included in the Energy Strategy.

[1] CMAQ changed its name to the Congestion Management and Environmental Quality Committee (CMEQ).

[2] The California Energy Action Plan was first published in 2003 and updated in 2005 (Energy Action Plan II). It is discussed in Section 2, Context.

Guiding Principles

- The Energy Strategy will leverage all existing and future federal, state, regional and public purpose (such as PG&E-administered) programs to the greatest extent feasible.
- Government agencies should lead by example in reducing energy and water use, enforcing regulations (where applicable) and educating citizens about energy issues.
- The City/County of San Francisco's energy use is inseparably linked to San Mateo County's use, so future strategies must be collaborative and consider the needs of both Counties.
- The process for developing the plan and recommendations is transparent and open.
- Quick and visible wins are important for building credibility and commitment. If solutions that are easy to implement are identified during the process, these can be recommended to the Congestion Management and Environmental Quality Committee (CMEQ) prior to the full report.
- Policies and programs should be designed to meet long-term goals.
- In accordance with the California Energy Action Plan II, conservation, efficiency, and demand management are the preferred ways to reduce energy use. Should new generation or infrastructure be required, it will be done with the least possible environmental impact.
- Energy solutions should support economic development and offer new job opportunities.
- Future land-use planning and development should include responsible energy decisions.
- Public education and awareness programs should promote responsible energy and other resource use by the public.
- Recommendations will take into account *environmental justice impacts.* (Such as equitable access to clean energy and water, affordable utility rates for low-income residents, creation of green collar jobs, and mitigating the effects of global warming).
- Decisions will not increase greenhouse gases and will preferably contribute towards significant reductions.

Adequate energy and water supplies are necessary to maintain the County's economy and quality of life.

Data-Gathering

The task force educated itself on a range of relevant topics, including historical and current energy use, energy forecasting methodology, the impact of peak power on infrastructure needs and the state's complex energy regulatory framework. The task force also learned about the relationship between energy and both water and climate change. Some of the key staff reports are reproduced in Appendix C.

[3] This number is derived from the five-year projections developed by PG&E, described in Section 3, Findings.

After reviewing the data, task force members realized that **if the historical trend continues, the county will use 22 percent more energy in 2027 than it does today.**[3] Furthermore, the total water demand in 2027 could be nearly 5 million gallons higher per day if San Mateo County's cities and water agencies fail to meet their current water conservation plans. Such significant growth in energy and water demands would require more energy infrastructure (e.g. power plants and transmission lines), consume a larger percentage of public and private budgets, and produce more greenhouse gas emissions.

The group invited speakers to present information about the programs and resources offered to local governments to help them save energy and water. Reports on actions taken by other Bay Area cities were also provided.

The task force concluded that countywide energy and water goals are appropriate and necessary to maintain the county's economy and quality of life. The task force members also developed supporting goals to 1) encourage economic development in the clean technology arena, 2) increase collaboration between local governments and with public utilities, and 3)promote environmental leadership in multiple sectors.

Report and Next Steps

Based on input from elected officials and staff from several jurisdictions, this Energy Strategy Report includes the following elements:

- Countywide goals and strategies
- Best management practices for energy efficiency and water conservation
- References to successful measures taken by neighboring governments
- Comprehensive list of resources

The task force now requests that CMEQ, City/County Association of Governments (C/CAG) and all 21 jurisdictions in the county do the following:

- Pass a resolution accepting the findings and goals in this Energy Strategy Report
- Participate in the development of the countywide Energy Strategy Implementation Plan by providing the name of one elected official and one staff contact for this work.
- Begin taking action in their own government facilities and in their communities
- Give C/CAG access to energy use data from PG&E so that the County may begin tracking progress related to efforts to reduce energy use and CO2 emissions countywide.
- Complete a Greenhouse Gas Inventory of Government Operations.

USTF members and staff believe this Energy Strategy and an ongoing project will be useful to elected officials and staff in the cities and the County, the business community, residents and other parties interested in energy issues. Outside input/information is accepted and appreciated. Please send comments to the County of San Mateo Resource Conservation Programs Manager, KSpringer@co.sanmateo.ca.us, (650) 599-1412.

SECTION 2

CONTEXT

Role of Energy

Energy is the lifeblood of the modern age. Most people don't worry about how energy is produced and delivered to their homes or businesses as long as the lights are on and a hot shower is available. And very few actually consider what impact their actions has upon the energy supply, the economy, society or the environment.

Only when an outage occurs is it clear how much of one's daily existence depends on the electric grid and natural gas supply. The energy crisis of 2000-2001 demonstrated how vulnerable local governments, businesses and individuals are to energy price increases and supply disruptions.

In San Mateo County, the rotating block outages in 2001 caused billions of dollars of productivity losses.[4] Soaring energy prices hit low-income families particularly hard and severely affected both small and large businesses alike. That past experience serves as a continual reminder today that an affordable, reliable energy supply is vital to the continued quality of life and economic health of San Mateo County.

The environmental impact of energy production and transmission facilities remains an almost invisible cost of a reliable energy supply. San Mateo County has never had a power plant within its borders, but that may change, as a 48 megawatt facility is planned at San Francisco International Airport, although construction has not begun and no opening date has been set. The new plant, which is expected to run at least 50 percent of the time, will use the cleanest natural gas available for a fossil fuel plant thanks to its turbine technology. Nonetheless, it's inevitable that the plant will still generate particulate pollution and greenhouse gases.

The energy delivery infrastructure has a smaller impact on its surroundings than a power plant does but it's still worth noting. Transmission lines carry high voltage electricity from power plants to substations. The lines interrupt open space and residential neighborhoods and disturb wildlife habitat. Substations use transformers to convert the high voltage into lower levels that can be sent across smaller distribution lines. Although power lines are mostly situated away from residential areas and surrounded by fences with posted warning signs—this is not always the case but they are always unsightly. **One group's actions will have an affect over everyone else because a single electric grid serves the entire region.** The average household in each of the four most affluent communities in San Mateo County consumes between two to five times more energy than households in other cities. Although the residents of those communities pay higher utility bills, they also require a larger energy infrastructure than is typically needed within the rest of the country.

[4] The biosciences, manufacturing and information technology industries are particularly vulnerable to power outages, often losing days or months of work. The Bay Area – A Knowledge Economy Needs Power (Bay Area Economic Forum, 2001), http://www.bayeconfor.org/pdf/PowerBAEF.pdf, p. 36-37.

Regulatory Framework

Three agencies oversee and regulate California's energy system with separate and interlocking duties and they are as follows:

- **California Independent System Operator** (CAISO) - operates and manages the overall transmission system also known as "the grid"
- **California Public Utilities Commission** (CPUC) - regulates the local distribution system and approves rates
- **California Energy Commission** (CEC) - tracks historical use, forecasts future needs, sets energy efficiency standards, develops new technologies and provides rebates for renewable energy

California's per-capita energy use has remained relatively flat over the past 30 years, compared to an average 45 percent increase elsewhere.

The Governor appoints the board members for all three agencies. The Legislature enacts energy legislation which must be approved by the Governor.

PG&E is an Investor-Owned Utility (IOU) that owns and manages the transmission system in its Northern California territory and delivers electricity to end-users. PG&E forecasts its territory's future energy needs and administers Public Goods Funds for public purpose programs which have been collected from rate-paying customers. PG&E also owns and manages a natural gas distribution network and delivers natural gas to end-users.

Some cities buy and deliver electricity and natural gas to their residents and local businesses. Palo Alto and Sacramento are both Municipal-Owned Utilities (MOUs). MOUs pay a fee to their local IOU to use the local transmission and distribution infrastructure. While MOUs typically set their own rates, their fees usually go into a general fund. At this time, there are no MOUs in San Mateo County.

Policy

Following the 2001 energy crisis, three regulatory agencies were primarily responsible for developing an Energy Action Plan (EAP). These agencies were 1) the California Independent System Operator (CAISO), 2) the California Energy Commission (CEC), and 3) the California Public Utilities Commission (CPUC), EAP's goal was to ensure adequate, reliable and reasonably priced electricity and natural gas supplies through cost-effective and environmentally sound policies, strategies and actions. EAP established a "loading order" to prioritize how the state should meet its increasing energy needs.[5] The loading order calls for reliance on:

[5] The loading order was affirmed in the 2005 update to the plan, and specific state actions were outlined according to this ranking. http://www.energy.ca.gov/energy_action_plan/2005-09-21_EAP2_FINAL.PDF.

- **Energy efficiency***: using the minimum amount of energy necessary to effectively perform a task; for example, using a compact fluorescent light instead of an incandescent bulb to light a room
- *Demand response**: discounted rates that encourage users to lower their energy use when demand is high (times of peak usage on high demand days) thereby preventing power outages
- **Renewable energy***: capturing energy and producing electricity from natural and renewable sources through the means of solar panels, wind turbines, hydroelectric dams, etc.
- **Distributed generation*** (DG): decentralized, renewable energy sources that supplement energy produced at centralized power plants
- **Clean fossil fuel***: highly efficient natural gas facilities instead of coal-fired plants

IMPACT

Compared to an average 45 percent increase in energy use within other states, California's strong regulatory framework and focus on energy efficiency have kept the state's per-capita energy use relatively flat over the past 30 years.

California's state programs and policies have been widely adapted and administered throughout the country—such as Building Code Title 24 requiring new and renovated buildings to be energy efficient. Appendix D provides information on several of the policies, technologies, programs and financial incentives available to local governments, businesses and consumers that have helped keep use levels stable.

SECTION 3
FINDINGS

After extensive data gathering and analysis, the Energy Strategy was developed. Sources include the Associated Bay Area Governments (ABAG) Energy Watch Partnership, the Bay Area Water Supply and Conservation Agency (BAWSCA), PG&E, state agencies, other Bay Area cities, local experts and an extensive host of web sites. Other regional energy plans, climate protection plans and handbooks were used to identify best management practices.

Highlights of the task force's findings are provided here to give context to the Energy Strategy's recommended goals, strategies and actions. Appendix C contains a few key staff reports which were reproduced and a full set of reports and presentations are available on the USTF website, http://www.ccag.ca.gov/ustf.html.

Energy Demand

PG&E is responsible for forecasting future energy needs based on numerous factors including 1) its territory based on historical demand, 2) anticipated population increases, and 3) expected job growth. The forecasts are used to ensure that sufficient electricity and transmission capacity are available to meet expected demand and prevent outages.

PG&E estimates a one percent annual increase in overall electricity use for the Peninsula area over the next five years.[6] (This includes San Mateo County). Although it may not sound like much, an additional 9.8 megawatts of energy (representing an extra one percent), will need to be generated or delivered to the region every year. Meeting such an increased demand will approximately require the building and commissioning of one small new power plant every five years.

The biggest factor in planning how much energy infrastructure is needed in a given area is called "Peak demand"*. In the Bay Area, the demand for energy generally peaks on weekday summer afternoons when most businesses use air conditioning. Power plants used only to meet these "Peak Demand" periods are called "peaker plants".

PG&E expects the Peninsula's peak demand to grow by 11 percent over the next decade. San Francisco, whose peak demand is expected to increase by 12 percent, also relies on transmission lines in San Mateo County. If both counties continue to use more energy every year as expected, the state will require PG&E to develop new power sources and add new transmission lines to prevent outages. While some portion of the increased demand may be offset by new solar electric and other renewable energy systems the remaining demand will likely come from natural gas power plants. These plants will still have a significant environmental impact because even the cleanest fossil fuel plants will emit greenhouse gases and air pollution to some extent. Using more energy will also lead to higher energy bills. As energy prices continue to rise, the financial impact of energy use will be magnified. San Mateo County residents, businesses and governments may find themselves spending a very large portion of their budgets on utilities if PG&E's energy projections prove accurate and demand is not curbed.

[6] PG&E does not publish its projections beyond a five-year period.

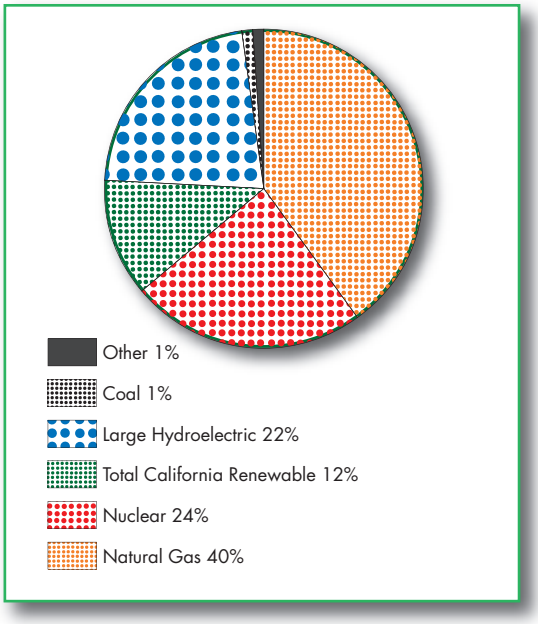
Energy Supply Sources

Centralized Production

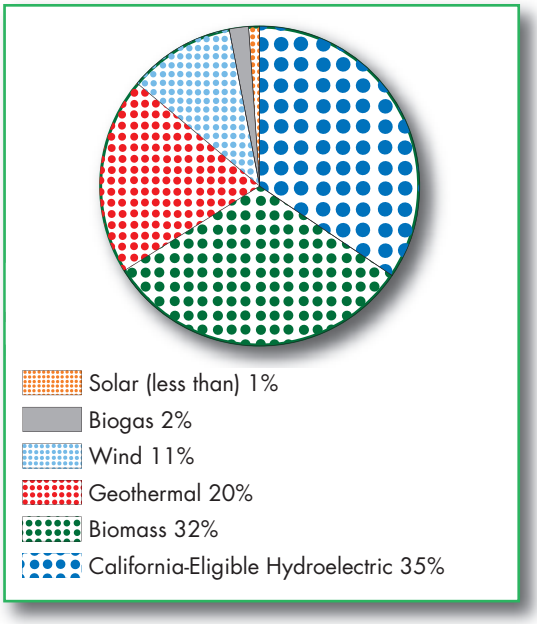
PG&E supplies electricity and natural gas to all of San Mateo County. The investor-owned utility owns 80 power plants and buys power from 400 other plants. PG&E's energy mix is the cleanest in the country with more than half of its energy derived from non-fossil fuel sources and 12 percent from California renewable resources (2006 data).

The state's Renewable Portfolio Standard requires utilities to obtain 20 percent of their energy portfolio from renewable sources by 2010.[7] Eligible renewable resources include *geothermal**, most *hydroelectric**, *biomass**, selected municipal solid waste facilities, *solar** and *wind**.[8]

PG&E 2006 Electric Power Mix Delivered to Retail Customers



PG&E 2006 California-Eligible Revewable Resources



As defined in Senate Bill 1078, which created California's renewable portfolio standard, an eligible renewable resource includes; geothermal facilities, hydroelectric facilities with a capacity rating of 30 MN or less, biomass, selected solid waste facilities, solar facilities, and wind facilities.

Source: http://www.pge.com

Self-Generation

More than 13,000 PG&E customers now meet some or all of their energy needs through self-generation. This is where customers buy or lease systems that produce energy on-site and several types of these self-generation systems are eligible for rebates, tax credits or other financial incentives which ultimately

[7] PG&E has announced it will not meet this goal initially, but will exceed requirements in 2011 and following years.

[8] http://www.energy.ca.gov/2007publications/CEC-300-2007-003/CEC-300-2007-003-CMF.PDF, p. 1.

make them more affordable to install. Self-generation systems are usually more cost-effective for users over the long-term and depending upon the financing model, they often provide near-term savings as well. Self-generation systems also help the overall electric system by reducing the load on the grid and contributing energy during peak periods when it's most needed.

*Solar electric** systems frequently produce more energy in summer afternoons than the owner can use. As long as the system is connected to the grid, often referred to as being "grid-tied," the extra energy can flow onto the grid and be used elsewhere.

*"Net-metering"** describes a user's ability to store energy credits with the utility for later use. State legislation currently limits net-metering to a single account which means that any energy credits produced at a site can only be used at that same site or meter. Some municipalities such as Davis, Cal State Sacramento and San Francisco have successfully lobbied for legislation allowing them to apply energy credits earned at one site to their facilities at other sites. The Utilities and Sustainability Task Force has been working closely with PG&E to support or develop legislation that would allow jurisdictions in San Mateo County and throughout the state to become eligible for similar treatment. These efforts to design legislation that will further entice utility customers to install systems larger than their needed loads have been hampered by Solar Electric system's high cost due to high demand and low supply along with the fact that PG&E would like to be compensated for the use of its grid. Recent legislation, AB1969, allows customers to sell back excess generation but the types of businesses that can benefit from this program are limited. New solar installations projects are unlikely to take advantage of this new legislation by over sizing their solar installations given that the sale cost of power to PG&E is at a relatively low rate—otherwise known as the market price referent. (In 2008, the Governor signed AB2466 which authorizes net-metering. Cites and the County will follow the implementation of this bill).

The cities and communities of San Francisco, Marin and Oakland-Emeryville-Berkeley are investigating a process called *Community Choice Aggregation (CCA)* This is where a government entity can buy energy from PG&E by paying a fee for the use of their distribution infrastructure and then they resell the energy to residents and businesses in its own community. Governments hope to use CCA as a mechanism to buy a preferred type of power, usually green or renewable, at a lower cost than is available through PG&E. However, according to industry critics, the bottom line benefits of CCA have been difficult to secure and sustain at this point in time.

DISTRIBUTION

PG&E owns the energy infrastructure within its territory, consisting of:

- **High-voltage transmission lines** that connect power plants to substations and form the backbone of the electric grid;
- **Substations** that connect the transmission and distribution systems where high voltage power enters and is "stepped down" to lower levels for distribution over lower-voltage lines;
- **Primary and secondary distribution lines** that carry power from the substation out to customer areas;
- **Transformers that** lower voltage down to usage levels;
- **Switching equipment** that lets the lines be connected in multiple combinations to reach a particular destination, and
- **Service lines** that deliver power to residential, commercial and industrial customers.

Energy and Climate Change

When fossil fuels such as natural gas, coal and petroleum are burned to produce energy, carbon dioxide and other greenhouse gases are released into the atmosphere. The gases trap solar rays inside the earth's atmosphere causing the temperature of the air, land and oceans to rise.[9] The slow but steady increase in the earth's temperature is known as *global warming**.[10]

Most public utilities today burn fossil fuels, primarily coal, at their power plants to generate the electricity distributed via the grid. Coal emits high amounts of greenhouse gases: carbon dioxide when it is burned and methane during its production and transportation. The utilities deliver natural gas directly to homes and businesses where it's burned by the consumer. Although natural gas is the cleanest fossil fuel, its principal component is a greenhouse gas 23 times more damaging to the atmosphere than carbon dioxide—this component is methane. **Using less energy from utilities will reduce greenhouse gas emissions**. That's because most energy produced or delivered by utilities generates greenhouse gas emissions.[11] Conversely, energy produced by solar electric, solar hot water, wind and other non-fossil fuel systems generates little or no greenhouse gas emissions

The Governor and California legislature passed landmark legislation in Fall 2006 (Legislation AB32: Global Warming Solutions Act) mandating significant reductions in greenhouse gas emissions from "stationary sources" such as power plants and petroleum refineries. And even though AB32 initially targets specific industries, **local governments will soon be required to play an important role in helping the state meet its greenhouse gas reduction goals**. The Global Warming Solutions Act in the short-term calls for a return to 1990 greenhouse gas levels by the year 2020 representing a 25 percent drop from today's emission rates. Over the long-term, Legislation AB32 calls for emissions to be reduced to 80 percent below 1990 levels by year 2050. The recently passed Senate Bill 375 will be important in reaching AB32's goals because it calls for local governments to make housing and transportation planning decisions that reduce fossil fuel consumption.

> The simplest, fastest & most cost-effective way to reduce greenhouse gas emissions is to use less energy & cleaner energy.

The simplest, fastest and most cost-effective way to reduce harmful greenhouse gas emissions is to use less energy overall and to use cleaner forms of energy. The state's directive to decrease the level of energy use throughout the county is a critical first step in reducing greenhouse gases and slowing the impact of climate change.[12]

Energy and Water

A surprisingly large amount of energy is needed to supply clean water to homes and businesses and to treat water after its initial use.[13] Almost one-fifth of all electricity and one-third of all natural gas

[9] For a more detailed explanation of the impact of greenhouse gases on climate, see the Union of Concerned Scientists website, http://www.ucsusa.org/global_warming/science/emissions-of-heattrapping-gases-and-aerosols.html.
[10] The term *"climate change"** is used to indicate the impact of increased global temperatures on both short-term and long-term climate patterns across the world. The term *"climate protection"** describes measures taken to reduce the impact of human activity on global temperatures and the climate.
[11] In Northern California, PG&E's relatively clean power mix produces fewer greenhouse gases than energy derived from more traditional sources.
[12] For more information on the state's extensive climate change activities, visit the California Climate Change Portal at http://www.climatechange.ca.gov

consumed in the state is consumed within the water lifecycle—for conveyance, treatment, distribution, end use and wastewater treatment.

Somewhat lower levels of energy are needed to supply San Mateo County with water since 96 percent comes from the Hetch Hetchy regional water system.[14] Owned and operated by the San Francisco Public Utilities Commission (SFPUC), the Hetch Hetchy system uses very little energy for conveyance because it relies on gravity to carry snowmelt from the Sierra Nevada mountain range to the Bay Area. And because the water is so remarkably pure—only minimal energy is needed for filtration and treatment. However, the energy used by Hetch Hetchy in their distribution, end use, wastewater treatment and recycling phases is comparable to that of other regions in the state.

The majority of energy is consumed at the end-use phase of the water supply lifecycle. In San Mateo County, 68 percent of the water consumption comes from indoor end use such as toilets, sinks, showers, laundry, cooking, cleaning and commercial activities. Outdoor use including landscaping, pools and recreation fields constitutes the remaining 32 percent of water consumption. **Most end-use energy is used to heat water**. Hot water, for homes and businesses alike, is mostly used indoors for dishwashers, clothes washers and showers. Commercial cooling towers, pumps and purification systems are the biggest users of non-heated water in addition to toilets and outdoor applications. Surprisingly, water leaks can amount to a significant 10 percent of total consumption.

WATER CONSERVATION MEASURES PROVIDE MULTIPLE BENEFITS: THEY SAVE WATER, SAVE ENERGY AND REDUCE GREENHOUSE GAS EMMISIONS.

Because of the high correlation between water and energy, water **conservation measures** provide multiple benefits in that they; **1) save water, 2) save energy, and 3) reduce greenhouse gas emissions.** For virtually every end use, a high-efficiency technology and/or water-conserving practice exists that can dramatically reduce water consumption.

The demand for water, like energy, peaks in the summer months when landscaping, cooling and other seasonal uses increase. Reducing peak water demand in the summer will provide the additional benefit of reducing the strain on the electric grid during critical times. If the demand for water is lowered on a consistent basis, such as in non-emergency situations, it will help reduce the need for new energy infrastructure in the region.

Using renewable energy instead of energy from the electric grid to heat water can help to mitigate the downstream impact of water use on global warming. *Solar hot water**, *fuel cell** and *co-generation** systems can all be used to heat water for residential and commercial use although they do not provide the benefits that come from water conservation.

In addition to **saving energy, water conservation mitigates the risk of supply shortages and rate hikes**. Less than one percent of the earth's water supply is suitable for human consumption and reserves are disappearing fast. San Mateo County is critically dependent upon the Hetch Hetchy regional water system and is therefore vulnerable to water shortages resulting from only one dry winter. Increasing

[13] For more on this topic, see "California's Water-Energy Relationship," http://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDF and "Energy
Down the Drain: the Hidden Costs of California's Water Supply,"
http://pacinst.org/reports/energy_and_water/energy_down_the_drain.pdf (NRDC, 2004).

[14] The remainder of the San Mateo County water supply is 1.5 percent groundwater. 2.1 percent surface water and .4 percent recycled water, according to numbers provided by BAWSCA.

demands on the system also pose a risk to users. Since 1971 when the last major supply improvements were added to the system—the number of people served by the Hetch Hetchy system has increased by more than 28 percent and this "service" number is expected to escalate another 12 percent by 2030.

SFPUC, owner of the Hetchy Hetchy system, has entered into long-term contracts with its water customers to guarantee the amount of water to be provided to each customer and the appropriate rate. Guarantees like this are called "assurances," and they've accounted for projected growth in demand assuming that each water supplier implements "cost-effective and feasible" measures to conserve and recycle water and develop other local water supplies such as groundwater and surface water capture.

Bay Area Water Supply and Conservation Agency (BAWSCA), the joint powers authority for all the water districts in San Mateo and Santa Clara counties, has proposed that the region's 2030 water needs should be met through a combination of measures that require no additional diversions from the Lower Tuolumne River. The measures would include partnering with other users of Hetch Hetchy water to fund conservation activities outside the Bay Area, in addition to conservation, recycling and the development of other local water sources.

Global warming is another factor which may affect the water supply in the future. Because just as water use indirectly contributes to global warming through the intensive use of energy for its conveyance and treatment, etc.,global warming will affect the supply of water around the world. Specific to the Bay Area, the effect will likely be felt in four ways:

- Sea level rise in San Francisco Bay will cause saltwater intrusions into groundwater supplies and the levee system in the Delta endangering fish and other marine life. Increasing sea levels will also cause coastal and bayside flooding, submerging wastewater treatment plants and other water and sewer infrastructure.
- The Sierra Nevada snowpack will shrink as air temperatures rise and melt earlier in the year. Spring runoff patterns will change in timing and intensity.
- Less snow and more rain will fall in the Sierra Nevada and Bay Area. The rainy season may be shorter and more intense, which could lead to flooding, levee failures and sewer and wastewater treatment plant spills.
- Droughts will be more frequent, resulting in water shortages[15].

Implementing water conservation practices and high-efficiency technologies now will help San Mateo County communities prepare for expected changes in the water supply.

Finally, water conservation will mitigate the financial impact of scheduled rate hikes. The water rates charged by San Francisco to its wholesale water agencies are expected to triple in the next several years—increasing from $531 an acre-foot in 2007 to a projected $1577 an acre-foot in 2015. These increased costs will be passed along to water customers.

The goal for San Mateo County is a reduction in overall water use, both residential and non-residential by 5.2 million gallons per day (MGD) in 2030. To accomplish this, it is estimated that residential customers would need to reduce their water use by 14.8 gallons per person per day in 2030.

[15] "From Watts to Water: Climate Change Response through Saving Water, Saving Energy, and Reducing Air Pollution," p. 9 (Santa Clara Valley Water District, 2007). For more on this topic, see the study by the Union of Concerned Scientists, "Our Changing Climate: Assessing the Risks to California," pp 6-7, at http://www.energy.ca.gov/2006publications/CEC-500-2006-077/CEC-500-2006-077.PDF.

Clean Energy

When most people think of clean energy, they think of solar electric* panels. Northern California leads the country in solar adoption, with an astonishing 44 percent of all U.S. customer-owned solar electric systems.

Several factors contribute to the increased popularity of solar electric systems in the region:

- The state's Million Solar Roofs dedicates $2.9 billion for solar electric rebates over 10 years, with a goal of financing 3000 megawatts of capacity by 2017[16]. Government, residential and commercial customers are all eligible for rebates.
- Higher energy prices, uncertainty about future energy costs and better financing options make the high upfront cost of solar electric systems less of a barrier than in years past.
- Venture capital investments in the clean technology industry have exploded in the past two years, creating dozens of new solar companies in the Bay Area alone.
- Technology improvements have increased the efficiency of solar photovoltaic (PV) cells, so fewer panels can generate the same amount of electricity at lower cost.
- New products have overcome traditional barriers, such as solar-integrated roof shingles that are less obtrusive than traditional PVs. New thin film technologies can be used in the tight spaces and odd angles of complex rooflines.
- Public and private sector installations are growing increasingly common and larger in scope. Solar is becoming a mainstream investment.

Several cities in San Mateo County have installed or plan to install solar electric systems to government facilities. Almost all jurisdictions in the county have lowered solar permit fees in recent years.[17] Residents in several cities in the county (e.g. Portola Valley, Woodside, Menlo Park, Atherton and San Carlos) have banded together to purchase solar electric systems as a group.

Solar hot water systems use sunlight to heat water and can save up to 75 percent of water-heating energy costs. Efforts are underway in the legislature to create a 10-year, $250 million program to install 200,000 solar hot water systems by 2017. Such a program would be similar, though much smaller in scope, than the Million Solar Roofs initiative.

Other types of clean energy are also gaining traction. The County of San Mateo installed a *co-generation** system at the Maguire Detention Center, using natural gas to produce both heat and electricity. Millbrae's *biogas** wastewater treatment plant creates almost enough energy out of grease-trap water to run the entire facility. Pacifica is building a plant that will create *biodiesel** out of waste cooking oil and use it to power the wastewater treatment plant and city vehicles. Burlingame saves more than $80,000 a year because the co-generation system at the wastewater treatment plant provides 80 percent of the facility's needs. The wastewater treatment plant for Redwood City, San Carlos, and Belmont also operates a co-generation system that provides the plant with 25% of its power needs.

*Fuel cells** and wind turbines are also eligible for state rebates, although they have not yet been deployed by Bay Area governments.

[16] The website is http://www.gosolarcalifornia.ca.gov/.
[17] Solar permit fees for each jurisdiction are listed in Appendix A.

Economic Opportunities

The rising public concern about global warming and explosive interest in all things "green" have converged to create a red-hot market for clean technology companies. Venture capitalists invested $2.9 billion in 2006 alone in North American companies in the energy, water, waste management and sustainability sectors.[18] Silicon Valley is an early leader in the bid to attract and nurture this new industry, although New England, Austin and Chicago are also vying for the honor.

San Mateo County is already home to more than a dozen clean technology companies, ranging from Tesla Motors, a San Carlos-based startup creating an all-electric sports car to Li*on, a Woodside company that makes lithium-ion batteries. Many more clean technology companies are based in Santa Clara and other Bay Area counties.

Local governments that hope to benefit from job growth and economic expansion from these new markets can take steps to attract and support the clean technology industry. **79 percent of venture capitalists surveyed said that public policies are a factor in their clean technology investment decisions. 91 percent said that a pro-environmental public policy can attract clean technology business to a region.**[19] Incentives, rebates and tax credits (the source of which will be explored) can also help make San Mateo County an appealing home for this new sector, which may someday be even larger and more influential than the information technology industry.

Barriers to Conservation and Efficiency

USTF members and representatives from other cities consistently cite the lack of staff time, budget and technical expertise as key barriers to adoption of energy efficiency measures. California Local Energy Efficiency Program (California LEEP), a project that analyzed local energy efficiency programs across the state, confirmed that these challenges are widespread.

California LEEP also found that energy efficiency projects stall because financial models and political timelines often optimize for quick payback and fast results—a poor match for some of the big-ticket measures that will provide the biggest impact over time.

City staff and water agency experts report that water conservation efforts are even more difficult to implement. Water programs face the same shortages of time and expertise, and have far fewer funding sources than in the energy arena.

The barriers are interrelated: without budget to hire sufficient staff, staff members don't have enough time to research, select, implement and manage resource conservation programs.[20] Local government officials seldom have the time to study and understand energy, water and climate issues, much less keep up to date on current program offerings and the latest technologies. Busy finance directors can seldom consider whether their standard short-term payback models are the best way to evaluate potential energy efficiency and water conservation measures.

[18] Cleantech Venture Capital: How Public Policy Has Stimulated Private Investment, by Environmental Entrepreneurs (E2) and the Cleantech Venture Network, available from http://www.e2.org, under Publications (select Reports, then 2007 National Cleantech Report: Executive Summary (May 30, 2007).

[19] Creating Cleantech Clusters: 2006 Update, Clean Tech Venture Network LLC (2006).

[20] A list of the barriers is included in the California LEEP report on p. 29, http://www.caleep.com/docs/CaliforniaLeep-SummitProceedings-May2004-FINAL.pdf.

AVAILABLE RESOURCES

A growing number of resources are available to help cities, companies and residents reduce their energy use, thanks to the state's longstanding commitment to energy efficiency and growing concerns about global warming. **Cities and counties are eligible for financial assistance and technical resources to improve energy efficiency in civic facilities and operations.** These include, for example, free energy audits of civic facilities[21] and low-cost loans for energy-smart capital improvements.[22] Expert advice, rebates, special utility rates, training and educational programs are offered to local governments by a host of providers, ranging from the energy agencies to local nonprofit groups. Similar energy-saving programs are targeted at the business community by the same providers and by industry-specific groups. Still other resources are available to individuals.

Rebates on water-efficient fixtures and tips for conserving water are offered through local water suppliers. The Bay Area Water Supply and Conservation Agency, which was formed in 2003 by the agencies that buy water from San Francisco on a wholesale basis, provides assistance in developing and implementing water conservation programs with and for its member agencies.

The Energy Strategy brings together an extensive list of these financial, technical and educational resources as well as providing context, data and analysis of the current situation, setting ambitious but achievable goals and identifying specific strategies and actions to help cities achieve the goals.

Finally, the Energy Strategy provides brief case studies about actions taken by local jurisdictions and their results. More extended case studies are provided for three San Mateo County communities that have pursued different paths toward energy efficiency, water conservation and climate protection. The extended case studies are offered so that cities facing similar challenges might learn from the experiences of their peers.

Other resources that can help governments include the business community—which faces many of the same issues and opportunities as government—nonprofit organizations, residents, students, teachers, local universities and religious groups.

CONCLUSIONS

The data shows that continued growth in the rate of energy use in San Mateo County will lead to additional energy infrastructure, higher energy bills and more greenhouse gas emissions. Reducing energy use will instead bring benefits such as lower costs and cleaner air. Water supplies will become more scarce and expensive in coming years, so conserving water makes economic and environmental sense. Saving water helps lower energy use as well.

Local governments that use resources wisely will be role models for their residential and business communities, and be well positioned to deal with future regulatory and technological challenges as they arise.

Other Bay Area cities have already achieved dramatic reductions in energy use in recent years. **San Mateo County communities can build on their own and others' energy saving experiences and reduce energy consumption countywide without experiencing any hardship.** The know-how, resources and technologies already exist. By working together and leveraging the region's diverse strengths, San Mateo County as a whole can move toward a cleaner, greener and more prosperous future.

[21] Audit and implementation services are available through the Energy Watch Partnership, the California Energy Commission and PG&E. See Appendix D, Energy Efficiency.

[22] The California Energy Commission offers low-cost loans to cities and counties for energy-efficient investments. See Appendix D, Financing/Funding.

SECTION 4
GOALS

The Energy Strategy, in accordance with its original charter and based on the context and findings, recommends five countywide goals that will help address the long-term energy needs of San Mateo County in an environmentally, socially and fiscally responsible manner. The goals address issues of collaboration, energy, water, economic opportunities and shared leadership.

The goals for energy and water reduction are consistant with the current institutional thinking in our region and state: the energy goal is related to AB32 and the water goal is based on current projections by the Bay Area Water Supply and Conservation Agency and contracts with the San Francisco Public Utilities Commission.

ENERGY

Energy provided by utilities generates greenhouse gas emissions and requires a complex infrastructure that affects the county as a whole. This goal is explicitly intended to decrease the demand for energy produced and delivered by utilities (electricity and natural gas).

GOAL **To support the state's greenhouse gas emission reduction targets, San Mateo County will reduce the amount of power it purchases from utilities to 25 percent below 2005 levels through conservation, efficiency and increased local production of clean energy.**

Improving *energy efficiency** lowers the overall demand for energy without imposing any sacrifice or hardship. Free services, new technologies and generous subsidies make saving energy easier than ever before.

Solar electric systems, fuel cells, biogas plants and other types of clean, local generation facilities are cost-effective and an environmentally sensitive way to meet energy needs. New subsidies and financing options also bring alternative energy systems within reach for most local governments, as well as many businesses and households.

WATER

Water conservation is an excellent way to save energy because enormous amounts of energy are consumed in delivering the use and disposition of water. Because the region depends upon a single water supply which is vulnerable to drought and changing weather patterns, water conservation also helps mitigate the risk of future shortages. This goal is explicitly intended to decrease the demand for water purchased from the Hetch Hetchy regional water system.

GOAL **Implement cost-effective and feasible water conservation and recycling, develop other local water supplies, and strongly support local water utilities' efforts towards the goal of meeting local water demands within the supply constraints enacted by the San Francisco Public Utilities Commission. The SFPUC currently estimates that San Mateo County will need an additional 5 million gallons of water per day by 2018 to meet projected demands.**

Upgrading to high-efficiency fixtures and equipment is a painless and cost-effective way to conserve water. Increasing the use of reclaimed and recycled water for non-potable needs will help ensure that the critical needs will still be met as conditions evolve.

COLLABORATION

The issues addressed in this Energy Strategy grow more complex every year. Communities will be better able to respond to environmental challenges and opportunities by working across sectors and sharing information and ideas.

GOAL **San Mateo County, to address environmental challenges more effectively and efficiently, will partner with the public utilities and work across city boundaries**.

ECONOMIC OPPORTUNITIES

Attracting businesses that address environmental challenges can help the local economy. Fostering their success, as was done with the high technology industry, may have a positive global impact.

GOAL **Support the clean technology sector to strengthen the long-term economic health of San Mateo County.**

LEADERSHIP FROM THE TOP

Big challenges need many leaders with diverse and complementary skills. Individual communities and the region as a whole need the active involvement of government staff, elected officials, business leaders, residents, teachers and other interested parties if the benefits of the Energy Strategy are to be realized.

GOAL **San Mateo County will encourage environmental leadership from the top in the public sector, the business community and residents to achieve the goals of the Energy Strategy.**

THESE GOALS ARE ACHIEVABLE WHEN THEY WORK TOGETHER HELPING TO MAKE SAN MATEO COUNTY A LEADER IN THE STATEWIDE EFFORT TO IMPROVE ENERGY EFFICIENCY, CONSERVE WATER AND EMBRACE CLEAN ENERGY.

SECTION 5
STRATEGIES

This section of the Energy Strategy sets forth the high-level strategies that can help San Mateo County governments, businesses and residents achieve the Energy Strategy goals. Specific actions to support the strategies are outlined in depth in Section 6. Resources to help implement the actions are provided in Appendix D.

ENERGY

Make energy conservation and energy efficiency standard practice.

Promote cleaner and greener sources of energy.

WATER

Make water conservation and recycling standard practice.

Partner with other Hetchy Hetchy regional water system customers to preserve the Lower Tuolumne River.

Pursue new sources of water by diversifying the water "portfolio".

COLLABORATION

Partner with public utilities for mutual benefit.

Collaborate with other jurisdictions to save time and resources.

ECONOMIC OPPORTUNITY

Encourage clean technology businesses to locate in the county.

Help accelerate the adoption of clean technologies, both locally and globally.

LEADERSHIP FROM THE TOP

Invest in environmental expertise in local government.

Recruit and support community leaders at every level.

SECTION 6
POTENTIAL ACTIONS

This section provides more detail about the strategies and suggests specific potential actions to help local governments meet the goals outlined in Section 4. Actions are categorized as ***Easy/ Short-term, Intermediate/ Medium-term or Advanced/ Long-term***. In general, the easy actions should be quick to implement taking zero to three months, the intermediate actions may take several months and advanced actions might require a year or more of planning.

The Case Studies refer to other communities that have successfully implemented the suggested action. ***Additional resource information is available in Appendix D; the relevant section heading is listed in parentheses following each entry.***

ENERGY

GOAL San Mateo County will reduce the amount of power it purchases from utilities to 25 percent below 2005 levels through conservation, efficiency, and increased local production of clean energy to support the state's greenhouse gas emission reduction targets.

STRATEGY Make energy conservation and energy efficiency standard practice.

Energy efficiency is a way of life in many parts of the world where the infrastructure is less reliable or the cost of energy is higher than it is in the U.S. Increasing energy prices and global warming mandate that Bay Area communities adopt this approach as well.

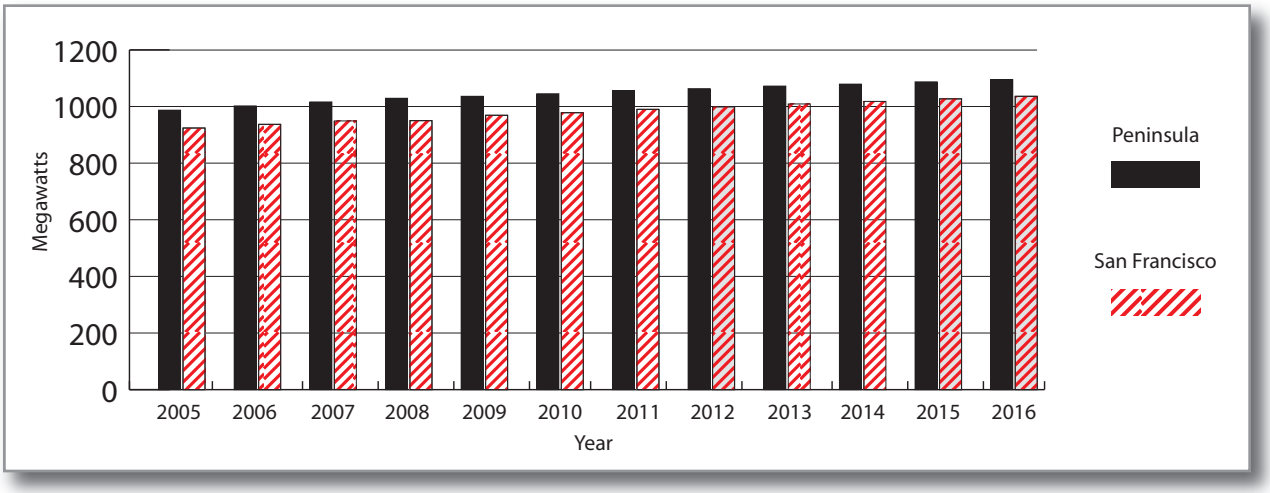
UNDERSTAND BASELINE USE

Without understanding current use levels, it's impossible to know which targets will yield the greatest impact or to measure the effectiveness of specific energy-saving measures.

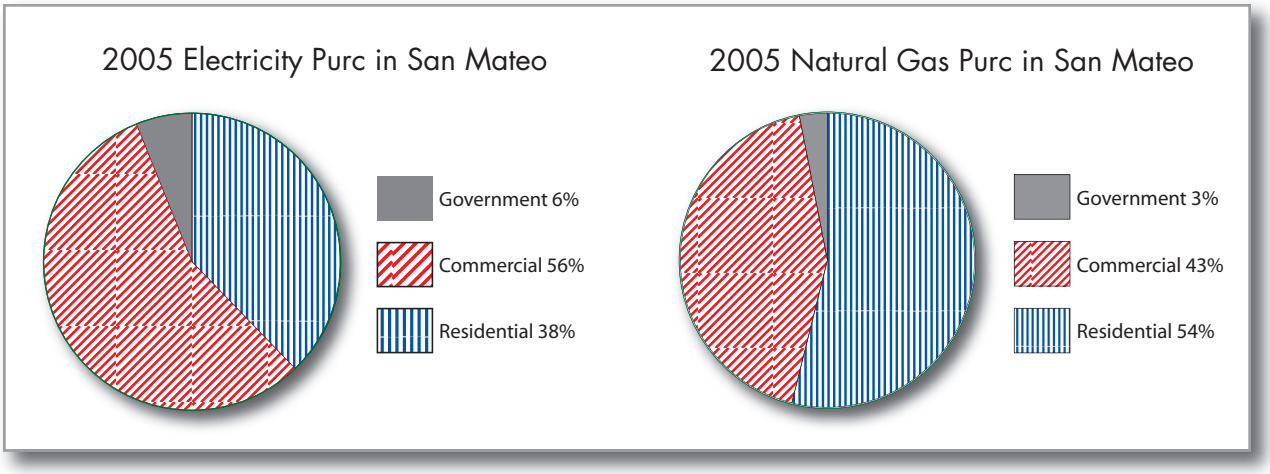
PG&E has provided the data for kilowatt-hours of electricity and therms of natural gas sold in San Mateo County in 2005. The data show that 55.5 percent of the electricity was delivered to commercial customers, 38.4 percent went to residential customers and 6.1 percent went to government agencies (the County, a city or a special district). In contrast, residents purchased 54 percent of the natural gas sold, commercial customers bought 42.7 percent and districts were responsible for a mere 3.2 percent of the total.

The chart below indicates a projected peak demand growth annually of one percent which is explained in sect 3, Findings. Without efforts to curb this trend it's easy to see how, relatively quickly, demand for electricity will likely outpace our ability to financially and environmentally provide the infrastructure for this resource.

Peak Demand Projections for Peninsula and San Francisco



2005 Electricity and Natural Gas Purc in San Mateo



The Bay Area Air Quality Management District sponsored free workshops to help each Bay Area local government develop a baseline greenhouse gas emissions inventory for its community. **The Energy Strategy recommends that all cities and the County use the data provided by PG&E to develop their own baseline, in a format consistent with the one developed by CARB, ICLEI, and the Climate Action Registry– the "Local Government Operations Protocol."** Doing so will make it easier to correlate individual communities and agencies against the countywide baseline and to track progress toward the Energy Strategy goals.

Local governments can develop their baseline energy use for operations from their utility bills or by getting the data from PG&E. Cities that participate in the ICLEI /Sustainable Silicon Valley/ Joint Venture Silicon Valley Climate Protection Task Force program for emissions inventory program will have the information provided to them. (Nearly all the cities in the county are participating in this effort). Otherwise, a city can request the data directly from PG&E.

Potential Actions

Create a Plan

The baseline data for the county as a whole and for each jurisdiction will provide only a starting point for an energy purchase reduction plan, not the details. An analysis of the largest energy users and their current efficiency levels will be needed to target energy reduction and production projects.

Local governments can play a leadership role by reducing energy use in public facilities and civic operations. Doing so will save taxpayer money and set a good example for others.

Improve government facilities and operations.

The energy consultants with such programs can help city staff analyze utility bills to identify which facilities are the most energy-intensive and which offer the biggest opportunities for savings. The consultants can then perform a detailed energy audit and suggest specific measures based on the upfront cost, expected energy savings and long-term financial benefits. The programs do not cover the cost of implementing the recommended measures such as the installation of a new chiller, boiler or pump, but energy consultants can help city staff find funding sources and contractors to do the work. Governments that have participated in such programs and implemented the recommendations have saved millions of dollars and reduced energy purchases from utilities by millions of kilowatt-hours.

The Energy Strategy recommends that local jurisdictions start by enrolling in an energy efficiency audit and services program if they have not already done so. An application is required to join the Energy Watch and Energy Partnership programs and other criteria apply. More information is in the Energy Efficiency section in Appendix D.

Integrate energy efficiency into government policies and processes.

To ensure that its policies and actions are aligned, local jurisdictions may wish to verify that their General Plan encourages resource conservation. Officials should consider updating or adding a new element at the next revision of the General Plan if the Plan includes older elements that conflict with energy efficient policies, water conservation practices or clean energy production (i.e. solar panels). Energy Watch Programs and other resources are available to help with this process. See more in this section under Actions and in the Ordinances and Policies section of Appendix D.

Financial policies should also be reviewed and updated as needed to reflect current environmental and economic realities. The financial constraints under which local governments operate make it easier to approve projects that show a quick payback. In other words, these projects pay for themselves within 2-5 years rather than larger capital investments that take longer to be recouped but provide greater long-term returns. Adding cash flow and internal rate of return analyses to the financial review process will provide more data on which to select energy efficiency and renewable energy measures.

Using the money saved from one project to fund or find other projects is another way to stretch dollars that are scarce. Some cities use energy savings to pay for staff positions that look for grant money and identify the most financially attractive measures.

Use incentives and ordinances to change behaviors.

A local government can encourage residents and local businesses to use less energy and/or produce their own clean energy through the exercise of its regulatory authority.

Voluntary programs have proven effective in many Bay Area cities. These include using green building guidelines[24] for educational purposes or as the basis for a condition of approval for certain types of permits or to qualify for expedited permitting. Some Bay Area governments such as Berkeley and Marin County offer technical assistance and give public recognition to projects that exceed basic energy requirements.

Incentives are a low-cost and high-impact way to change behavior. Incentives usually save a permit-seeker both time and/or money. PG&E and the CEC offer financial incentives for builders of new homes and commercial buildings to use energy-efficient design techniques, appliances and lighting. Several San Mateo County cities have reduced or waived solar permit fees to encourage residents to generate their own power. San Mateo County now offers a speedier permitting process for projects that meet a specific green or energy efficiency standard. The programs achieve faster turnaround time either through coordinated inspections, fast-track status or over-the-counter permits. See more examples of incentives under the Financing/Funding Sources and Ordinances & Policies sections in Appendix D.

Mandatory energy efficiency and green building ordinances have the greatest impact. Some jurisdictions may hesitate to pass ordinances requiring energy-efficient behavior, but they are the surest way to achieve results.[25] Because buildings are responsible for more than 50 percent of the energy used in the U.S. today, policies that demand more energy-efficient structures are essential to reducing greenhouse gas emissions.[26] Existing knowledge and materials can increase the energy efficiency of most buildings by 15-50 percent, reaping long-term savings of both resources and money.

The State adopted a statewide Green Building Standards Code, which is voluntary starting in 2009 and becomes mandatory in 2011. The code establishes a minimum level of green building standards and does not preempt local governments from adopting and enforcing their own more stringent ordinances.

POTENTIAL ACTIONS

Easy/Short-term

- Use PG&E bills or data to understand the 2005 energy use by sector in your community and in government operations, and use it as a baseline to measure reductions in power purchases. Use a format that is consistent with the one used in the Air District's free greenhouse gas inventory workshops.
- **Enroll in an Energy Watch or Energy Partnership program** for help in assessing energy-saving opportunities in government facilities and operations, detailed building audits, policy assistance and numerous other tasks. Priority is given to government agencies that are willing and able to implement energy-saving actions that deliver quantifiable reductions in electricity and natural gas use. (Energy Efficiency > SERVICES)

[24] The San Mateo Countywide Guide to Sustainable Buildings and the Build It Green (BIG) single-family and multi-family Green Building Guidelines outline dozens of ways in which new buildings or renovations can be made energy efficient. Rating systems like BIG Green-Point Rated and the Leadership in Energy and Environmental Design (LEED) can have the same effect.

[25] Recall that California's strong energy efficiency standards for buildings and appliances have kept per capita energy use flat for 30 years, compared to huge increases elsewhere.

[26] The U.S. Council of Mayors and several cities and counties have endorsed the 2030 Challenge, an architect-led initiative to make all buildings carbon-neutral by 2030. See http://www.architecture2030.org/.

- Use **Energy Service Companies*** or ESCO's ("for-profit" companies) to conduct free energy audits and recommend equipment upgrades as an alternative to or in addition to using Energy Watch or Energy Partnership services. Under an Energy Savings Performance Contract, the ESCO will buy, install and maintain energy-efficient equipment in government facilities at a guaranteed savings to the city. An ESCO may also offer a Power Purchase Agreement under which a government agency agrees to buy power generated by the ESCO. This is usually generated by a solar electric system on the agency's facility under a long-term, fixed-price contract that costs less than the agency's current utility rates. (Energy Efficiency > SERVICES)

- Replace lighting in all government facilities with the latest energy-efficient technologies, including compact fluorescent and high-efficiency, T8 linear fluorescent lamps and fixtures. (Energy Efficiency > Lighting)

INTERMEDIATE/ MEDIUM-TERM

- **Develop a plan for how your community can reduce energy purchases and/or increase local clean energy production.** This can be accomplished, for example, by encouraging solar electric systems, fuel cells or other innovative methods. Assign existing staff, or hire an energy manager, climate action coordinator or consultants if possible. If neither staff nor funds are available, recruit a citizen task force (to support work in community,)and/or interns from local colleges (to support work at agency).

- **Establish an implementation action plan** for initiating and completing specific energy-efficient projects in government facilities and operations that are suggested by the Energy Watch audits and other investigative efforts.

  Case study: An ABAG Energy Watch audit revealed that the County of San Mateo could save nearly 4 million kilowatt hours of electricity, 180,000 therms of natural gas and more than $600,000 by optimizing heating, ventilating, and air-conditioning (HVAC) controls and systems in its facilities.

- **Update General Plans** to advance energy efficiency policies and encourage alternative and renewable energy sources. (Ordinances & Policies > GENERAL PLANS)

  - ♦ Create an Energy Element that specifically addresses energy issues and update existing language within the required seven elements (land use, circulation, housing, conservation, open space, noise and safety) and any optional elements to reflect energy goals.

  - ♦ Ensure language in the Energy Element provides support for existing or future energy efficiency programs, policies and projects.

  - ♦ If updating the General Plan is a barrier, identify existing language that supports energy efficiency measures and use it as a basis for implementing programs.

- **Update Strategic Plans** to consider the impact of rising energy costs and shifting energy sources from fossil fuel to renewable when making or assessing long term planning decisions.

- **Adopt a green building policy for new public construction**. (Ordinances & Policies > POLICIES)

  - ♦ Hire architects and builders with significant green building experience to keep costs in line with traditional buildings while designing and building in long-term operational savings.

  - ♦ Use case studies, financial analyses and local municipal green building success stories to increase political support for the standard.

  - ♦ Consider identifying a specific LEED level as a goal whether it is Certified, Silver, Gold or Platinum regardless of whether the building will go through the certification process.

  Case study: Alameda County built its Juvenile Justice Center to the LEED Silver standard and reduced energy consumption to 46 percent below Title 24 and water consumption to 41 percent below code.

- **Adopt energy efficiency and green building ordinances** applicable to the residential and commercial sectors to make energy efficiency the standard practice in your community. (Ordinances & Policies > ORDINANCES) The State adopted a statewide Green Building Standards Code, which is voluntary starting in 2009 and becomes mandatory in 2011. The code establishes a minimum level of green building standards and does not preempt local governments from adopting and enforcing their own more stringent ordinances.

♦ Review the General Plan, programs, policies and codes to identify areas that support or inhibit energy efficiency or green building ordinances. Garner political backing.

♦ Educate staff, public, builders/designers/developers and policy makers on energy efficiency methods, green building, rating systems and ordinance processes.

♦ Ask staff in the planning, building and public works departments to help identify the building types in your community and permit requests types with the greatest potential for energy savings. This would encompass residential or commercial, commercial tenant improvements, residential remodels or time of sale retrofits.

♦ Review and consider adopting ordinances similar to those used in other jurisdictions to strengthen regional consistency. Builders, designers and developers are more ready to adapt to new rules if they are common throughout the area.

♦ Encourage input from stakeholders on using a voluntary versus mandatory policy and preferred standards, to help create an implementation plan and build community support.

♦ Analyze the fiscal impact of the ordinance, determine funding sources and project the measurable outcomes. Estimate the potential energy savings based on the average number of permit request types per year and the proposed standard such as "15 percent below Title 24".

♦ Understand the legal framework for implementing an energy efficiency and or green building ordinance in relation to Title 24 and the California Building Codes Standards (CBCS). If required, conduct an energy study and submit ordinance to CEC and CBCS for approval.

♦ Consider implementing an energy efficiency ordinance as the first step toward a green building ordinance.

Case study: Rohnert Park adopted an energy efficiency ordinance as well as a green building ordinance, using the LEED rating system as the reference standard for commercial buildings and GreenPoint Rated for residential buildings.

Case study: San Francisco has adopted a **mandatory** green building ordinance applicable to private development of all new commercial buildings over 5,000 square feet, major alterations and new residential construction projects. LEED and GreenPoint Rated are the reference standards for commercial and residential buildings, respectively, with increasingly stringent requirements to be phased in over a five-year period.

Case study: San Mateo County has adopted a mandatory Green Building Ordinance that is based on LEED or GreenPoint rated. The ordinance offers incentives such as expedited building and planning review and/or 24-hour turnaround of inspections depending on the point goals of the project.

- Update **financial tools** to include long-term operational savings and deferred costs as well as first costs or retrofit costs in cost-benefit analyses, and look at the internal rate of return and cash flow as well as simple payback. (Financing/Funding)

Case study: Sebastopol balanced low-cost, quick payback projects with long-term bigger impact projects in its 20-year plan. The projects will provide positive cash flow for 19 of the 20 years.

- Form **revolving funds** to pay for ongoing efficiency measures through energy savings. (Financing/Funding > REVOLVING FUNDS)

  Case study: Ann Arbor Michigan's $100,000 initial energy efficiency fund paid for itself in eight years.

- Use energy savings to fund new staff positions and additional energy measures from energy savings or rebates.

  Case study: The City of San Jose used a $300,000 rebate from PG&E to fund an energy officer position for two years.

- Sign up for the demand response program from PG&E to receive lower rates in exchange for reducing use during peak demand. (Financing/ Funding > DEMAND RESPONSE PROGRAM RATES)

ADVANCED/ LONG-TERM

- Install energy accounting or utility management software to monitor energy use, spot trends and identify opportunities for savings. (Energy Efficiency > AUDIT/ASSESSMENT > Software)

  Case study: Oakland saved $200,000 in the first year after it initiated and implemented a Utility Management System which discovered numerous accounting errors in their favor.

STRATEGY Promote cleaner and green sources of energy.

Clean, renewable energy sources are now more affordable than ever before. Local governments, businesses and individuals can produce and use clean energy by investing in **solar electric, solar hot water** and **wind energy systems**. Solar electric systems for homes cost about as much as a car depending on the size of the home, energy consumption patterns and physical set-up. For commercial and public buildings- the size, upfront cost and long-term economic benefits are usually far greater. Rebates, tax credits and other financial incentives lower the initial cost of these systems but the ability to pre-purchase 25 to 40 years of electricity reduces the risk associated with energy rate increases.

A solar hot water system is another relatively low-cost, low-tech source of clean energy (costs less than $10,000 installed within the average home and it uses the sun's rays to heat water or other fluids instead of using fossil fuels). Solar fans are the cheapest and easiest form of alternative energy. For a few hundred dollars, they can help keep a building cool without using any energy from the grid.

Co-generation, biodiesel, biogas and f**uel cell** systems all capture and use waste energy to reduce or eliminate the need to use electricity or natural gas. Rebates and other financial incentives are available to help with the upfront cost, and they deliver the same long-term financial advantages as solar electric systems.

A building owner can still use clean energy and save money even if he prefers not to buy and maintain a renewable energy system. **Energy Service Companies** or ESCOs are "for-profit companies who will often purchase, install and maintain an alternative energy system on government or commercial facilities. The company will then sell the power generated by the system to the building owner for less than the current cost of grid-supplied energy under a long-term Power Purchase Agreement. The contracts lock in the per-kilowatt hour electricity rate, guaranteeing the owner won't be affected as utility rates continue to increase.

For those who wish to learn more, PG&E offers several classes on solar and other renewable energy systems at the Pacific Energy Center in San Francisco. Technical evaluations of renewable energy systems are available through the Energy Watch program.

POTENTIAL ACTIONS

EASY/ SHORT-TERM

- **Reduce or eliminate** permit fees for solar electric, wind and solar hot water systems to encourage their widespread adoption. (Ordinances & Policies > ALTERNATIVE ENERGY > Incentives)

- Invite solar installers to offer **group discounts to city residents**. (Purchasing > PURCHASING POOLS > Neighborhood groups > Solar systems)

  Case study: 77 Portola Valley homeowners installed 355 kilowatts (kW) of solar capacity under the Solar City Collective Power program increasing the total amount of solar electric systems in their community by 50 percent. In Woodside, 21 households installed 213 kW of capacity, and in San Carlos 18 homes installed 83 kW of solar electric power under the same program. Other communities are running similar programs.

- Encourage, incentivize or require new construction and major renovation projects to **pre-plumb for solar hot water and pre-wire for solar electric systems**. Renewable energy systems can then be added quickly and inexpensively at a later time.

- Install **solar fans** where appropriate to reduce cooling costs and increase occupant comfort.

INTERMEDIATE/ MEDIUM-TERM

- Consider providing a **rebate** to residents and local businesses that invest in solar electric, solar hot water, wind and/or other clean energy systems.

  Case study: Millbrae offers rebates between $200 and $950 to help offset the expense of installing solar electric, solar hot water and/or solar pool heating systems. The Millbrae rebates are available to residents and business owners and are on top of state and federal financial incentives. (Ordinances & Policies > Incentives)

  Case study: Belmont has proposed offering a $500 credit toward city services to residents that purchase a hybrid car. The credit could be applied to swimming lessons, parking permit fees or other voluntary services offered by the city.

- **Adopt ordinances** that incent or require residents and businesses to install alternative and renewable energy sources such as solar electric and solar hot water systems. (Ordinances & Policies > ORDINANCES)

  Case study: Marin County set an energy use cap on new large homes by requiring single-family dwelling units of more than 3,500 square feet to use no more energy than a typical home of that same size. Homeowners can meet the requirements through energy efficiency and/or the use of renewable energy systems.

- **Adopt ordinances for residential new construction developments** that require a certain percentage of new homes to be built with rooftop solar electric as standard installation, and/or a percentage of homes to be built "PV-ready" in terms of roof construction and solar access.

- Install **solar hot water** systems at city facilities- especially those with swimming pools.

- Recruit and train **Green Energy Experts** on staff and in the community.

ADVANCED/ LONG-TERM

- After making facilities as energy-efficient as possible, install **solar electric** panels on city facilities, either through purchase or under a Power Purchase Agreement with an ESCO. (Energy Efficiency > SERVICES > ESCOs)

  Case study: 1800 solar panels produce 10-15 percent of the energy used at the wastewater treatment plant in Pacifica worth an estimated $100,000 per year in savings.

  Case study: San Carlos installed a 60 kilowatt solar photovoltaic system at its Corporation Yard. The system will return its cost, plus interest and an additional $100,000, over the life of the system.

- Develop co-generation*, biogas*, biodiesel* or fuel cell* sources at city facilities.

  Case study: Millbrae's biogas plant collects 3000 gallons of restaurant kitchen grease daily and converts it into methane gas. The gas fuels a 250-kilowatt co-generation system that can produce 1.7 million kilowatt hours per year or 80 percent of the wastewater treatment plant's needs.

  Case study: Burlingame saves $80,000 per year on its energy bills and received a $160,000 rebate from PG&E for its co-generation wastewater treatment plant. The plant uses naturally produced methane gas to create renewable energy and provide backup power during utility outages and emergencies.

  Case study: Pacifica is building a biodiesel plant which will convert waste vegetable oil into power that will run the plant, the adjacent wastewater treatment facility and a portion of the city's fleet. The city expects to save $200,000 a year in energy costs.

WATER

GOAL

Implement cost-effective and feasible water conservation and recycling, develop other local water supplies, and strongly support local water utilities' efforts towards the goal of meeting local water demands within the supply constraints enacted by the San Francisco Public Utilities Commission. The SFPUC currently estimates that San Mateo County will need an additional 5 million gallons of water per day by 2018 to meet projected demands.

STRATEGY

Make water conservation and recycling standard practice.

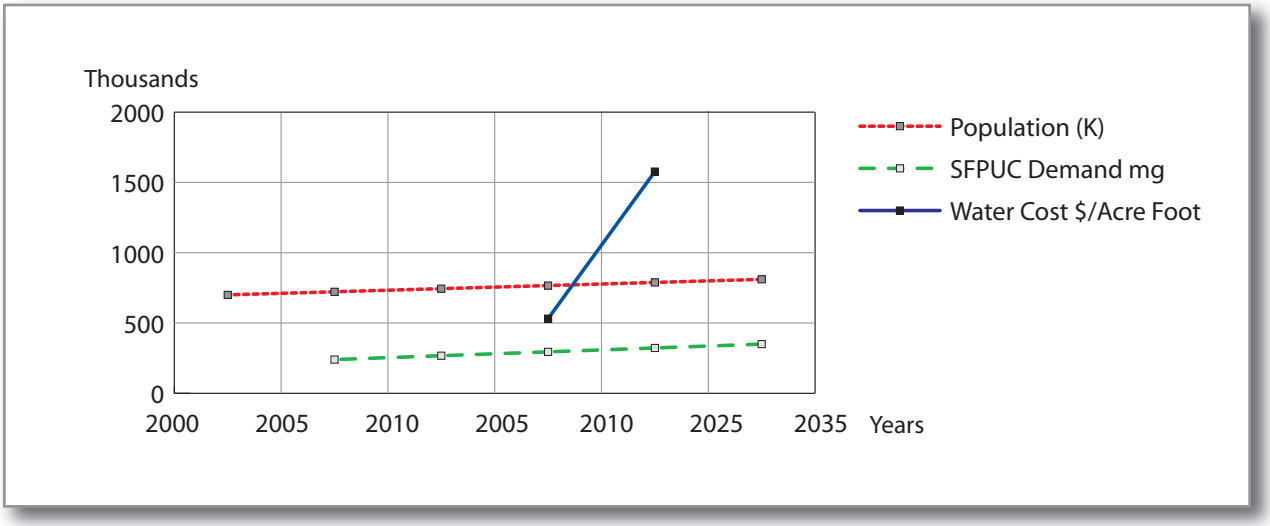
UNDERSTAND BASELINE USE

Water sales data is published in the BAWSCA Annual Report and is broken out by water district, jurisdiction and sector. Single family residences account for 52.8 percent of the water sold in the county with commercial activity at only 18.5 percent. As shown below, three other categories make up the remainder.

As residences and businesses have become more water-efficient, per-capita water use throughout the Hetch Hetchy regional water system has decreased in recent decades. The average water use level in 2005-2006 was 88 gallons per person per day, 15 percent lower than before the drought in 1986-1987 and 23 percent lower than the 1976-1977 levels. However, the average per person daily use could be as much as 50 gallons or lower when best management practices are implemented.

As seen in the chart below and mentioned in Section 3, Findings, Energy and Water, the cost for water per acre-foot is expected to triple by the year 2015. One can also see that projected water demand in million gallons per day, without conservation, is closely tied to population growth.

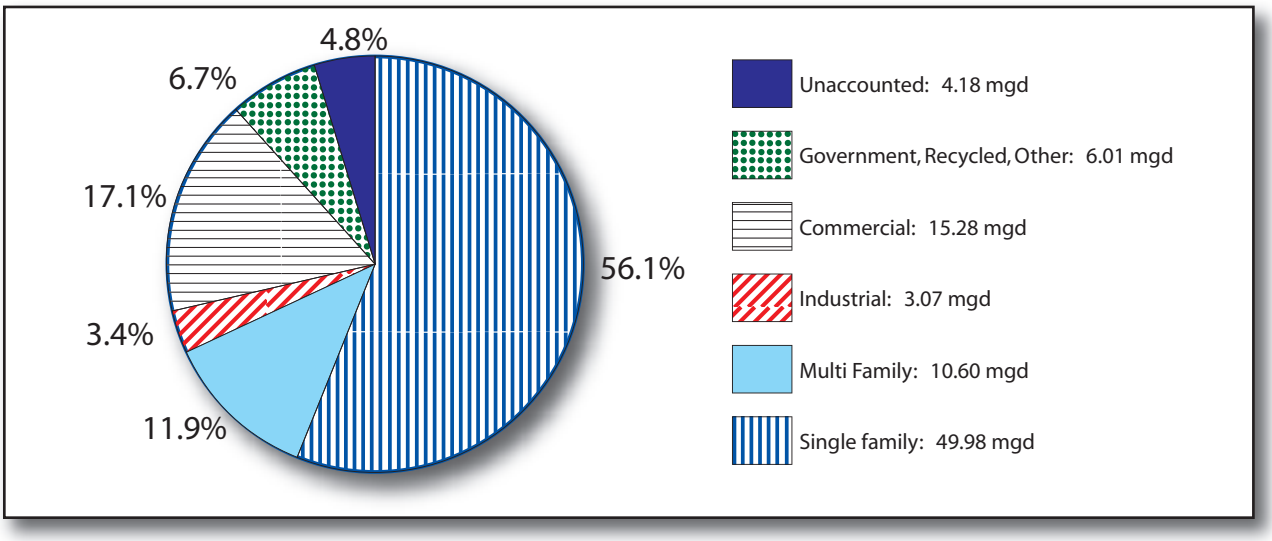
SFPUC Wholesale Customer Water Cost and Demand Projections



Create a Plan

State and federal government funding isn't as readily available for water conservation programs as it is for energy efficiency. Subsequently, programs are usually funded from local water rate revenues and implemented by the local water supplier. Projects that save both water and energy such as retrofitting cooling towers in commercial or government facilities may be covered by energy-efficiency programs and funding. There are significant economic benefits for all sectors to implement cost-effective water conservation with water prices in the Hetch Hetchy system expected to triple by 2015.

2005-2006 Water Usage by Sector in San Mateo County



IMPROVE GOVERNMENT FACILITIES AND OPERATIONS.

Local governments can save money and water by installing high-efficiency fixtures in City Hall, libraries, fire stations, police facilities and public recreation areas. Drought-tolerant plants and high-efficiency irrigation systems also reduce water use and can serve as demonstration projects for community members to see and emulate.

INTEGRATE WATER CONSERVATION AND REUSE INTO POLICIES AND PRACTICES.

As with energy, jurisdictions may wish to review their General Plan to ensure it promotes water conservation and reuse, and update it as needed during the next revision cycle. The financial analysis for any proposed water conservation project should reflect the significant rate increases that will take effect in 2015 and account for the risk that more water may simply not be available at any price.

Water is as critical to the health and quality of life in San Mateo County as energy, but there are no viable substitutes. Jurisdictions may need to rethink longstanding assumptions about water given the ever-present risk of drought, the aging Hetch Hetchy water delivery infrastructure and the competing demands of agriculture, wildlife and humans.

Arid regions like Arizona and New Mexico have accepted residential and commercial greywater systems as a necessity and San Mateo County may wish to consider doing the same. Jurisdictions should review building codes and consider enacting similar ordinances. Communities that may once have been uncomfortable using recycled water for parks and lawns, similarly, may now find that it is an acceptable option both technically and socially. Additional outdoor watering alternatives include improvements in artificial turf which now make it an attractive substitute for grass playing fields. Artificial turf provides both economic and environmental benefits with lower maintenance costs and the elimination of the need for water and pesticides.

USE INCENTIVES AND ORDINANCES TO CHANGE BEHAVIOR.

Ordinances can be used to incentivize or mandate commercial and residential building owners to choose water-efficient appliances and landscaping practices. Local governments are required by state law[27] to adopt a landscape water conservation ordinance by Jan. 1, 2010 that is at least as effective as the model ordinance developed by the California Water Resources Board. The model ordinance promotes 1) the use of recycled water, 2) use of climate-appropriate plants, 3) the capture and use of on-site stormwater and 4) the use of weather-smart irrigation controllers. Jurisdictions can recoup the cost of adopting the ordinance from the state.

Local governments may choose to offer financial incentives to help offset the cost of water-saving plumbing fixtures or irrigation equipment if it is necessary or desirable to do so. Communities may also wish to consider permitting greywater* and other water reuse systems at least on a pilot basis. At minimum, new buildings and renovations should be encouraged to include dual plumbing to facilitate a future greywater system. The EcoHouse group in Berkeley has been working on a system for two years and is waiting for final approval from the City of Berkeley. The system takes shower, bathroom sink and laundry water and channels it through a backyard gravel bed topped by water-loving plants into mulch-filled trenches where it eventually seeps back into the groundwater.

Water agencies can influence customer behavior by implementing tiered rate structures for water and sewer that encourage water conservation and reuse.

[27] AB 1881, the 2006 update to the Water Conservation in Landscaping Act.

POTENTIAL ACTIONS

EASY/ SHORT-TERM

- Replace older, inefficient toilets in city facilities with **high efficiency toilets** that use 20 percent less water per flush. (Water Conservation > FIXTURES > Toilets)

- Ensure that city facilities use **drought-tolerant plants** and appropriate water conserving irrigation with **drip irrigation or "Smart Controllers"**. (Water Conservation > Landscaping)

- Buy **recycled water** to use on golf courses, playing fields and for other irrigation needs. (Water Conservation > LANDSCAPING > Recycled water)

  Case study: Daly City currently produces and delivers 5.5 million gallons per year of recycled water to three neighboring golf courses, other city parks and open space areas.

- Switch to artificial turf for playing fields. (Water Conservation > LANDSCAPING > Parks and open spaces)

  Case study: After saving 2.8 million gallons of water a year and decreasing maintenance costs by replacing a playing field with artificial turf, Redwood City replaced six additional fields with turf. Other cities in the county, such as Atherton, San Mateo, and South San Francisco, have used artificial turf at parks and schools.

- **Strengthen water conservation ordinances** and enforce compliance with existing water conservation ordinances (e.g. landscape ordinances). (Ordinances & Policies > WATER CONSERVATION)

- Offer **financial incentives** to offset the purchase price of high-efficiency toilets, smart irrigation controllers, high-efficiency washing machines and other water-saving appliances.

  Case study: When Redwood City purchased more water from San Francisco than it was allotted, it instituted a high-efficiency toilet program. The city put demonstration models on display, sponsored a free "give-away" of the high-efficiency toilets, installed them for multi-family and non-residential customers and gave rebates to residential customers for the purchase of qualifying toilets. Within 36 months, 6500 toilets were replaced for an estimated annual water savings of 200 acre-feet or 65,170,200 gallons.

- **Implement a water-conserving rate structure** intended to signal the need to conserve and to potentially provide funding for water conservation programs.

  Case study: Burlingame's water and sewer rates are helping tip the balance in favor of installing high-efficiency toilets at major hotels during renovations. At a cost of $200 per toilet, the annual water savings are 2,683 gallons per fixture per year with a simple payback of three years. A hotel will save $4.69 for every 1,000 gallons on their potable water bill and $7.62 per 1,000 gallons on the sewer bill.

  - **Encourage local home improvement and plumbing fixture stores** to expand their selection of high efficiency toilets, faucets and other plumbing fixtures.

  - **Encourage local businesses** to install **high-efficiency toilets** that use 20 percent less water per flush and **sensor-activated sinks** in high-traffic areas.

  - **Encourage local nurseries** to promote **climate-appropriate plants** and urge local businesses to landscape with native, adaptive and drought-tolerant plants.

  Case study: Alameda and Contra Costa Counties have implemented Bay-Friendly* **Landscaping Guidelines** for landscapers, nurseries and homeowners to reduce water use, eliminate pesticides and reduce runoff to the Bay. Inspire the public into action by increasing awareness of the value of water and the importance of water conservation and landscape water use efficiency.

Potential Actions

- **Promote available rebate programs** for high-efficiency washing machines, urinals, and toilets. (Water Conservation > REBATES)
- Encourage, incentivize or require new construction and major renovation projects to **pre-plumb for greywater systems**. The systems can be completed at a later time at lower cost and with greater ease.
- **Support activities that will increase the efficiency of water use by other users** of the Hetch Hetch water system to prevent additional diversions from the Tuolumne River and to protect against future shortages.

INTERMEDIATE/ MEDIUM-TERM

- **Update General Plans** and municipal codes to include water conservation and reuse policies while supporting the new state-mandated landscape guidelines. (Ordinances & Policies > WATER CONSERVATION > General Plan).
  - ♦ Review the General Plan and identify existing language relevant to water use and efficiency.
  - ♦ Update the language within the current seven General Plan elements (land use, circulation, housing, conservation, open space, noise and safety) or create a new Water Element that specifically addresses water efficiency and reuse.
- **Update Strategic Plans** to consider the impact of rising water rates and decreasing availability on long-term planning projects.
- **Consider permitting greywater system**s at least on a pilot basis.

  Case study: Two pilot systems in Oakland showed savings of more than 20 gallons per person per day. San Francisco and Berkeley have each recently permitted a limited number of greywater systems.

STRATEGY Partner with other Hetchy Hetchy regional water system customers to preserve the Lower Tuolumne River.

A lengthy conversation began between various organizations and elected officials when the SFPUC announced plans to divert an additional 25 million gallons per day from the Tuolumne River based on estimates that future water demand in their Bay Area service territory will increase 19% by 2030. The SFPUC's regional water system delivers Tuolumne water to 2.4 million people in San Francisco, Santa Clara, San Mateo and Alameda Counties.

Understand the relationship between agricultural water use in the Lower Tuolumne basing and San Mateo County.

The associated environmental review document identified a number of alternatives. One of these alternatives was that water agencies should pursue water conservation and recycling instead of taking more water from the Tuolumne River. Rather than continuing the Bay Area's dependence on water from the Sierras, pursuing more efficient water use and a more diverse mix of water supplies would also minimize the risks associated with a shrinking snowpack that is expected as a result of climate change.

POTENTIAL ACTIONS

EASY/ SHORT TERM AND INTERMEDIATE/ MEDIUM-TERM

- **Assign staff to follow and support BAWSCA's** ongoing efforts to quantify and promote conservation efforts both inside and outside the County.

STRATEGY Pursue new sources of water by diversifying the water "portfolio"

POTENTIAL ACTIONS

INTERMEDIATE/ MEDIUM-TERM

- Work collaboratively with other organizations and agencies to follow progress related to **desalinization and the use of treated wastewater** as a water source alternative.
- **Explore rainwater collection** as a water source alternative.
- Closely follow the development of new technologies that may be approved for the local treatment of **greywater** and direct use of this water for use as a water source alternative.

COLLABORATION

GOAL San Mateo County will partner with the public utilities and work across city boundaries to address environmental challenges more effectively and efficiently.

STRATEGY Partner with public utilities for mutual benefit.

Local governments and utilities alike benefit when they work together to minimize community disruptions and coordinate planning efforts. Jurisdictions that take a pro-active role in understanding the issues affecting energy, water and other infrastructure providers will be better prepared for known and unexpected developments such as water rate increases and storm-related power outages.

In areas where local governments and utilities share a policy perspective, they may wish to work together on issues at the regional or state level.

POTENTIAL ACTIONS

EASY/ SHORT-TERM

- **Review quarterly updates from PG&E** representative about upcoming utility projects and take action as required.
- Consider adding an **environmental "line item" to City Council agendas** where status and issues concerning energy, water and climate efforts can be addressed.
- Establish an **internal process that alerts city management of any applications** for permits to do work in the cities by PG&E or other utilities that would have a significant impact on residents, businesses, or on municipal operations.
- Establish a San Mateo County Energy Watch program through a Local Government Partnership with PG&E.

INTERMEDIATE/ MEDIUM-TERM

- Support the passage of net-metering or similar legislation at the state level to allow cities to "sell" their excess self-generated energy to the utility and apply the credits to their other government accounts. (In 2008, the Governor signed AB 2466 which authorizes net metering. Cities and the County will follow the implementation of this bill).

STRATEGY Collaborate with other jurisdictions to save time and resources.

Cities within San Mateo County vary in geographic size, population, affluence, political climate and level of commercial and industrial activity. The communities also differ in terms of the type and quantity of energy efficiency and water conservation measures already implemented.

Despite these differences, every community shares some key traits with several of its neighbors. Each jurisdiction may be able to save significant time and money—and minimize risk—by collaborating with other cities facing similar challenges.

The table below shows the average kilowatt-hour purchases per household and per commercial business and the average purchases of Therms of natural gas per household and per commercial business. The last column shows a calculation of the ratio of residential accounts to commercial accounts with higher number depicting more residential and lower number depicting more commercial. The highlighted cells in the table show the five highest and the five lowest values in each column. The intention is to show cities how they might consider collaborating with other cities. For instance, looking at the second column, Brisbane, Foster City, Menlo Park, Redwood City and South San Francisco have the highest average use of natural gas by commercial businesses. These cities should consider working together if any one of them intends to develop a program to help businesses reduce their use of natural gas through energy efficiency measures. Looking at the last column, Brisbane, Burlingame, Colma, San Carlos and San Mateo have the most commercial energy accounts in ratio to residential. These cities should consider working together to develop a commercial energy efficiency outreach program. On the other hand, Atherton, Daly City, East Palo Alto, Foster City and Hillsborough have the highest ratio of residential to commercial energy accounts. These cities should consider working together to develop a residential energy efficiency outreach program.

	KWH per Customer *		Therms per Customer*		
	Residential	Commercial	Residential	Commercial	Res/Comm Ratio**
Atherton	19,583	70,750	1,544	15,358	22
Belmont	5,608	49,148	577	3,385	15
Brisbane	4,691	118,693	431	5,450	5
Burlingame	4,966	99,766	589	5,961	8
Colma	4,113	95,350	452	6,160	2
Daly City	4,881	90,896	497	5,833	23
East Palo Alto	5,227	101,570	550	8,308	23
Foster City	5,547	162,128	568	9,405	20
Half Moon Bay	6,617	76,261	543	9,218	9
Hillsborough	15,030	43,967	1,408	7,505	45
Menlo Park	5,925	178,736	586	13,208	10
Millbrae	5,529	95,321	581	8,900	17
Pacifica	5,242	49,919	518	2,858	23
Portola Valley	12,954	57,411	1,155	10,476	17
Redwood City	5,238	149,798	503	6,493	11
San Bruno	5,313	103,734	550	4,166	15
San Carlos	6,094	65,874	567	2,507	7
San Mateo	5,413	104,323	576	5,383	13
South San Francisco	4,905	164,181	499	13,641	8
Woodside	18,342	42,726	1,478	3,625	1

* Source: PG&E Data for 2005, calculation is the average purchases per household or commercial business.
** Source: PG&E Data for 2005, calculation is the average number of Residential Accounts/Commercial Accounts

Highest Residential or Commercial Electricity Usage
Lowest Residential or Commercial kWh Usage
Highest Residential or Commercial Natural Gas Usage
Lowest Residential or Commercial Natural Gas Usage
Highest Residential Ratio
Lowest Residential Ratio

Although there are an infinite number of ways to analyze data in order to choose measures to undertake as groups, but the main point here is that **measures that have worked well in one city are likely to work well in similar communities. The staff from one jurisdiction can help another neighboring jurisdiction's staff by sharing** "lessons learned" and the financial analyses from past projects to save time, reduce the risk of implementation pitfalls, and be helped by others in turn. The Joint Venture Silicon Valley Network Climate Protection Task Force and C/CAG, are both forums for cities to share such information and develop common strategies for lowering energy use and reducing greenhouse gas emissions.

When cities work together, one city might choose to develop a program for multi-family buildings while another city investigates water conservation options at golf courses. A third city might target office buildings and a fourth might focus on hotels and restaurants. Every community, by sharing their research and results of their efforts, can save time and money and the region as a whole can reach its resource purchase reduction goals.

POTENTIAL ACTIONS

EASY/SHORT-TERM

- **Collaborate** with other cities that have similar results from their baseline inventories and share some of the traits listed above. Compare notes on past resource-saving efforts and develop common strategies where appropriate.
- **Join the Joint Venture Silicon Valley Climate Protection Task Force** to share best practices, develop common strategies, access technical resources and get discounts on energy-saving or energy-generating equipment purchased in quantity. (Organizations > JOINT VENTURE SILICON VALLEY NETWORK)

INTERMEDIATE/ MEDIUM-TERM

- Collaborate to **identify funding sources** to provide the technical support and expertise required for these programs, as cities may not be able to hire additional staff or consultants due to budget limitations.
- Jointly **support legislation** that helps meet the goals of the Energy Strategy

ECONOMIC OPPORTUNITIES

GOAL

Strengthen the long-term economic health of San Mateo County by supporting the clean technology sector.

STRATEGY

Encourage clean technology businesses to locate in the county.

Clean Edge, a clean-tech research firm, describes clean technology as "a diverse range of products, services, and processes that 1) harness renewable materials and energy sources, 2) dramatically reduce the use of natural resources, and 3) cut or eliminate emissions and wastes."

The "green" market is now the fifth largest sector in the U.S. providing jobs and attracting an increasing range of both customers and capital. The clean technology sector is already being compared to the high tech industry as a long-term growth engine for Silicon Valley. Venture capitalists are investing in startups that are developing alternative energy solutions, water-saving devices and energy-efficient equipment.

New technologies will come to market and the economic impact of the green economy will spread throughout the region.

Jurisdictions can attract these businesses by accentuating the availability of a highly skilled workforce, excellent schools and worker training programs along with the high quality of life in the area. They may wish to offer tax or other incentives as appropriate.

POTENTIAL ACTIONS

EASY/SHORT-TERM

- Establish a **working group** of knowledgeable economic development staff across the county to develop strategies and tools to attract clean technology businesses. Encourage SAMCEDA to work with the local chambers of commerce to target companies in the energy, water, green building, sustainable design, recycling and waste management industries.

INTERMEDIATE/ MEDIUM-TERM

- Consider offering **tax or other incentives to attract clean technology businesses** to San Mateo County.
- Urge the Workforce Investment Board, local community colleges, universities and trade unions to offer **classes and job training programs to meet the needs of clean technology employers** such as solar installation companies.
- **Evaluate policy** choices to both drive change and to influence job creation for the clean technology sector and to ensure that policy does not negatively impact local adoption of clean technology products and services.

STRATEGY Help accelerate the adoption of clean technologies, both locally and globally.

Local governments can help foster the growth of green technologies by evaluating and adopting, if suitable, products or services that reduce energy consumption, generate clean energy, lower greenhouse gas emissions, conserve or recycle water, reduce waste, increase the use of recycled materials or otherwise reduce environmental impact.

The combined economic power of San Mateo County communities is substantial. Helping clean technology companies establish a firm market for their products may accelerate their impact regionally, nationally and globally.

POTENTIAL ACTIONS

EASY/SHORT-TERM

- **Sponsor events to educate the broader community** about the importance of clean energy and resource-saving technologies. Invite venture capitalists and clean technology entrepreneurs to speak at local forums.
- **When in the market for alternative energy or energy-saving products, buy from local companies whenever possible**. Join the Joint Venture Silicon Valley Climate Protection Task Force to take advantage of technical evaluations and group discounts.

INTERMEDIATE/MEDIUM-TERM

- Consider partnering with local clean technology businesses in innovative ways by 1) helping specify or provide feedback on public sector product requirements or participate in a pilot program, and 2) helping **local governments become early adopters and leaders** in the use of clean technology.
- **Harness the purchasing power of the public sector** to drive wider adoption of new technologies

LEADERSHIP FROM THE TOP

GOAL

San Mateo County will encourage environmental leadership from the top in the public sector, the business community and residents to achieve the goals of the Energy Strategy.

Leadership From The Top doesn't stop at the municipal level and it should be encouraged in all organizations including businesses and even within the residential communities. Change doesn't happen without strong, visible, committed leaders who can articulate a vision and guide others toward the desired state. The first step is for there to be resources and staff allocated to support "change" and recognition that there will likely be direct savings as a result of these added staff resources- especially in larger communities.

STRATEGY

Invest in environmental expertise in local government.

MAKE RESOURCE CONSERVATION PART OF EVERYONE'S JOB

All government staff and elected officials need to become more knowledgeable about energy, water and climate issues which relate to and affect the county's economy and quality of life. In recent years, public demand for action on energy and climate matters has increased dramatically as green values and actions become increasingly important to voters and business owners. Staff in every department can save energy and conserve water through their individual actions. Almost all can increase their impact exponentially by applying their functional expertise in an environmentally conscious manner.

FOR EXAMPLE:

- City and County Management can lead green teams with representatives from every department in the organization to address energy, water, and climate change related efforts.
- Facilities Management can save significant amounts of energy through audits, retrocommissioning* and retrofit projects that upgrade lighting, HVAC systems, window coverings and mechanical systems.

- Information Technology department can cut energy use by buying only energy-efficient equipment and using the Energy Star power-saving settings.
- Public Works can use more flyash in its concrete to improve strength and keep the material out of landfills.
- Parks and Recreation can switch to artificial turf and using high-efficiency irrigation systems.
- Commute Alternatives programs can encourage employees to take public transit and incentivize other environmentally-wise behaviors.
- Accounts payable can red-flag unexpectedly high energy or water bills to help ensure that any problems are caught and fixed promptly.

The first step to encouraging such proactive behavior is awareness. The more a person understands about the impact of their actions the more he or she is capable of modifying them to alter the impact. Awareness can be increased through 1) formal training classes, 2) recommended reading, 3) presentations at staff meetings and City Council meetings, and 4) informal "lessons learned" forums between colleagues.

The second step to instilling new behaviors is encouragement. Staff members, if urged to look for ways to reduce energy and save water, will do so, finding opportunities that would otherwise go unrecognized. Employees who feel empowered to make suggestions about how their community can reduce its environmental impact will most likely do so.

The third step is to consider incentives rewarding and promoting energy efficiency and water conservation as part of everyone's job. Leadership is fostered by praise from a manager, recognition at a staff meeting, a letter from the mayor and other acknowledgments of a job well done. While financial rewards are always appreciated they're not always necessary for making individuals feel that their efforts were appreciated.

DEVELOP ENVIRONMENTAL EXPERTISE FOR THE ORGANIZATION

Only a handful of jurisdictions in San Mateo County currently have full-time employees assigned to environmental issues. Most have a broad portfolio, covering such areas as 1) waste management and recycling, 2)green building,3) energy efficiency, 4)water conservation, and 5)climate protection. Some smaller and mid-sized cities utilize volunteers to help understand and address these issues as in Woodside; San Carlos takes a multi-faceted approach, using a citizen task force to work with residents, the Chamber of Commerce to work with businesses, and city staff to work on green municipal projects.

To provide environmental expertise, organizations should assign internal staff, hire staff or use outside resources. With local governments offering so many programs, a community is more likely to get the maximum benefits available if a staff member can look for programs that match local priorities. In larger communities, a staff position may be funded by savings, cost avoidances and/or grants. Some of the tasks and benefits of a dedicated staff person include:

- Lowering utility bills by proactively looking for ways to save water and energy;
- Avoiding high electricity rates by managing peak power demands;
- Monitor discrepancies in utility billing;
- Taking advantage of existing local, state and federal programs, financial incentives and other offers;

- Ensuring water supplies will meet current needs and anticipated growth;
- Minimizing solid waste landfill, reducing waste generation and maximizing recycling in accordance with the Integrated Waste Management Act (AB939);
- Limiting wastewater discharge and thus the need for additional wastewater treatment facilities which also benefits the Bay.
- Reducing greenhouse gas emissions in accordance with the Global Warming Solutions Act (AB32) and supporting regulations.

The county can be rewarded by such an investment for much the same reasons that a city can benefit from having in-house environmental expertise.. The Energy Strategy recommends that, at the Countywide level, funds be allocated to provide staff to address the mounting number and importance of environmental issues, and take full advantage of resources offered by the state, regional agencies and other entities.

POTENTIAL ACTIONS

EASY/SHORT-TERM

- **Take advantage of free or low-cost training** opportunities and technical services offered by PG&E Local Government Partnerships, the Pacific Energy Center, Sustainable Silicon Valley, RecycleWorks, Sustainable San Mateo County, Build It Green and other organizations. (Education)
- **Identify a point person for environmental issues on City Council and on staff** (even if the staff person has another job). If at all possible, **assign budget and full-time staff** to manage environmental programs. Duties should include:
  - ♦ Complying with stormwater pollution prevention regulations.
  - ♦ Complying with AB 939 regulations and reporting requirements. (Not an energy strategy)
    - Managing garbage and recycling services.
    - Promoting waste reduction and recycling to residents and businesses.
  - ♦ Staffing environmental task forces and commissions.
  - ♦ Educating public and staff about energy efficiency, green building and water conservation.
  - ♦ Promoting transportation alternatives.

(The duties listed here may require more than one staff person).

- If it's not possible to assign full-time staff, try the following:
  - ♦ **Recruit college or graduate school interns** with environmental expertise; many of whom are eager to work with cities and acquire valuable work experience.
  - ♦ **Share a single resource (part-time, FTE or intern) among several cities** with a similar energy profile.

INTERMEDIATE/MEDIUM-TERM

- **Establish an Energy Task Force (Internal "Green Team")** to identify, analyze, plan, prioritize and implement energy-saving measures in civic facilities and the broader community.
  - ♦ Try to include representatives from facilities or public works, finance, the City Manager's office and the City Council to ensure that energy efficiency plans are cost-effective, adequately resourced, and supported by the affected departments and individuals.
  - ♦ If no staff resources are available, start a Citizen Task Force to do research and help with planning and prioritization. Burlingame, Menlo Park, San Mateo and other local cities have Green Ribbon Task Forces at work.
  - ♦ In the alternative, create a multi-jurisdictional Energy Task Force with representatives from different cities with a similar energy profile. Facilities, financial issues and energy-saving opportunities may be similar enough to make a joint approach politically feasible and cost-effective.

STRATEGY Recruit and support community leaders at every level.

Leadership in resource conservation must come from elected officials and city staff, but is also needed throughout the community and at all levels. **By recruiting and empowering others** to help meet the goals of the Energy Strategy, **local governments can 1) increase the level of civic involvement, 2) take advantage of free support, and 3) ultimately make their own job easier. Leadership in resource conservation must come from elected officials and city staff but it's also needed at all levels throughout the community.**

Burlingame, Menlo Park, San Mateo, San Carlos, San Mateo County and other cities are creating Green Ribbon Task Forces to help shape policy and prioritize measures to mitigate climate change. Members of these communities have proven themselves eager to donate their time and expertise to gather data and sort through complex issues. Even communities that aren't ready yet to confront climate change issues can take advantage of the growing public interest in environmental issues. And they can do so by recruiting city employees and volunteers to organize programs, teach classes, coach neighborhood groups or help make small business operations "greener."

PARTNER WITH LOCAL BUSINESSES AND NONPROFITS.

Meeting the countywide energy and water use reduction goals will require the active engagement of the business community. The commercial sector represents half or more of the energy used in almost every city in San Mateo County, even overwhelming water use on the residential level in a some cases. Fortunately, many businesses within the county have already taken substantial steps to lower their energy use and reduce the environmental impact of their operations. Many of these businesses are the larger ones and these leaders are often generous in sharing their experiences with other businesses.

Still there are those businesses that have neglected to do so even with market and regulatory forces raising awareness about the economic benefits of becoming more resource-efficient. Some resource-efficient factors include:

- Energy prices continue to rise cutting into operating budgets and margins.
- Energy-efficiency programs that are available at little or no cost can dramatically reduce utility bills.

- Restrictions on water use and water rate increases are expected.
- Customers want to do business with green companies.
- Being energy- and water-efficient generates good PR and goodwill with customers and stockholders.
- Over the next several years, large companies will be tracking developments of the Global Warming Solutions Act(AB32) and related regulation over the next several years.

Programs that save both water and energy for businesses will bring substantial benefits to participants and the broader community alike. PG&E offers an extensive array of programs and financial incentives for both large and small businesses. Depending on the size and type of businesses within a community, local governments may wish to partner with a local trade association, chamber of commerce or nonprofit organization to ensure awareness and encourage the use of existing energy-efficiency programs.

A Green Business Certification program has been initiated and implemented by the County to help local businesses reduce their environmental impact. The program emphasizes energy efficiency, water conservation, pollution prevention and waste reduction. While businesses may pay some up-front costs on upgrades to qualify for certification (new lights, toilets, etc.), these upgrades pay for themselves over time and often result in measurable savings to the companies' bottom-line operating costs. The Green Business Certification program requires that cities provide staff to help businesses though the certification process. Cities should consider this program as they design their plan to reduce resource use within their communities.

Rented and leased office space consumes more energy than any other segment of industry in the county[28] — 14.5 percent of total electricity and 6.0 percent of natural gas (2005 data). Simply by improving building operation standards, the average office building can reduce energy use readily by as much as 30 percent experiencing enormous savings potential.

San Mateo County's many restaurants, cafes and drinking establishments also consume a significant amount of natural gas because they use hot water for dishwashing and cleaning-approximately 9.7 percent of the total. Targeting these establishments for efficiency upgrades can help cities reduce energy use and save water at the same time.

Nonprofits like Sustainable Silicon Valley (SSV) and Sustainable San Mateo County (SSMC) can play an important role in facilitating business-to-business sharing of best practices and networking opportunities. SSV members and members of the Silicon Valley Leadership Group (SVLG) can take advantage of Energy Watch retrocommissioning and other services. Green-oriented business associations exist to support and encourage members. Small businesses may be more easily reached through the local Chamber of Commerce or a local merchants' association. See the Industry-Specific section in Appendix D for more information.

ENCOURAGE INDIVIDUALS TO EMBRACE ENERGY-EFFICIENT HABITS.

Information is now readily available on opportunities to save energy and conserve water, but studies

[28] The energy use figures are categorized by industry codes. The Real Estate category (no. 531) includes renting, leasing or managing real estate for others, as well as buying, selling or appraising real estate. North American Industry Classification Systems (NAICS), http://www.census.gov/epcd/naics02/naicod02.htm.

[29] Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing, by Doug McKenzie-Mohr and William Smith (New Society Publishers, 1999), 8-11.

show that information is not enough to create widespread, long-lasting behavioral change.[29] **Civic leaders can encourage and support energy-efficient behavior at little or no cost by:**

- Explaining the financial, environmental and social benefits of purchasing less power and less water in city newsletters, mailings and meetings on the website and on signage in public facilities.
- Modeling good behavior by installing highly efficient lights, equipment and plumbing fixtures and using only drought-tolerant plants when landscaping.
- Recognizing and rewarding individuals that have made meaningful efforts to reduce their energy and water consumption.
- Helping individuals understand their own carbon footprint by promoting simple online calculators.

Several environmental organizations have compiled lists of "10 things you can do" to save energy or combat global warming. A community may wish to endorse one of the lists and ask residents to pledge to take action on one or all items.

A community can also take action through neighborhood-based groups. Small teams of 8-10 people support each other in their efforts to reduce their ecological impact in the areas of energy, water, waste, chemicals and transportation. A Palo Alto-based nonprofit called Acterra can help organize such Green Teams as well as track their progress.

As another option, cities can also promote and sell copies of a workbook called "The Low-Carbon Diet" which addresses the same ecological issues.

POTENTIAL ACTIONS

EASY/ SHORT-TERM

- **Partner with businesses, nonprofits, schools and other groups** to influence resource-efficient behavior in all parts of the community.
- **Collaborate with other cities** in the area with similar types of commercial activity such as movie theaters, auto repair shops, big box retailers and golf courses.
- **BOMA International**, a trade association for building owners and managers, **offers energy efficiency programs and trainings which can be leveraged**. The San Francisco chapter would be happy to partner with local governments to encourage energy efficiency in their members' buildings.
- **Encourage local retailers to carry a large selection of compact fluorescent and especially LED lights** and to participate in San Mateo County Environmental Health's "take-back" partnership to encourage the proper disposal of used fluorescent lamps.
- **Assist businesses with high-water use** such as restaurants, laundry facilities, hotels and hospitals to save both water and energy and collaborate with then to spread best practices to other facilities.
- **Work with local organizations**, including San Mateo County Economic Development Association

(SAMCEDA), the local Chamber of Commerce and merchant associations.

- **Leverage and support state and regional public outreach and education** programs.
  - ♦ Reinforce the messages of Flex Your Power and other energy- and water-saving campaigns in formal and informal communications, city policies and actions.
  - ♦ Promote local workshops and training offered at the Pacific Energy Center, RecycleWorks, SSMC, SSV, etc. (Education)
- **Encourage neighborhoods to start Green Teams**, posting their combined energy savings on the city website to create awareness and initiate healthy competitive spirit and challenges.
- **Send letters of commendation to school teachers and students** who demonstrate energy-awareness and the need for water conservation in science classes, science fair projects or other schoolroom activities.
- **Post energy efficiency information** and materials available on the city website and in city facilities, libraries and local stores. Also, encourage a friendly competition between neighborhoods for the most innovative and effective energy- and water-saving ideas.
- **Create an online suggestion box** for ideas about how to conserve resources. Publicly recognize and reward the people whose ideas are implemented
- Recruit and train **Energy Ambassadors** from among city staff, residents and local businesses and ask them to share energy-saving information with their peers.
- Recruit and train **Water Ambassadors** to do the same for water conservation.
- **Support existing neighborhood-based programs** and publicize the Green Team program. (Education > NEIGHBORHOOD GROUPS)

SECTION 7
NEXT STEPS

A countywide strategy needs countywide buy-in and participation. Once the Energy Strategy is approved by the San Mateo County Board of Supervisors and the C/CAG Board (the respective groups who 1) funded the development of the Energy Strategy and 2) under whose authority it was produced) the Energy Strategy will be circulated to the cities and the County for comment. All San Mateo County jurisdictions will be asked to adopt the Energy Strategy and the five countywide goals. Jurisdictions will be asked to authorize release of utility information from PG&E for their community on an ongoing basis, as needed, to allow C/CAG to track progress.

A countywide implementation plan and ongoing resources will be needed to ensure that the goals and related economic and environmental benefits are achieved. The Energy Strategy recommends that at least one countywide staff position be added to coordinate the development of the implementation plan and collaborative efforts across jurisdictions.

The following milestones are suggested as the first step in an implementation plan.

ENERGY

MILESTONE Establish the baseline power purchase level (2005 electricity and natural gas purchases from PG&E) for each community and for the county as a whole.

An accurate baseline level of countywide energy is needed to meet the countywide energy reduction goal. Each community will need to release its energy usage data to C/CAG and the County, so the County can establish a baseline for each jurisdiction and the county as a whole.

Every jurisdiction should take part in the ICLEI Cities for Climate Protection, Government Operations Inventory, which is being sponsored by Joint Venture Silicon Valley Network (JVSVN), for a more accurate report leading to specific actions directed at government operations.

TIMELINE: To be completed when cities adopt the Energy Strategy and release data to C/CAG.

MILESTONE Identify individual city goals and programs that will ensure the countywide energy goal is met.

There are many ways to meet the countywide goal. The Energy Strategy recognizes the need to balance each community's autonomy with the imperative for action to preserve the county's prosperity and quality

of life. The goal is intended to encourage communities to work collaboratively across city boundaries and sectors to achieve meaningful reductions in energy use and to significantly increase the production and use of local, clean energy.

One city might set strong energy efficiency goals for its internal operations and community. Another might choose to encourage or require residents to install solar panels or fuel cells to reduce demand on the electric grid by a certain percentage. Countywide programs targeting particular populations like the small business community, big box retailers or owners of large homes may also be needed to ensure that the overall goal is achieved.

Timeline: To be completed by December 2009.

Milestone 3 Develop plans to meet the energy reduction goal.

Specific plans will be needed to ensure that the county as a whole and individual communities are able to meet the targets they have set for themselves.

Timeline: To be completed by December 2009.

Note: Detailed suggestions on how to develop an energy reduction plan are included in the Energy Strategy Report. Communities can also get help from nonprofit organizations and other Bay Area communities.

Milestone 4 Track the development of energy reduction plans and progress toward the goal.

The status of energy plans and ongoing power purchases must be tracked to see if the plans are working as expected. If not, the strategies and/or level of resources may need to be adjusted.

Timeline: Assess status every year, beginning in 2009.

Note: The USTF or another entity will be convened to verify the status of efforts throughout the county. The analysis will identify resource gaps, best practices and further opportunities to share knowledge and resources.

WATER

Milestone 1 Establish the 2005 water use level for each community and for the county as a whole

As with energy, it is necessary for each city to release water data to C/CAG and the County, so the County can establish a baseline water use level for each jurisdiction and the county as a whole against which future progress can be tracked.

Timeline: To be completed whent cities adopt the Energy Strategy and release data to C/CAG.

Note: This milestone has been tentatively completed pending review by Bay Area Water Supply Conservation Agency (BAWSCA).

Milestone 2 Identify targets and programs that will ensure the countywide water goal is met.

As with the energy goal, one jurisdiction may set strict water efficiency goals for its operations and community. Another may focus on increasing its use of "self-generated" water—rainwater, greywater and recycled water.

Timeline: To be completed June 2009.

Milestone 3 Develop plans to meet the water conservation goal.

Specific plans will be needed to ensure that the county as a whole and individual communities are able to meet the targets they have set for themselves.

Timeline: To be completed December 2009.

Note: Elements of a water conservation plan are included in the Energy Strategy Report. BAWSCA and local environmental nonprofits can also provide assistance in developing a plan.

Milestone 4 Track the development of water reduction plans and progress towards the goal.

The status of water reduction plans must be tracked to see if the plans are working as expected. If not, the strategies and/or level of resources may need to be adjusted.

Timeline: Assess status every year, beginning in 2009.

Note: The USTF or another entity will be convened to verify the status of efforts throughout the county. The analysis will identify resource gaps, best practices and further opportunities to share knowledge and resources.

COLLABORATION

Milestone 1 Establish an effective, interactive relationship with PG&E for long-term planning and communications.

Timeline: Develop a process and implement it by December 2008.

Note: This milestone has been partly achieved. A new collaboration and communication process has been developed to keep local governments in San Mateo County informed about upcoming PG&E projects and engaged in the energy planning process. It still remains for PG&E to formalize this process with the cities.

Milestone 2 Effect a change in state policy to permit local governments to use their clean energy production credits for any of their accounts.

Net-metering restrictions currently prohibit most jurisdictions from using energy credits earned at one government facility (e.g. from a solar electric system on a fire station) to be applied to other facilities (e.g. city hall). A change in this law would provide local governments with more options for generating their own power cost-effectively.

Timeline: Propose and promote a bill or pursue an alternative strategy to achieve the same ends by December 2009.

Note: A subcommittee of the USTF is working with PG&E and state legislators to create a solution acceptable to all parties. (In 2008, the Governor signed AB2466 which authorizes net metering. Cities and the County will follow the implementation of this bill).

Milestone 3 Establish an effective process for implementing, coordinating, planning and collaboration among the communities.

Funding has been established to provide for one full-time staff person within RecycleWorks and C/CAG to coordinate these efforts. This position will be responsible for organizing meetings for information sharing and a quarterly workshop event on topics timely to progress towards the goals in the Energy Strategy.

Timeline: To be completed by the June 2008 budget cycle.

Milestone 1 Establish a Countywide forum to facilitate sharing of information and monitoring of countywide results.

Timeline: As part of the adoption of the Energy Strategy and Collaboration milestone 3 above.

Economic Opportunities

Milestone 1 Identify an appropriate group to spearhead the county's efforts to attract and retain clean technology companies.

Promoting economic development is outside the scope of the Energy Strategy, but it is an important element of a successful strategy.

Timeline: To be completed by February 2009.

Note: SAMCEDA is an obvious candidate for this role. City Economic Development Managers who belong to the Silicon Valley Economic Development Alliance (SVEDA) can also contribute to this milestone.

Shared Leadership

Milestone 1 Identify one or more elected officials and staff members in each jurisdiction to take the lead on energy, water and climate issues.

Environmental issues, especially climate protection, will only become more important in the coming years. Designating at least a few leaders in every community will make it easier to gain traction, exchange information and make meaningful progress toward goals.

Timeline: To be completed when cities adopt Energy Strategy.

Note: Most of the jurisdictions in the county have identified a staff member to participate in the Joint Venture Silicon Valley Climate Protection Task Force. Many jurisdictions as well have elected officials who are actively involved with climate and sustainability issues. Sharing the names of the right contacts will make it easier for communities to collaborate.

APPENDICES

APPENDIX A

STATUS OF CITY AND COUNTY EFFORTS

JURISDICTION	ELECTED CONTACT	STAFF CONTACT	RES. OF SUPPORT FOR ES	JVSVN TASK FORCE	ICLEI	MAYOR'S AGREEMENT/ CITY CLIMATE LETTER	SSV	SOLAR FEES (IN $)
Atherton				Y	Y	Y	Y	250
Belmont	Bill Dickenson	Karl Mittelstadt		Y	Y	N	Y	0
Brisbane	Sepi Richardson			Y	Y	N	Y	250
Burlingame	Terry Nagel	Gordon Gottsche		Y	Y	Y	Y	309
Colma				Pending	Pending	N	N	80
Daly City				N	N	N	N	490
East Palo Alto				Y	Y	N	Y	541
Foster City		Kristi Chapelle	Y	Y	Y	Y	Y	0
Half Moon Bay				N	N	N	N	291
Hillsborough				Y	Y	N	N	509
Menlo Park		Dianne Dryer		Y	Y	Y	N	411
Millbrae		Shelly Reider		Y	Y	N	N	Varies
Pacifica				Y	Y	N	Y	334
Portola Valley	Maryann Derwin	Brandi de Garmeaux		Y	Y	Y	Y	50
Redwood City	Barbara Pierce	Magda Gonzalez		Y	Y	Y	Y	261
San Bruno				Y	Y	Y	Y	320
San Carlos				Y	Y	Y	Y	0
San Mateo				Y	N	Y	Y	225
South San Francisco				Y	Y	Y	Y	300
Woodside	Deborah Gordon			Y	Y	N	Y	30
County of San Mateo	Jerry Hill	Kim Springer		Y	Y	N	Y	345

APPENDIX B

GLOSSARY

Adaptation Steps taken as a result of, or in anticipation of, changes to the natural and built environment caused by climate change.

Bay-friendly A term used to denote landscaping practices that are appropriate for the Bay Area climate (i.e. can handle wet winters and dry summers), limit or eliminate the use of pesticides and herbicides and reduce surface runoff.

Biodiesel Diesel fuel made from vegetable matter, sometime waste vegetable oil.

Biogas Fuel produced by the fermentation of organic matter such as municipal waste, manure or sewage sludge. Biogas is usually composed of methane and carbon dioxide.

Biomass Plant-based matter burned for fuel, generally in an industrial setting.

Carbon footprint The amount of carbon dioxide generated whenever human activities involve the burning of fossil fuels. The term is usually used in reference to an individual or entity.

Carbon offsets Investments in actions intended to reduce carbon emissions (or more generally, greenhouse gas emissions), made with the intention of slowing climate change.

Cap and trade A market-based mechanism used to modify behavior to achieve environmental benefits. Under the system, entities are granted a certain number of credits, e.g. to emit some number of tons of a harmful chemical like nitrogen oxide or sulphur dioxide. Entities that use fewer than the permitted credits may sell their excess credits to entities that exceed their allotted number. A cap and trade system worked well to reduce acid rain in the Northeast in the 1980s. Europe has implemented a cap and trade system for greenhouse gas emissions that has been criticized for setting the number of credits too high.

Clean fossil fuel Generally a reference to natural gas, which burns cleaner than coal, petroleum or other oil derivatives.

Climate change The impact of increased temperatures on the short-term and long-term climate patterns around the world.

Climate protection Measures taken by governments, businesses and individuals to lower greenhouse gas emissions and thereby limit the growth of global warming.

Co-generation A traditional power source that captures and uses the waste heat generated by the process of producing electricity. Co-gen systems are sometimes called “combined heat and power “(CHP) systems.

Commissioning Verifying that systems were properly installed and configured and are operating efficiently in a newly-constructed building. Retrocommissioning is the same process for an existing building.

Community Choice Aggregation (CCA) Cities that purchase power and sell it to their residents and business community in lieu of having those customers buy power from the local utility.

Compact Fluorescent Lamp (CFL) A lamp that uses approximately one-quarter of the electricity used by a comparable incandescent bulb. CFLs use more energy than LEDs. CFLs contain mercury and must be disposed of as a hazardous material.

Conservation The practice of using less of a particular resource, such as energy or water. Also used to describe efforts used to preserve or protect the natural environment.

Daylighting A green building design technique that relies on natural light as much as possible, thus saving energy used for task and general lighting.

Demand response Actions or programs intended to reduce energy consumption during specific periods, usually peak periods on summer afternoons.

Distributed generation Decentralized sources of power production, such as solar electric systems and wind turbines. Distributed generation is contrasted with centralized generation, where power is produced by utilities at power plants.

Ecological footprint A measure of how much land and water area a human population requires to produce the resources it consumes and to absorb its wastes under prevailing technologies.

Energy audit An assessment of the current and potential energy efficiency of a building or process.

Energy efficiency The practice of using less or the least amount of energy needed to achieve a task.

Energy Service Company (ESCO) Companies that provide energy audits and related services to organizations. The energy savings that result from actions taken after an audit, or by installing a renewable energy system, are usually shared between the ESCO and the client under a long-term contract.

Fuel cell An alternative, renewable energy system that uses compressed hydrogen, a catalytic agent (usually platinum) and oxygen to produce electricity, heat and water.

General Plan The official planning document for a city. State law requires that it include seven elements (land use, circulation, housing, conservation, open space, noise and safety), but may have more. It is updated roughly once a decade.

Geothermal An alternative, renewable energy system that uses the constant temperature of the earth (approximately 200 feet below the surface) to warm or cool a building. Geothermal systems are more common in colder climates than exist in the Bay Area.

Global warming The current and future increase in the temperature of the earth's air and oceans.

Green energy/ green power A general term that refers to renewable forms of power generation such as solar electric, hydropower, wind energy, bio-based fuels, etc.

Greenwashing When companies engage in minimal efforts toward social or environmental responsibility in order to enhance their public image.

Greywater Water that is captured after its initial use, such as from a shower or sink, and diverted from the sewer line so it can be used again for irrigation or another purpose.

Hydrogen A chemical element that can be used to create energy. Some people believe that hydrogen can replace gasoline as a primary transportation fuel, although significant obstacles exist, e.g. in its natural state, hydrogen is a bulky gas. Hydrogen is the primary fuel in fuel cell systems.

Hydroelectric Electricity produced by hydropower.

Hydropower Electricity generated by extracting the energy released by water rushing over a stationary surface, such as a dam.

Light-Emitting Diode (LED) The most energy-efficient type of lamp commercially available at this time. LEDs are more efficient than CFLs.

LEED (Leadership in Energy and Environmental Design) A rating system developed by the U.S. Green Building Council to measure the degree of environmentally-friendly materials and techniques used in a building's design or operations. See Appendix under Organizations for more info.

Mitigation Steps taken to minimize or avoid foreseeable negative effects, e.g. of climate change.

Net-metering The ability to "sell" excess, locally-generated energy to the utility for a credit to be used at a later time.

Peak demand The period when user requirements for energy supply exceed the average demand. In Northern California, peak demand is during summer afternoons.

Photovoltaic (PV) The most common type of solar receptor used in solar electric systems today. A photovoltaic cell is made of crystalline glass, usually blue. Several PV cells are contained on a panel. Several panels are assembled into an array, or a system.

Radiant heating and cooling A type of space conditioning system using water to conduct and transport heat throughout a building. The same process can be used to absorb heat and cool a building.

Renewable energy Energy derived from natural, renewable resources such as the sun, wind, algae or biomass.

Renewable Energy Credit (REC) Energy users that wish to use green power but can't get it from their local utility sometimes choose to buy RECs (also known as "green tags") to help subsidize the market for clean, renewable energy. Producers of renewable energy own the credits and can sell them to a willing buyer. Prices vary, but average around 2 cents per kilowatt-hour.

Retrocommissioning Commissioning an existing building to verify whether its systems are working as designed and to identify opportunities for performance improvements.

Self-generation Energy produced at the user's site through the use of solar electric, fuel cell, co-generation or other renewable energy systems.

Smart controls In buildings, smart controls can adjust the temperature, lighting and other systems based on occupant behavior and other variables with the goal of minimizing energy use. In landscaping and irrigation, smart controls can adjust frequency and amount of water delivered to plants based on rainfall and temperature variables.

Smart growth An urban planning and design approach that favors density and use of public transit and opposes suburban sprawl and dependence on cars.

Solar

Passive heating/cooling Passive solar design relies on a building's orientation toward the sun and mass to regulate internal temperatures and occupant comfort.

Electric An alternative, renewable energy system that consists of a solar receptor (often photovoltaics, see above) and an inverter. The inverter converts the direct current (DC) flow of electricity generated from the sun into the alternating current (AC) used in residential and commercial settings. Many systems also have a connection to the utility grid and a meter.

Hot water (solar thermal) An alternative, renewable energy system that uses the sun's rays to heat water for domestic or commercial use. Solar hot water systems in harsher climates use a liquid other than water to absorb solar energy and heat the water.

Time-of-use A utility rate that charges more for energy used when demand is highest (during peak periods, summer afternoons) and less for off-peak hours.

Water conservation Actions or practices intended to use less or the least necessary amount of water to perform the task.

Wind power An alternative, renewable form of energy production using stationary turbines to harness the energy in wind. The biggest challenge with wind power is its intermittent nature.

APPENDIX C

TASK FORCE REPORTS

San Mateo County Energy Snapshot (6/5/2006)

San Mateo County Water-Energy Snapshot (8/2006)

Largest Commercial Energy Users in San Mateo County (8/2006)

San Mateo County Energy Snapshot

introductory information for the Utilities Working Group

June 5, 2006

RecycleWorks
GREEN BUILDING
A PROGRAM OF SAN MATEO COUNTY

Questions on this report should be directed to
Jill Boone at 650-599-1433 or
jboone@co.sanmateo.ca.us

The Utilities Working Group is a subcommittee of CMAQ and
staffed and supported by CCAG and
the County of San Mateo Public Works Department

Introduction

This snapshot of the current usage and trends within San Mateo County is intended to inform the newly formed Utilities Working Group (UWG) and to help frame some of the initial questions in developing an energy strategy and to form a basis for common understanding of the issues. As the UWG confers and asks questions, deeper data or analysis can be added to this snapshot view.

CO_2 Emissions – from our built environment

This snapshot starts with CO_2 because CO_2 emissions represent the overall impact of our energy use on the global issue of climate change. On a national basis, electricity and natural gas usage produce half of the anthropogenic sources of CO_2 emissions. In San Mateo County, it is somewhat less due to our relatively clean electricity mix.

Nationally, CO_2 emissions from buildings – residential, commercial and industrial – rose by 1.7% from 2001 to 2004; in San Mateo County, the emissions increased by 14.9% in the same time period. This is caused partially by the changing mix of where our electricity comes from. When most of our electricity comes from nuclear, large hydro or renewable energy, a small amount of CO_2 is emitted. But if some electricity is generated in coal burning plants or older natural gas burning plants such as Hunters Point in San Francisco, the factor to convert kWhs to CO_2 tons increases. The energy mix here on the Peninsula is relatively clean – and the production of our electricity only produces half as much CO_2 as the national average. However, due to increased usage, the mix has become more dependent on less clean sources of electricity and therefore the CO_2 increases. (For conversion factors, please see appendix)

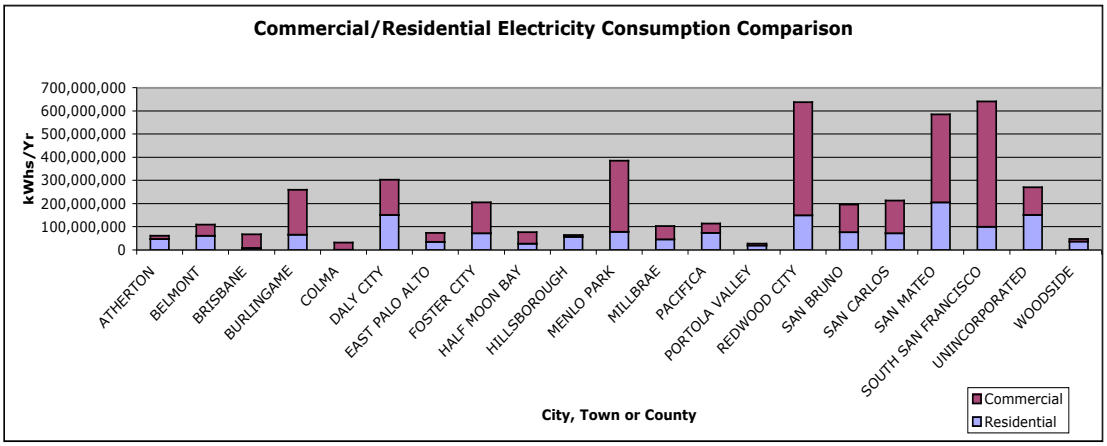
Global Greenhouse Emissions: Calculating the CO_2 generated by the County of San Mateo built environment

YEAR	Electricity (kWhs)	CO_2	Natural Gas	CO_2	TOTAL CO_2 tons
2001	4,372,586,265	1,033,683.77	252,727,121	1,470,871.84	2,504,556
2002	4,212,327,604	995,798.46	254,129,664	1,479,034.64	2,474,833
2003	4,435,886,126	1,241,826.32	249,267,282	1,450,735.58	2,692,562
2004	4,590,780,856	1,426,585.15	249,343,012	1,451,176.33	2,877,761
2005	4,480,713,617	1,392,381.76	239,246,323	1,392,413.60	2,784,795
Percentage of increase 2001 to 2005	2.47%	34.70%	-5.33%	-5.33%	11.19%

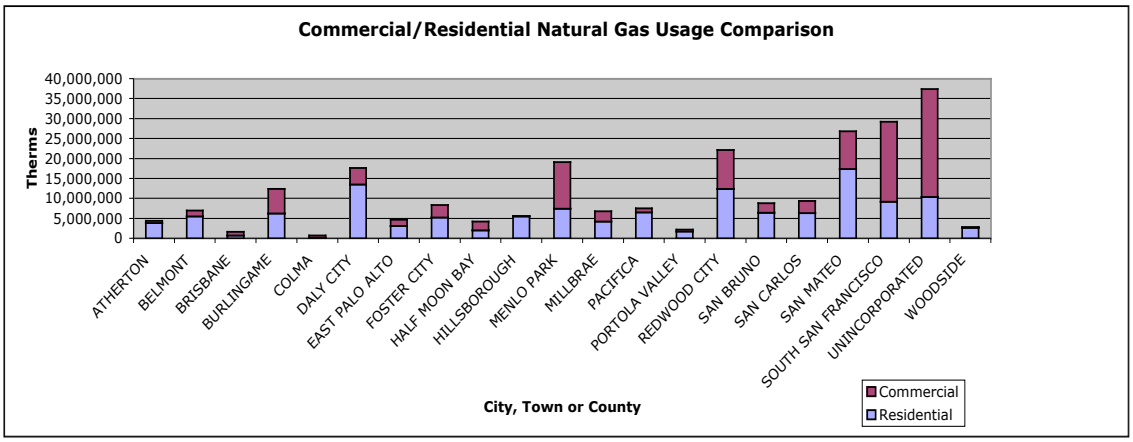
(see paragraph above for explanation of why CO2 increases faster than electricity usage.)

Commercial/Residential Ratios

Countywide residential energy usage makes up 35% of the electricity and 55% of the natural gas consumption. As we would expect, this varies widely by city or town. The following chart compares electrical usage by city and divides the usage in each city into commercial and residential use. The only data that is not included in the calculations are accounts that are owned and paid for by the City and County of San Francisco, such as the San Francisco Airport, the San Bruno Jail, pumps for their water system, etc. Most, if not all, of the San Francisco facilities are located in the unincorporated county.

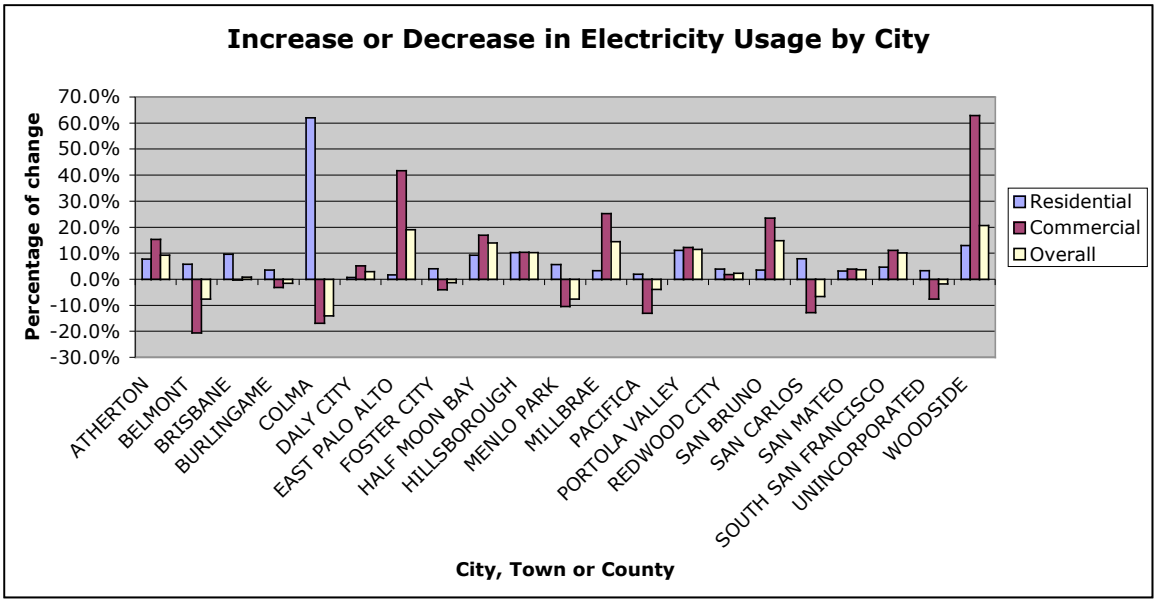


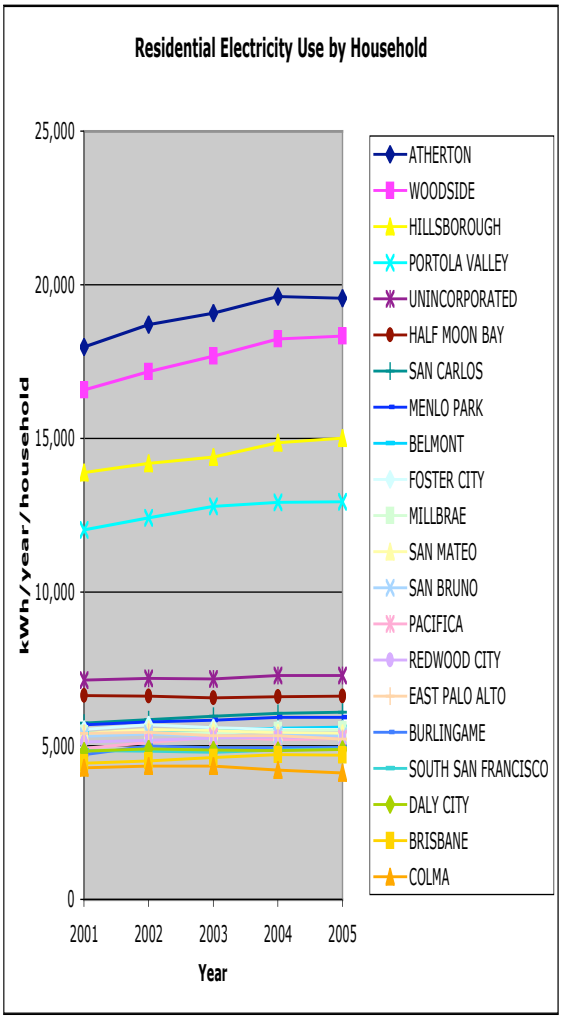
The following chart illustrates the relationships between commercial vs. residential by jurisdiction. In this case, the San Francisco owned facilities are included in the data set.

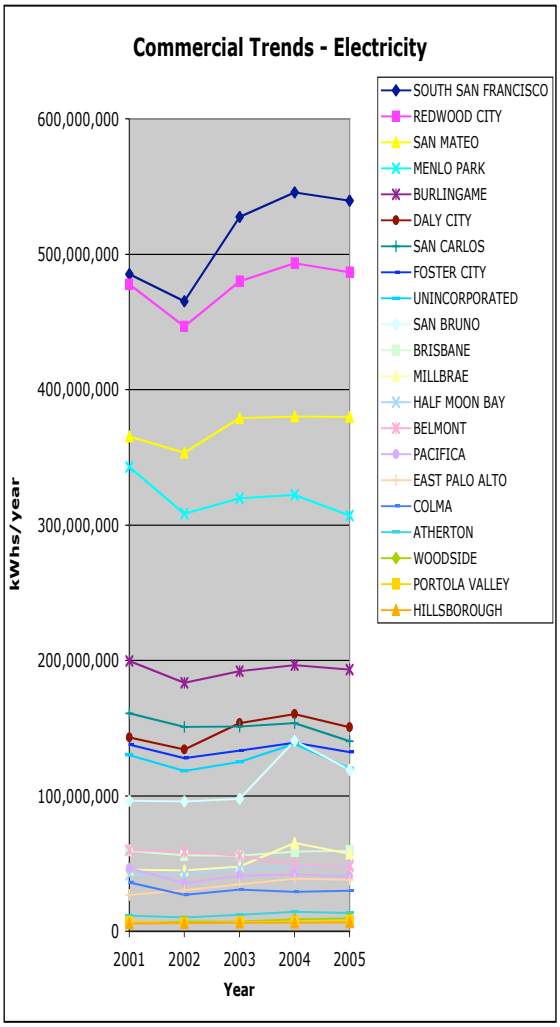


Electricity Consumption

Electricity consumption on a countywide basis has increased by 2.5%, (to 4,480,713,617 kWhs in 2005) with the most dramatic changes by percentage happening in East Palo Alto, Woodside, Millbrae and San Bruno (commercial) and in Colma and Woodside (residential).


Increase or Decrease in Electricity Usage by City
Percentage of change
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
-30.0%
ATHERTON
BELMONT
BRISBANE
BURLINGAME
COLMA
DALY CITY
EAST PALO ALTO
FOSTER CITY
HALF MOON BAY
HILLSBOROUGH
MENLO PARK
MILLBRAE
PACIFICA
PORTOLA VALLEY
REDWOOD CITY
SAN BRUNO
SAN CARLOS
SAN MATEO
SOUTH SAN FRANCISCO
UNINCORPORATED
WOODSIDE
Residential
Commercial
Overall
City, Town or County


Residential Electricity Use by Household
kWh/year/household
25,000
20,000
15,000
10,000
5,000
0
2001
2002
2003
2004
2005
Year
ATHERTON
WOODSIDE
HILLSBOROUGH
PORTOLA VALLEY
UNINCORPORATED
HALF MOON BAY
SAN CARLOS
MENLO PARK
BELMONT
FOSTER CITY
MILLBRAE
SAN MATEO
SAN BRUNO
PACIFICA
REDWOOD CITY
EAST PALO ALTO
BURLINGAME
SOUTH SAN FRANCISCO
DALY CITY
BRISBANE
COLMA

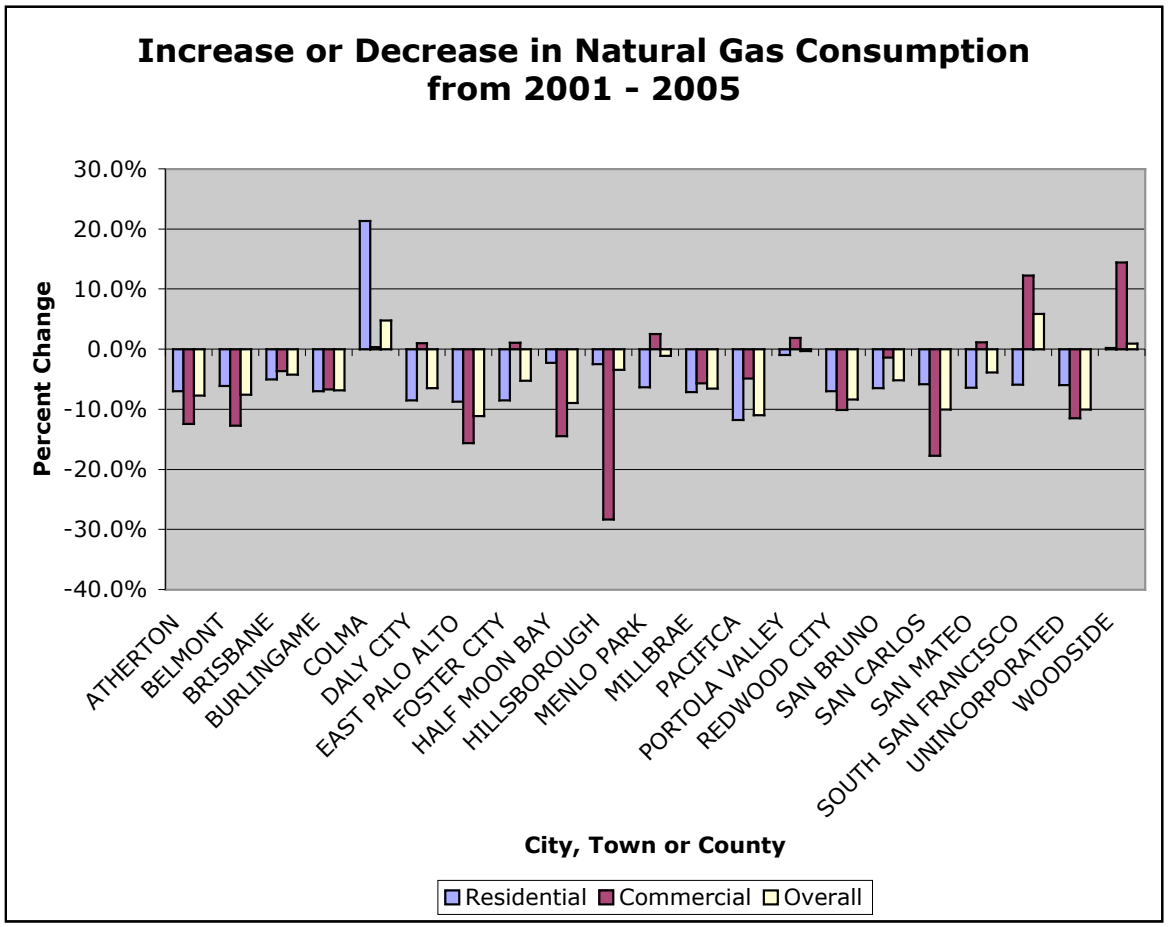

Commercial Trends - Electricity
kWhs/year
600,000,000
500,000,000
400,000,000
300,000,000
200,000,000
100,000,000
0
2001
2002
2003
2004
2005
Year
SOUTH SAN FRANCISCO
REDWOOD CITY
SAN MATEO
MENLO PARK
BURLINGAME
DALY CITY
SAN CARLOS
FOSTER CITY
UNINCORPORATED
SAN BRUNO
BRISBANE
MILLBRAE
HALF MOON BAY
BELMONT
PACIFICA
EAST PALO ALTO
COLMA
ATHERTON
WOODSIDE
PORTOLA VALLEY
HILLSBOROUGH

The amount of electricity used per household varies widely and appears to correlate to the size of the homes and the wealth of the residents. Atherton, Hillsborough, Portola Valley and Woodside account for 10.6% of the residential electrical use, but have only 4.4% of the population in the county.

The City and County of San Francisco uses almost 20% more electricity than all of San Mateo County according to 2001 data. Of that, 27% is residential use (compared to our 35% residential use). San Francisco shares the transmission lines that go through San Mateo County. Their electricity is handled by two agencies: the San Francisco Public Utilities Commission (PUC), which handles municipal accounts, museums and schools, and PG&E, which handles the rest.

Natural Gas Usage

Consumption of natural gas has gone down by 6.6% countywide. With only a few exceptions, the trends indicate that consumption both residentially and commercially is decreasing. Only three jurisdictions are using more natural gas now then in 2001: South San Francisco (5.9%), Colma (4.8%) and Woodside (1%).

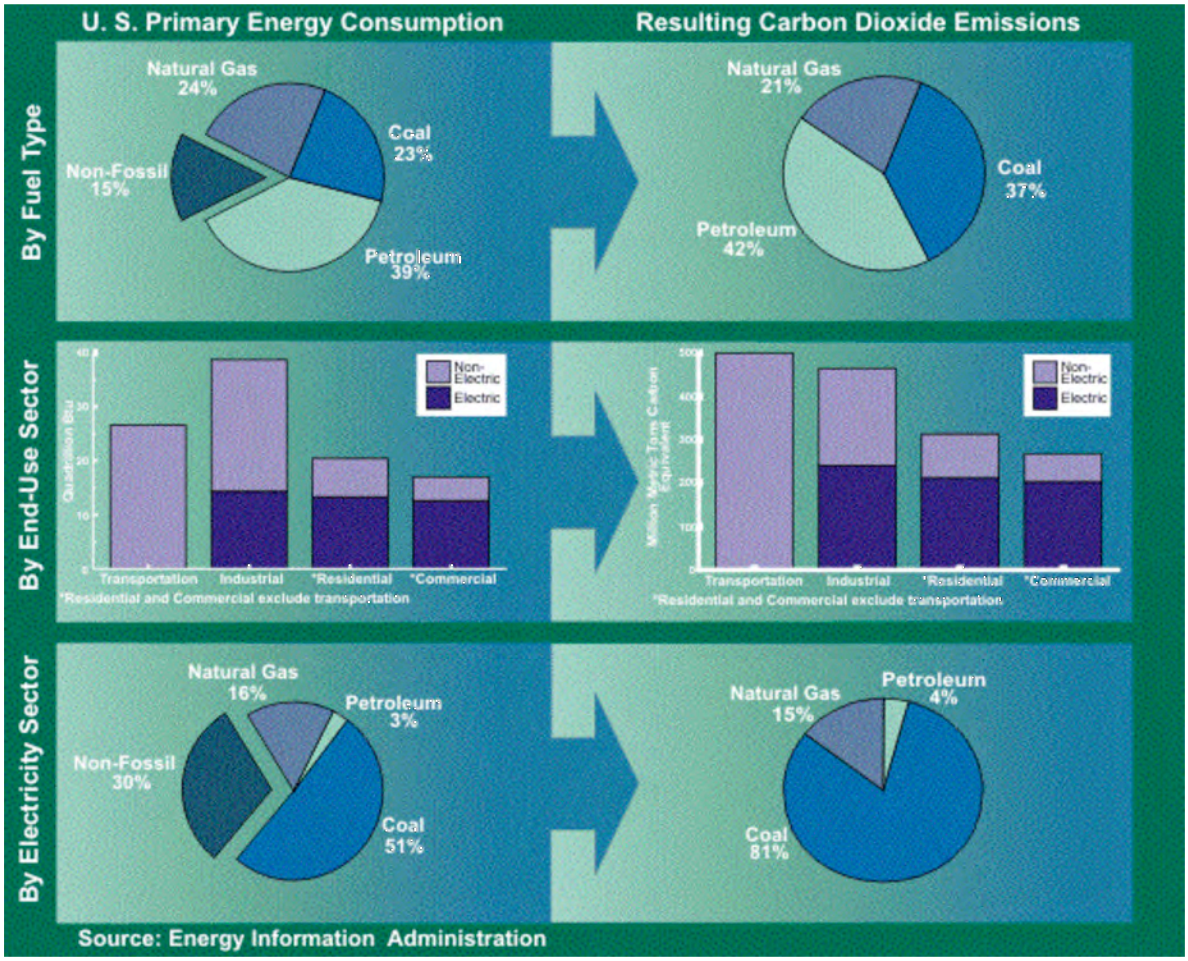


Atherton, Hillsborough, Portola Valley and Woodside consume the most natural gas per capita, consuming 10.4% of the overall residential usage in the County.

Summary

This Snapshot gives a glimpse of how energy is used in the county and what the current trends are. The bigger picture will include peak demand, capacity, and source of energy. As questions are asked and topics are raised, more information will be provided to supplement this initial report.

Appendix 1:
National Chart on Energy Consumption and CO_2 Emissions



Appendix 2:

Conversion Factors for CO_2:

Electricity in San Mateo County (the Northern CA Mix):

	Conversion Factors for kWhs to CO_2 lbs
1990	0.536000667
1991	0.522001333
1992	0.554000333
1993	0.412001333
1994	0.595998333
1995	0.331998333
1996	0.303999667
1997	0.356000333
1998	0.368001333
1999	0.512233333
2000	0.472802
2001	0.472802
2002	0.472802
2003	0.5599
2004	0.6215
2005	0.6215*

* conversion factor from 2004

Conversion Factor for Natural Gas therms to CO_2 lbs: therms x11.64 = lbs CO_2

San Mateo County
Energy – Water Snapshot

August 1, 2006

Questions on this report should be directed to
Jill Boone at 650-599-1433 or
jboone@co.sanmateo.ca.us

Report was prepared for the Utilities & Sustainabilty Task Force (USTF),
a subcommittee of CMAQ and
staffed and supported by C/CAG and the County of San Mateo

Introduction

This snapshot on water and the energy-water connection will cover the following three topics: (1) a general overview of water usage in San Mateo County, (2) the concept of energy intensity, and (3) opportunities for reducing energy and water consumption.

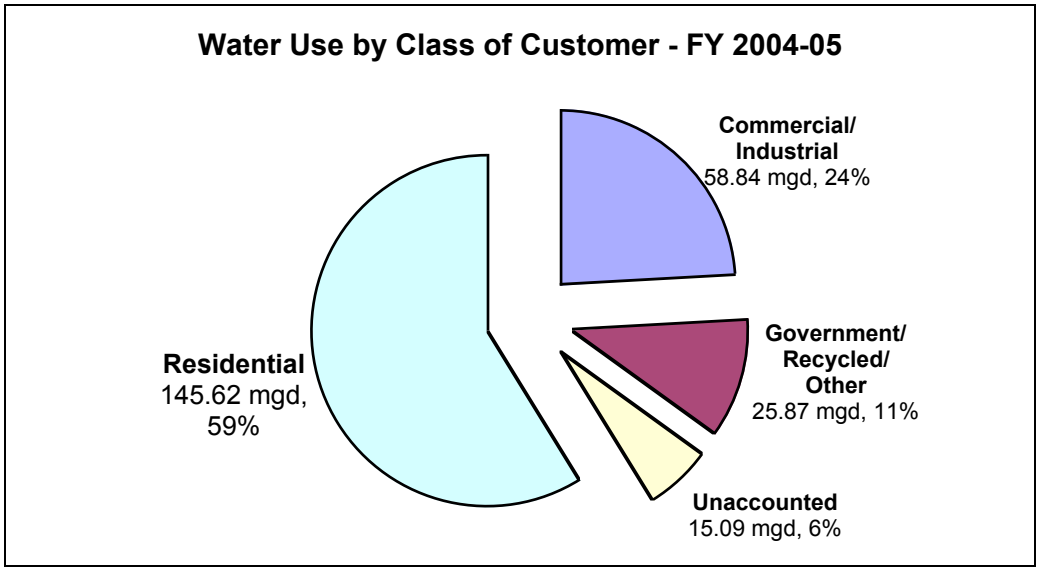
San Mateo County Water - Source

Ninety-three percent (93%) of the county's water comes from the Hetch Hetchy Reservoir in Yosemite National Park. This reservoir is fed by snowmelt from the Sierra Nevada Mountains. The remaining six percent (6%) comes from groundwater, which is fed by rain percolating through the soil.

Reduced snowfall and/or any prolonged droughts caused by climate change will decrease water availability. Increased urbanization, including roads and large buildings (impermeable surfaces), can divert rainwater into storm drains instead of allowing it to recharge the groundwater levels at the site unless careful attention is paid to stormwater management practices. Groundwater overuse – pumping more water out of underground aquifers than is being recharged into them – can reduce the amount of storage capacity for these reservoirs and increase the possibility of salt water intrusion or contamination and render well water unusable.

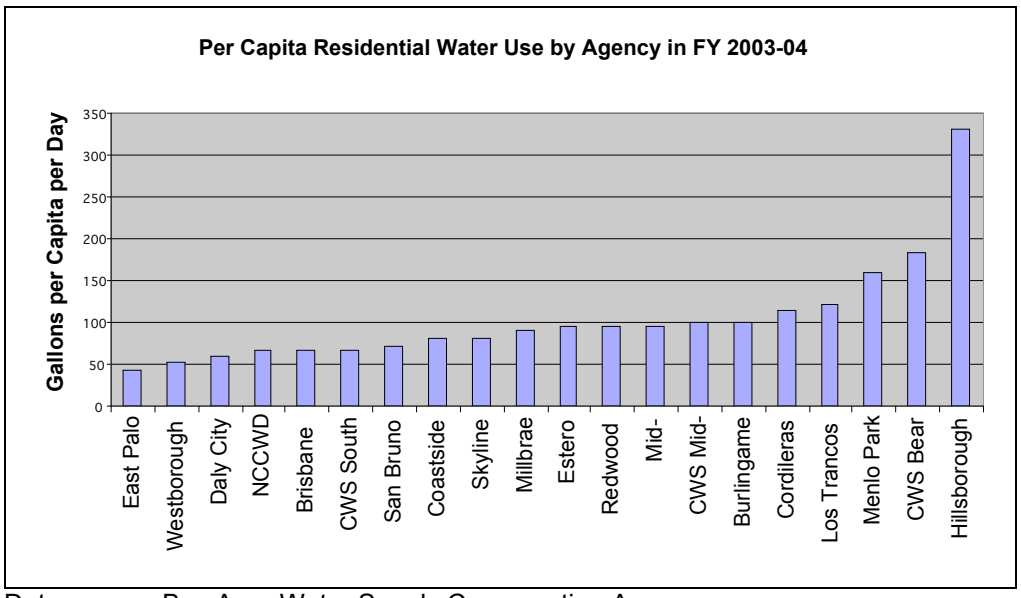
San Mateo County Water – Consumption

According to the 2006 Sustainable San Mateo County Indicators Report, San Mateo County uses about 99 million gallons of water per day, an amount that is expected to increase by 1.1% each year through 2030. The following chart breaks down water use by customer class.



Data source: Bay Area Water Supply Conservation Agency

The most affluent communities use the greatest amount of water residentially and a higher proportion of their water use is for landscaping. For instance, homes in the California Water District – Bear Gulch (which includes Atherton) use as much as 62% of their water for outdoor use. East Palo Alto residents use only 11% of their water outdoors and all the other communities fit somewhere between these two extremes.



Data source: Bay Area Water Supply Conservation Agency

The Energy-Water Connection

The electricity industry is second only to agriculture as the largest user of water in the United States. Electricity production from fossil fuels and nuclear energy accounts for 39% of all freshwater withdrawals in the nation (USGS)! Fortunately, the majority of San Mateo County's electricity is generated by hydro or pumped storage.

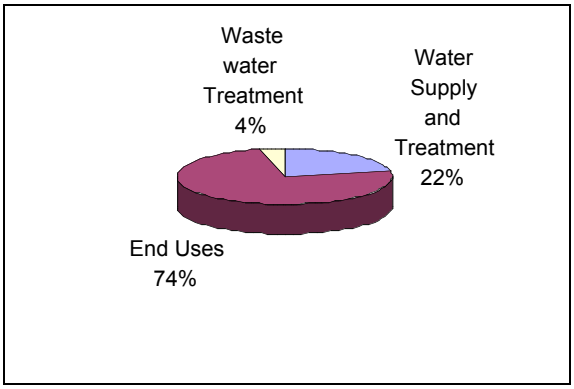
The term *energy intensity* is "defined as the amount of energy consumed per unit of water to perform water management-related actions such as desalting, pumping, pressurizing, groundwater extraction, conveyance and treatment – for example, the number of kilowatt hours consumed per million gallons (kWh/MG) of water." (CEC, p.4)

The energy intensity of the water of San Mateo County is below the California average for two reasons: (1) our water supply is gravity fed from the Sierras, reducing the need for pumping and conveyance, and (2) water from Hetch Hetchy is pristine and requires less treatment.

The data in the following charts shows how much electricity is used to supply water to the consumer, for the consumer to use the water, and the wastewater treatment. Total water-related electricity use is estimated at 19 percent of all electricity used in California. Not shown on this graph is the fact that 30% of California's natural gas use is related to water.

Water-Related Energy Use in California in 2001

	Electricity (GWh)
Water Supply and Treatment	
Urban	7,554
Agricultural	3,188
End Uses	
Agricultural	7,372
Residential	27,887
Commercial	
Industrial	
Wastewater Treatment	2,012
Total Water Related Energy Use	**48,012**
Total California Energy Use	**250,494**
Percent	**19%**



1 GWh = 1,000 MWh or 1,000,000 KWhs.

2001 California Energy Consumption by End Use Report

Opportunities to focus on water reduction *in order to reduce energy demands.*

When we view water conservation from an energy standpoint, the focus for reduction may be slightly different than simply reducing water consumption for water conservation goals. Some gallons of water require more energy (higher energy intensity) than others. Plus, there are a few changes in water consumption and treatment patterns that may affect electricity use. For instance, we should be aware of these facts:

- Agricultural use is less energy intensive than urban uses because it does not require treatment after use. Therefore, saving a gallon of irrigation water does not give us the same energy savings as saving a gallon of urban water.
- If diesel irrigation pumps are used on farms in San Mateo County, recent air quality incentives to switch to electric pumps could increase electricity needs.
- New water quality regulations for wastewater may increase energy demand.
- Recycled water is the least energy intensive of all sources of water; expansion of this usage could offer significant energy savings.
- In urban consumption, the most energy intensive use is hot water because it requires additional energy to heat the water. Therefore, increasing efficiency and conservation of hot water is an effective step in decreasing energy intensity per gallon used. (Good focus for residential incentives related to energy).

As the USTF moves forward with an Energy Strategy for San Mateo County, energy intensity of water uses should be considered as one of the factors in determining which programs/incentives/actions to do. Costs, potential reduction volumes and ease of implementation are other considerations. Any new equipment, infrastructure or processes

being designed and implemented at the utility level (conveyance, treatment) should include energy efficiency and reduction in the decision process.

And finally, water utilities should be encouraged to investigate and pursue increased electric generation that is related to the process – biogas conversion at wastewater treatment plants or in-conduit hydropower – and to consider installation of renewable energy options on their lands and buildings.

The state water plan is a good document for more in-depth understanding. This report concludes that the largest single new supply available for meeting expected growth in water demand over the next 25 years is water use efficiency. Other sources will increase energy demands.

Summary

Water use is increasing in San Mateo County, which in turn, increases the amount of energy used in the water process. Energy demand reduction relating to water consumption can be addressed in two ways: (1) starting with the end uses of water and identifying opportunities to incentivize change, educate the public or develop policy to address usage and (2) encouraging, requesting or requiring the water utilities to become more energy efficient and to choose self-generation options.

References for Further Information

Bay Area Water Supply Conservation Agency. *Annual Survey FY 2004-05*. April 2006. http://bawua.org/almanac.html
California Energy Commission (CEC). *California's Water-Energy Relationship Report*. November 2005. http://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDF

NRDC. *Energy Down the Drain, The Hidden Costs of California's Water Supply.* August 2004. http://www.nrdc.org/water/conservation/edrain/contents.asp

Sandia National Laboratories. *Energy-Water Nexus Overview*. http://www.sandia.gov/energy-water/

Sustainable San Mateo County. *Indicators for a Sustainable San Mateo County, 2006 Report Card*. http://www.sustainablesanmateo.org/

U.S. Geological Survey (USGS). Estimated Use of Water in the United States in 1995. *http://water.usgs.gov/watuse/pdf1995/html/*

Largest Commercial Energy Users in San Mateo County, by Industry

Prepared for the Utilities & Sustainability Task Force

August 2006

Questions or comments, please contact Gina Blus, gina.blus@gmail.com 510.428.0349

San Mateo County's diverse economy is evident in the following charts, which list the largest commercial users of electricity and natural gas, and the industries that spend the most on energy. Except for the Real Estate sector (see Appendix for details on what is included in each industry category) and Utilities, no one industry accounts for more than 10% of the total, and the top 10 categories combined represent just over half of the total. This is in contrast to the City and County of San Francisco, where a single sector—food services and drinking establishments—uses a full 30% of the natural gas consumed, and the top four industries account for more than 75% of the total.[1]

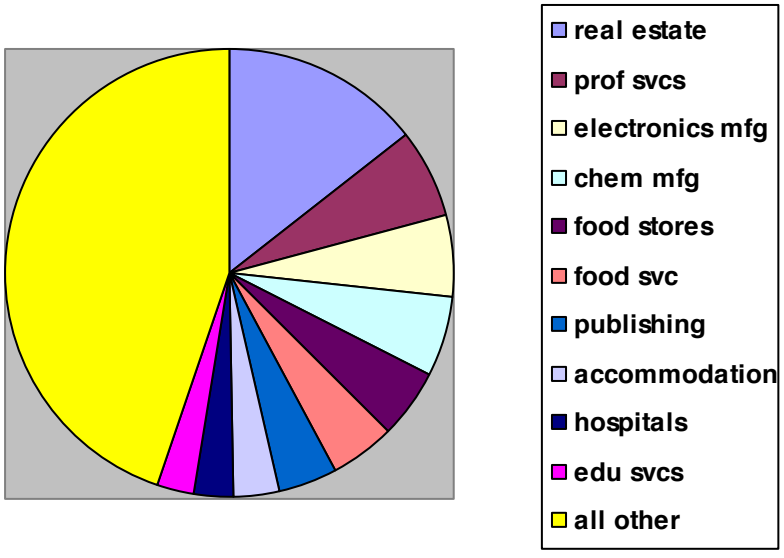
All calculations for San Mateo County businesses are based on data provided by PG&E. The San Francisco data was provided by the San Francisco Department of the Environment.

San Mateo County (2005 data)

Ten largest commercial users of electricity, by sector

Real Estate **14.5%**
Professional, Scientific, and Technical Services **6.2%**
Computer and Electronic Product Manufacturing **6%**
Chemical Manufacturing **5.7%**
Food and Beverage Stores **5%**
Food Services and Drinking Places **4.8%**
Publishing Industries **4.1%**
Accommodation **3.4%**
Hospitals **2.9%**
Educational Services **2.7%**

Cumulative total, top 10: 55.3%

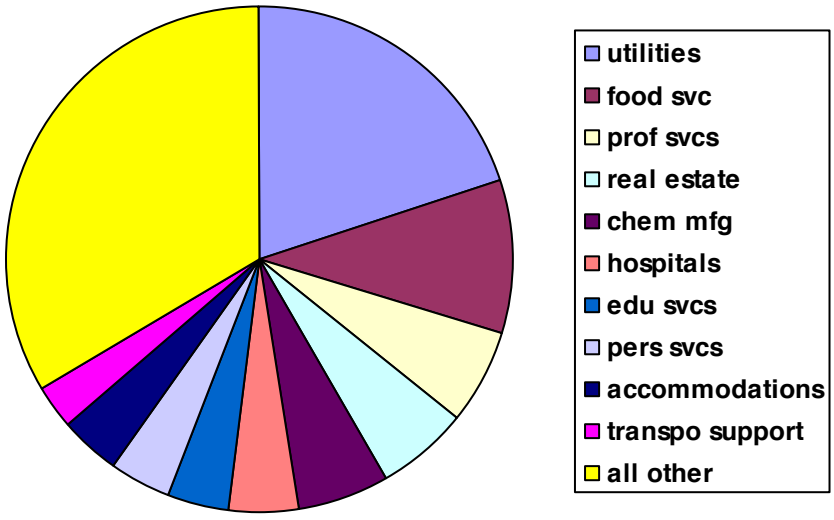


[1] The data obtained from San Francisco does not include electricity usage broken out by sector.

Ten largest commercial users of natural gas, by sector

Utilities **20%**
Food Services and Drinking Places **9.7%**
Professional, Scientific, and Technical Services **6.1%**
Real Estate **6%**
Chemical Manufacturing **5.6%**
Hospitals **4.5**%
Educational Services **4%**
Personal and Laundry Services **3.9%**
Accommodation **3.8%**
Support Activities for Transportation **2.9%**

Cumulative total, top 10, 66.6%

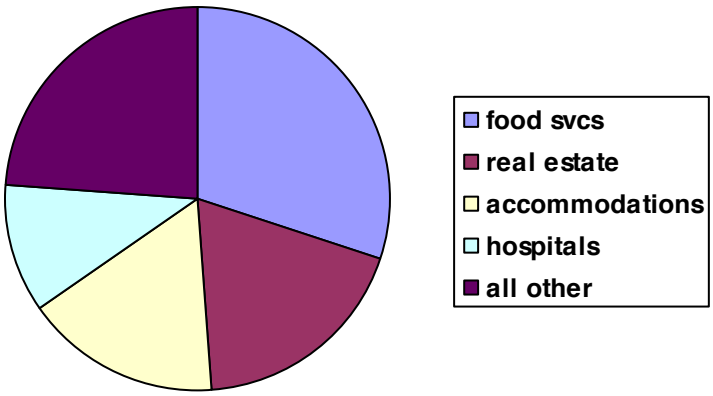


City and County of San Francisco (2003 data)

Four largest commercial users of natural gas[2], by sector

Food Services and Drinking Places **30%**
Real Estate **19%**
Accommodation **16.4%**
Hospitals **10.8%**

Cumulative total, top 4: 76.2%



[2] Commercial electricity broken out by sector was not available for this analysis.

APPENDIX

NAICS definitions, alphabetically

The following descriptions are from the official North American Industry Classification Systems (NAICS) site, http://www.census.gov/epcd/naics02/naicod02.htm

721 Accommodation

Industries in the Accommodation subsector provide lodging or short-term accommodations for travelers, vacationers, and others. There is a wide range of establishments in these industries. Some provide lodging only; while others provide meals, laundry services, and recreational facilities, as well as lodging. Lodging establishments are classified in this subsector even if the provision of complementary services generates more revenue. The types of complementary services provided vary from establishment to establishment.

The subsector is organized into three industry groups: (1) traveler accommodation, (2) recreational accommodation, and (3) rooming and boarding houses. The Traveler Accommodation industry group includes establishments that primarily provide traditional types of lodging services. This group includes hotels, motels, and bed and breakfast inns. In addition to lodging, these establishments may provide a range of other services to their guests. The RV (Recreational Vehicle) Parks and Recreational Camps industry group includes establishments that operate lodging facilities primarily designed to accommodate outdoor enthusiasts. Included are travel trailer campsites, recreational vehicle parks, and outdoor adventure retreats. The Rooming and Boarding Houses industry group includes establishments providing temporary or longer-term accommodations, which for the period of occupancy, may serve as a principal residence. Board (i.e., meals) may be provided but is not essential.

Establishments that manage short-stay accommodation establishments (e.g., hotels and motels) on a contractual basis are classified in this subsector if they both manage the operation and provide the operating staff. Such establishments are classified based on the type of facility managed and operated.

325 Chemical Manufacturing

The Chemical Manufacturing subsector is based on the transformation of organic and inorganic raw materials by a chemical process and the formulation of products. This subsector distinguishes the production of basic chemicals that comprise the first industry group from the production of intermediate and end products produced by further processing of basic chemicals that make up the remaining industry groups.

This subsector does not include all industries transforming raw materials by a chemical process. It is common for some chemical processing to occur during mining operations. These beneficiating operations, such as copper concentrating, are classified in Sector 21, Mining. Furthermore, the refining of crude petroleum is included in Subsector 324, Petroleum and Coal Products Manufacturing. In addition, the manufacturing of aluminum oxide is included in Subsector 331, Primary Metal Manufacturing; and beverage distilleries are classified in Subsector 312, Beverage and Tobacco Product Manufacturing. As in the case of these two activities, the grouping of industries into subsectors may take into account the association of the activities performed with other activities in the subsector.

334 Computer and Electronic Product Manufacturing

Industries in the Computer and Electronic Product Manufacturing subsector group establishments that manufacture computers, computer peripherals, communications equipment, and similar electronic products, and establishments that manufacture components for such products. The Computer and Electronic Product Manufacturing industries have been combined in the hierarchy of NAICS because of the economic significance they have attained. Their rapid growth suggests that they will become even more important to the economies of all three North American countries in the future, and in addition their manufacturing processes are fundamentally different from the manufacturing processes of other machinery and equipment. The design and use of integrated circuits and the application of highly specialized miniaturization technologies are common elements in the production technologies of the computer and electronic subsector. Convergence of technology motivates this NAICS subsector. Digitalization of sound recording, for example, causes both the medium (the compact disc) and the equipment to resemble the technologies for recording, storing, transmitting, and manipulating data. Communications technology and equipment have been converging with computer technology. When technologically-related components are in the same sector, it makes it easier to adjust the classification for future changes, without needing to redefine its basic structure. The creation of the Computer and Electronic Product Manufacturing subsector will assist in delineating new and emerging industries because the activities that will serve as the probable sources of new industries, such as computer manufacturing and communications equipment manufacturing, or computers and audio equipment, are brought together. As new activities emerge, they are less likely therefore, to cross the subsector boundaries of the classification.

611 Educational Services

Industries in the Educational Services subsector provide instruction and training in a wide variety of subjects. The instruction and training is provided by specialized establishments, such as schools, colleges, universities, and training centers.

The subsector is structured according to level and type of educational services. Elementary and secondary schools, junior colleges and colleges, universities, and professional schools correspond to a recognized series of formal levels of education designated by diplomas, associate degrees (including equivalent certificates), and degrees. The remaining industry groups are based more on the type of instruction or training offered and the levels are not always as formally defined. The establishments are often highly specialized, many offering instruction in a very limited subject matter, for example ski lessons or one specific computer software package. Within the sector, the level and types of training that are required of the instructors and teachers vary depending on the industry.

Establishments that manage schools and other educational establishments on a contractual basis are classified in this subsector if they both manage the operation and provide the operating staff. Such establishments are classified in the educational services subsector based on the type of facility managed and operated.

445 Food and Beverage Stores

Industries in the Food and Beverage Stores subsector usually retail food and beverages merchandise from fixed point-of-sale locations. Establishments in this subsector have special equipment (e.g., freezers, refrigerated display cases, refrigerators) for displaying food and beverage goods. They have staff trained in the processing of food products to guarantee the proper storage and sanitary conditions required by regulatory authority.

722 Food Services and Drinking Places

Industries in the Food Services and Drinking Places subsector prepare meals, snacks, and beverages to customer order for immediate on-premises and off-premises consumption. There is

a wide range of establishments in these industries. Some provide food and drink only; while others provide various combinations of seating space, waiter/waitress services and incidental amenities, such as limited entertainment. The industries in the subsector are grouped based on the type and level of services provided. The industry groups are full-service restaurants; limited-service eating places; special food services, such as food service contractors, caterers, and mobile food services; and drinking places.

Food services and drink activities at hotels and motels; amusement parks, theaters, casinos, country clubs, and similar recreational facilities; and civic and social organizations are included in this subsector only if these services are provided by a separate establishment primarily engaged in providing food and beverage services.

Excluded from this subsector are establishments operating dinner cruises. These establishments are classified in Subsector 487, Scenic and Sightseeing Transportation because those establishments utilize transportation equipment to provide scenic recreational entertainment.

622 Hospitals

Industries in the Hospitals subsector provide medical, diagnostic, and treatment services that include physician, nursing, and other health services to inpatients and the specialized accommodation services required by inpatients. Hospitals may also provide outpatient services as a secondary activity. Establishments in the Hospitals subsector provide inpatient health services, many of which can only be provided using the specialized facilities and equipment that form a significant and integral part of the production process.

541 Professional, Scientific, and Technical Services

Industries in the Professional, Scientific, and Technical Services subsector group establishments engaged in processes where human capital is the major input. These establishments make available the knowledge and skills of their employees, often on an assignment basis, where an individual or team is responsible for the delivery of services to the client. The individual industries of this subsector are defined on the basis of the particular expertise and training of the services provider.

The distinguishing feature of the Professional, Scientific, and Technical Services subsector is the fact that most of the industries grouped in it have production processes that are almost wholly dependent on worker skills. In most of these industries, equipment and materials are not of major importance, unlike health care, for example, where "high tech" machines and materials are important collaborating inputs to labor skills in the production of health care. Thus, the establishments classified in this subsector sell expertise. Much of the expertise requires degrees, though not in every case.

511 Publishing Industries (except Internet)

Industries in the Publishing Industries (except Internet) subsector group establishments engaged in the publishing of newspapers, magazines, other periodicals, and books, as well as directory and mailing list and software publishing. In general, these establishments, which are known as publishers, issue copies of works for which they usually possess copyright. Works may be in one or more formats including traditional print form, CD-ROM, or proprietary electronic networks. Publishers may publish works originally created by others for which they have obtained the rights and/or works that they have created in-house. Software publishing is included here because the activity, creation of a copyrighted product and bringing it to market, is equivalent to the creation process for other types of intellectual products.

In NAICS, publishing the reporting, writing, editing, and other processes that are required to create an edition of a newspaper is treated as a major economic activity in its own right, rather than as a subsidiary activity to a manufacturing activity, printing. Thus, publishing is classified in the Information sector; whereas, printing remains in the NAICS Manufacturing sector. In part, the NAICS classification reflects the fact that publishing increasingly takes place in establishments that are physically separate from the associated printing establishments. More crucially, the NAICS classification of book and newspaper publishing is intended to portray their roles in a modern economy, in which they do not resemble manufacturing activities.
Music publishers are not included in the Publishing Industries (except Internet) subsector, but are included in the Motion Picture and Sound Recording Industries subsector. Reproduction of prepackaged software is treated in NAICS as a manufacturing activity; on-line distribution of software products is in the Information sector, and custom design of software to client specifications is included in the Professional, Scientific, and Technical Services sector. These distinctions arise because of the different ways that software is created, reproduced, and distributed.

The Publishing Industries (except Internet) subsector does not include establishments that publish exclusively on the Internet. Establishments publishing exclusively on the Internet are included in Subsector 516, Internet Publishing and Broadcasting. The Publishing Industries (except Internet) subsector also excludes products, such as manifold business forms. Information is not the essential component of these items. Establishments producing these items are included in Subsector 323, Printing and Related Support Activities.

531 Real Estate

Industries in the Real Estate subsector group establishments that are primarily engaged in renting or leasing real estate to others; managing real estate for others; selling, buying, or renting real estate for others; and providing other real estate related services, such as appraisal services. Establishments primarily engaged in subdividing and developing unimproved real estate and constructing buildings for sale are classified in Subsector 236, Construction of Buildings. Establishments primarily engaged in subdividing and improving raw land for subsequent sale to builders are classified in Subsector 237, Heavy and Civil Engineering Construction.
Real Estate Investment Trusts (REITS) are classified in Subsector 525, Funds, Trusts, and Other Financial Vehicles, because they are considered investment vehicles.

488 Support Activities for Transportation

Industries in the Support Activities for Transportation subsector provide services which support transportation. These services may be provided to transportation carrier establishments or to the general public. This subsector includes a wide array of establishments, including air traffic control services, marine cargo handling, and motor vehicle towing.

The Support Activities for Transportation subsector includes services to transportation but is separated by type of mode serviced. The Support Activities for Rail Transportation industry includes services to the rail industry (e.g., railroad switching and terminal establishments).

Ship repair and maintenance not done in a shipyard are included in Other Support Activities for Water Transportation. An example would be floating drydock services in a harbor.

Excluded from this subsector are establishments primarily engaged in providing factory conversion and overhaul of transportation equipment, which are classified in Subsector 336, Transportation Equipment Manufacturing. Also, establishments primarily engaged in providing rental and leasing of transportation equipment without operator are classified in Subsector 532, Rental and Leasing Services.

221 Utilities

Industries in the Utilities subsector provide electric power, natural gas, steam supply, water supply, and sewage removal through a permanent infrastructure of lines, mains, and pipes. Establishments are grouped together based on the utility service provided and the particular system or facilities required to perform the service.

APPENDIX D

RESOURCES

Comprehensive Guides

Any city that plans to address energy and climate issues is encouraged to review both "The Energy Strategy" document and this "Resources" document to see what they have to offer and utilized them as reference documents as appropriate. s The guides in this document are far more detailed than The Energy Strategy itself.

The number of stars indicates the level of quality, comprehensiveness and overall value (higher number of stars means higher level of specific attributes) of the document to local government officials tasked with implementing energy, water and/or climate protection plans.

«««««« **California Local Energy Efficiency Program** (California LEEP) This program was developed in 2004 and 2005 and helped local governments design and implement effective energy efficiency strategies in their communities. The comprehensive documentation includes workbooks and practical decision-making tools, as well as all the results of research, stakeholder engagement and pilot projects.
http://www.caleep.com/default.htm

««««« **Climate Protection Manual for Cities** Natural Capital Solutions and ICLEI, Cities for Climate Protection, produced this well-organized and well-written guide which offers a wealth of information and links to further resources. It is highly recommended for staff and elected officials involved with energy, water, waste and climate issues. It provides helpful information on how to conduct a baseline emissions inventory, adopt an emissions reduction goal, develop a local action plan, and measure and verify results. Chapters on municipal buildings, infrastructure, transportation, waste reduction and recycling, purchasing and municipal utilities provide a clear overview on the issues and options. Numerous case studies provide data on the costs, benefits and impact of specific measures adopted by ICLEI cities nationwide.

Long-term initiatives like urban planning and fuel transitioning are also covered and dozens of case studies detail the impact of environmental programs for businesses and individuals.
http://www.climatemanual.org/cities/index.htm

«««« **Monterey Bay Regional Energy Plan** The Associated Monterey Bay Area Governments (AMBAG) published a regional energy plan in 2006. Part I sets out the goals and action plan in the following areas;1) energy information and education,2) energy conservation and efficiency, 3) clean renewable and distributed generation resources, and 4) transportation energy.
http://www.ccag.ca.gov/pdf/USTF/docs/AMBAGPartIFINAL11April06.pdf

Part 2 describes local actions that have already been taken as well as their results. It calculates the amount of energy efficiency potential by sector and end use and then identifies the most cost-effective measures in each sector. Detailed calculations on the cost per kilowatt-hour for specific measures (e.g. T8 fluorescent bulbs, refrigeration, chillers) are included.
http://www.ccag.ca.gov/pdf/USTF/docs/AMBAGPartIIFINAL11Apr06.pdf

The Appendices list existing energy efficiency programs, energy elements in General Plans, and brief explanations of more than 100 energy saving measures available for businesses and residents.
http://www.ccag.ca.gov/pdf/USTF/docs/AMBAGAppendicesApr06.pdf

«« **Energy and Environment Best Practices** The US Conference of Mayors compiled an extensive list of best practices most of which provide data on the cost, savings and payback period. The information is loosely organized under the headings of 1) municipal buildings, 2)facilities and operations, 3) air quality 4) climate change, 5) energy sources, 6) fuels, vehicles and transit, 7) housing and 8) "other." Within those areas, the case studies are organized by city and by project.
http://www.usmayors.org/climateprotection/AtlantaEESummitCDROMVersion.pdf

Topic-Specific Resources

The resources in this Appendix are listed under the following categories:

Action Plans

Alternative Energy

Climate Protection

Education & Outreach

Energy Efficiency

Funding/Financing Sources

Green Building

Industry-Specific

Jobs

Materials

Ordinances & Policies

Organizations

Purchasing

Waste Management

Water Conservation

Action Plans

CLIMATE PROTECTIION

Alameda County's waste management authority, Stopwaste.org, provided funds for its communities to join ICLEI and tackle climate protection as a group. Available to help individual jurisdictions complete their own Climate Action Plans are a template, list of proposed measures, assumptions and calculations. Under the heading "Climate Action Plan Template 2007" http://www.stopwaste.org Click Climate Change
Marin County completed its greenhouse gas emissions inventory and set a target of 15-20 percent reduction of government emissions and 15 percent countywide by 2020. Specific reduction measures are identified in the areas of building energy use, transportation, waste management and land use. The estimated CO_2 impact is included in the plan but not the financial impact. Appendix B lists sample reduction measures suitable for cities. http://egovwebprd.marinpublic.com/depts/CD/main/pdf/final_ghg_red_plan.pdf

San Francisco Climate Action Plan , completed in 2004, sets the goal of reducing greenhouse gas emissions by 20 percent below 1990 levels by 2012. The Kyoto Protocol, for reference, targets a seven percent reduction in the same timeframe or one-third as much. Well-researched and thoughtful actions are community-wide in scope and categorized under transportation, energy efficiency, renewable energy and solid waste.

http://www.sfenvironment.org/downloads/library/climateactionplan.pdf

Sonoma County The County of Sonoma created a draft CAP in 2006.
http://www.climateprotectioncampaign.org/news/documents/TS%20-%20white%20paper%20july%205%2005.pdf

ENERGY

California Energy Action Plan II was issued by the State Public Utilities Commission and the California Energy Commission in 2005. Updating the state's coordinated implementation plan for energy policies. The prioritized order to meet the state's energy needs is as follows: (1) energy efficiency and demand response; (2) renewable power and distributed generation; (3) clean and efficient fossil-fired plants as needed, and (4) grid upgrades to support both new demand and new power generation centers.
http://www.energy.ca.gov/energy_action_plan/2005-09-21_EAP2_FINAL.PDF (24 pages)

Monterey Bay Regional Energy Plan was a comprehensive energy strategy issued in 2006 by the Associated Monterey Bay Area Governments (AMBAG). See entry above in Comprehensive Guides.

San Diego Regional Energy Plan 2030 was developed by the San Diego Association of Governments (SANDAG) Energy Working Group in 2003. The four focus areas include: (1) energy planning, policy, consensus building and implementation; (2) unified legislative and regulatory advocacy with the state and federal governments; (3) coordination with Mexico, and (4) evaluating the Regional Energy Strategy implementation efforts. http://www.sdenergy.org/uploads/Regional_Energy_Strategy_Final_07_16_03.pdf (98 pages)

San Francisco Electricity Resource Plan was developed by the San Francisco Public Utilities Commission and the

Department of the Environment in 2002. Driven by an imperative to close the highly-polluting Hunters Point power plant, this plan outlines actions for energy efficiency and increasing the percentage of renewable energy through 2030. http://www.sfenvironment.org/downloads/library/1_planreviseddecember2002pdf.pdf (91 pages)\\

ALTERNATIVE ENERGY

Transportation Sustainability Research Center (TSRC) conducts research on alternative transportation fuel sources.
http://www.its.berkeley.edu/sustainabilitycenter/Index.html

BIOFUEL

The City of Pacifica is partnering with Pacifica's Livability Project to address local energy concerns and to discover areas where localization of power generation can be achieved. One micro-generation project currently in development is the Calera Creek Waste Oil Recycling/Biodiesel Production Facility. For more information on this innovative partnership, visit: http://www.pacificabiodiesel.com/About_Us.html

SF Greasecycle e is a citywide effort by the City of San Francisco to create a waste vegetable oil (WVO) recovery program that diverts Fats, Oils & Grease (FOG) out of the trash, away from the sewer and eventually into City fleet.
http://www.sfgreasecycle.org/

FUEL CELLS

California Fuel Cell Partnership is a collaboration of 32 organizations that believe fuel cell vehicles powered by hydrogen have the potential to change the future of transportation.
http://www.fuelcellpartnership.org/

BIOGAS

The City of Millbrae has updated their wastewater treatment plant to accept grease trap cleanings consisting of approximately 80% water and 20% grease as a feed material for their digester units. s An increase in the amount of methane produced is the result whereby the methane is then burned in a micro turbine to generate electricity for the wastewater treatment plant.
http://www.chevronenergy.com/news_room/default.asp?pr=pr_20050921.asp

SOLAR ELECTRIC (PHOTO VOLTAICS, PVS)

Low Income Solar

GRID Alternatives is a nonprofit that provides energy efficiency and renewable energy services, equipment and training under its Solar Affordable Housing Program. They work with local governments including San Mateo County and San Francisco's Department of the Environment and nonprofits such as Habitat for Humanity to design and install solar systems for low-income households. http://www.gridalternatives.org/.

California Solar Initiative Low-Income Incentive Program. On January 12, 2006, the CPUC committed to set aside 10% of the overall CSI funds for low-income customers and affordable housing projects. This decision, and as further clarified by Senate Bill 1 signed by the Governor on August 21, 2006, directs the CPUC to implement a solar incentive program that addresses the non-residential and existing housing markets in the investor-owned utility service areas including Pacific Gas and Electric, Southern California Edison, San Diego

Gas & Electric.
http://www.cpuc.ca.gov/PUC/energy/Solar/070424_csilowincome.htm

Government Resources

Consumer Energy Center – here at the Center, the California Energy Commission offers tips on energy efficiency, rebates, alternative energy and transportation choices for consumers.
http://www.consumerenergycenter.org/

Go Solar California - Joint website for California Public Utilities Commission and California Energy Commission to provide information on solar energy systems for new, existing, low-income and municipal customers. http://www.gosolarcalifornia.ca.gov/

California Solar Center (CSC) is working to promote greater use of renewable energy through education, research, program and policy development.
http://www.californiasolarcenter.org/index.html

Installers is a searchable database of accredited installers and related professionals. Database at:
http://www.findsolar.com

Permit fees See Ordinances & Policies > SOLAR PERMIT FEES

Purchasing See Purchasing > Solar systems

Solar Estimator is an easy-to-use web-based tool providing an estimate on the size, effectiveness and cost of a solar system based on the location and electricity bills of a home or business. Other good information for consumers is also on the site related to financing, return on investment for home energy efficiency projects and more. More info at: http://www.findsolar.com/index.php?page=rightforme

The National Renewable Energy Laboratory also created the PVWatts website to help estimate the size and dimensions of solar energy systems. Visit http://rredc.nrel.gov/solar/codes_algs/PVWATTS/

Park Environment Trash Compactor

The Big Belly is a solar-powered trash compactor used for city streets and parks. The compactor reduces the risk of overflow at big events and allows the trash to be collected less frequently. Each compactor costs between $4,000 and $5,000 and currently they're in use in Santa Cruz and Capitola. http://bigbellysolar.com

SOLAR HOT WATER

Solar water heating systems include storage tanks and solar collectors. There are two types of solar water heating systems; 1) "active" which have circulating pumps and controls, and 2) "passive" which do not have these same features. To obtain a thorough explanation and learn more about how these systems work and differ link on to the Energy Efficiency and Renewable Energy page of the US Department of Energy. .
http://www.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=12850

WIND

California Wind Energy Association (CalWEA) is a non-profit corporation supported by members of the wind energy industry including turbine manufacturers, project developers and owners, component suppliers, support contractors and others. CalWEA represents its members in California's policy forums seeking to encourage and support the production of electricity through the use of wind generators. The following site is the links page of CalWEA. http://www.calwea.org/windLinks.html

CLIMATE PROTECTION

AUDIT/INVENTORY

For Businesses

California's **Climate Action Registry** (CAR) is a voluntary registry for greenhouse gas emissions established by the California Legislature to help businesses and other entities establish and record their baseline emission levels. Voluntary reductions are encouraged and the state has pledged to try and ensure that reporting entities will get credit for past reductions against any future emission reduction requirements. Info about the Protocol is at http://www.climateregistry.org

Members of the EPA's **Climate Leaders** program can receive guidance and technical assistance on conducting inventories. http://www.epa.gov/stateply/resources/reporting.html

OpenEco is a global on-line community that provides free, easy-to-use tools to help participants assess, track, and compare energy performance, share proven best practices to reduce greenhouse gas (GHG) emissions, and encourage sustainable innovation.
http://www.openeco.org/

For Cities

The **Climate Action Registry** is open to cities as well as companies. See the entry above under "Businesses".

ICLEI, Cities for Climate Protection provides its members with access to greenhouse gas emissions inventory software developed by Torrie Smith & Associates. For non-members, cost of software is $2000. More information and a demo version of this software program is available at
http://www.torriesmith.com/index.html

Sustainable Silicon Valley provides a simple CO_2 Emissions Reporting Tool on its website at no charge but an account is required. http://cf.valleywater.org/_ssv/.

A table with carbon conversion factors based on the local energy mix is on p. 7 of a document titled "CO2 Emissions and Reporting Protocol" available at http://www.sustainablesiliconvalley.org/

The EPA's **Waste Reduction Model** (WARM) software is available free of charge to help waste managers reduce emissions caused by waste management practices.
http://epa.gov/climatechange/wycd/waste/calculators/Warm_home.html

For Individuals

The EPA offers an online tool to calculate the emissions produced based on the lifestyle of an individual or household. http://epa.gov/climatechange/emissions/ind_calculator.html

PG&E offers an online calculator to measure an individual's carbon footprint based on energy usage and miles driven. http://www.pge.com/mybusiness/environment/calculator/

Many other calculators are provided by companies and organizations offering carbon offset programs such as the "Cool It!" Campaign by the Sierra Club. http://www.cool-it.us/index.php?refer=acterra

Software

A demonstration version of the Climate Action Registry Reporting Online Tool (**CARROT**) is at
http://www.climateregistry.org/CARROT/Demo/Index.htm

Access to **ICLEI's Clean Air and Climate Protection (CACP)** software is one of the benefits of group membership. Currently in development with Torrie Smith and Associates, ICLEI plans to have a web based software tool available in 2008 althoughmembership with ICLEI may be required. For more information specifically on ICLEI their home page is: http://www.iclei.org/

CAPPA is a new software product developed by ICLEI and the EPA. This program is the collective experience of numerous jurisdictions and the climate action initiatives they have performed. Using real data from these experiences, this software can be regularly updated to reflect the results of all these efforts collectively. The software allows the user to set their baseline, expected growth and target emission reduction goals. Software then suggests initiatives that the user might consider to meet their targeted goals. For more information on this new software, visit:

http://www.iclei-usa.org , click on Action Center >Tools >CAPPA Decision Support Tool.

LEGISLATION AND REGULATION

AB 32 The 2006 landmark legislation establishes a cap on greenhouse gas emissions, enables the introduction of a market-based (cap and trade) system and sets aggressive deadlines for the California Air Resources Board to identify, implement and enforce regulations to achieve the targets. More info is at
http://www.arb.ca.gov/cc/factsheets/ab32factsheet.pdf; the text of the bill is at
http://www.arb.ca.gov/cc/docs/ab32text.pdf

SB1 The Million Solar Roofs law expands the California Solar Initiative (CSI) developed by the California Public Utilities Commission. The goal of CSI is to dramatically expand the amount of clean energy generated by solar panels on homes and businesses by 1) providing long-term incentive funding, 2) letting solar customers "sell" their excess energy back to utilities for credit and 3) requiring new home builders to offer solar as an option as of 2011. http://gov.ca.gov/index.php?/press-release/3588/

LOCAL ORGANIZATIONS & PROJECTS

Business Council on Climate Change (BC3) is sponsored by the UN Global Compact, the San Francisco Department of the Environment and the Bay Area Council. This coalition plans to offer support and tools to businesses ready to reduce their carbon footprint. http://www.bc3sfbay.org

Joint Policy Committee of ABAG, BAAQMD, BCDC, MTC issued a report in May, 2007 recommending that Climate Protection Task Force be formed to address mitigation and adaptation. For more information, see http://www.abag.ca.gov/jointpolicy/jpc_climate_change.htm

Joint Venture Silicon Valley Network (JVSVN) Joint Venture analyzes and takes action on issues affecting the economic vitality and quality of life of the region. It has started a Climate Protection Task Force of senior city staffers in San Mateo, Santa Clara and southern Alameda Counties. The task force will work collaboratively to analyze and specify climate protection solutions. The goal is to lower costs and speed up deployment of programs and technologies to reduce greenhouse gas emissions in the area.
http://www.jointventure.org/index.html

Silicon Valley Leadership Group (SVLG) convenes business and government leaders to address policy issues affecting the quality of life and economic health of the region. The Clean and Green Energy Action plan includes multiple initiatives to lower the region's greenhouse gas emissions such as 1) the "Cool Commutes" competition for local employers, 2) advocacy for improved transit options, 3) demonstration projects and 4) a green building initiative for cities. http://www.svlg.net/campaigns/cleanandgreen/

Sustainable Silicon Valley (SSV) started in 2001 by the Silicon Valley Leadership Group, California EPA and environmental nonprofits, SSV urges its members from business, governmental and nonprofit sectors to reduce their CO_2 emissions 20 percent below 1990 levels by 2010. SSV sponsors educational and information-sharing forums and publishes a report of its members' emissions reductions. Educational forum materials are available in the Archives section of the site. Annual membership fees for SSV are $1000 for cities of which San Mateo County, Portola Valley and the City of San Mateo are members.
http://www.sustainablesiliconvalley.org/

Sustainable San Mateo County (SSMC) was established in 1992 by a group of San Mateo County citizens who sought to create a broader awareness of the sustainability concept. They publish an indicators report annually that includes indicators related to water, energy and CO2, as well as a host of other indicators, all related to sustainability. In addition they provide outreach and education to cities, the business community and residents. You will find their home page and other information at:
http://www.sustainablesanmateo.org/

NATIONAL / INTERNATIONAL ORGANIZATIONS & PROJECTS

ICLEI—Local Governments for Sustainability ICLEI is an international nonprofit group that has focused on sustainable development and climate protection for over 10 years. It offers technical services, consulting, training, emissions inventory software and a network of almost 500 cities across the globe that share information and experiences. Membership fees are on a sliding scale based on a city's population, either $600 to $1200 for cities in San Mateo County. Dozens of local Bay Area cities are members of ICLEI whose national office is based in Oakland. http://www.iclei-usa.org

US Mayors Agreement on Climate Protection The Mayors Climate Protection Center provides mayors with the guidance and assistance they need to lead their cities' efforts to reduce the greenhouse gas emissions that are linked to climate change
http://www.usmayors.org/climateprotection/

Sierra Club Cool Cities program is aligned with the US Mayors Climate Protection Agreement. The three common strategies are green vehicle fleets, energy efficiency and renewable energy. San Mateo, San Bruno and several other Bay Area cities have signed up. http://www.coolcities.us/

United States Department of Energy, Energy Efficiency and Renewable Energy (EERE) division outlines federal efforts to promote energy efficiency and renewable energy programs.
http://www.eere.energy.gov/

Center for Transit-Oriented Development, Reconnecting America is a national non-profit organization devoted to promoting best practices in transit-oriented development and development-oriented transit.
http://www.reconnectingamerica.org/

EDUCATION

PROFESSIONAL TRAINING

BOMA is an association of building owners and managers offers both online and in-person training as part of its energy-efficiency program for offices and high rise buildings.
http://www.boma.org/TrainingAndEducation/BEEP/

Build It Green (BIG) This Bay-Area based nonprofit offers training and certification classes for green building professionals (engineers, real estate professionals, etc.), as well as for inspectors certifying homes under its Green Point Rated program. (See BIG under Organizations). http://www.builditgreen.org

PG&E Pacific Energy Center (PEC) offers excellent, free classes for professional architects, engineers, facility operators, electricians and others, with classes concentrated in the spring and fall. The majority are given at the San Francisco facility although an increasing number of classes are offered in other locations and via the web. More information at: http://www.pge.com/pec

Sustainable Silicon Valley (SSV) is a nonprofit group with the goal of reducing regional carbon dioxide emissions 20% below 1990 levels by 2010. SSV offers quarterly educational programs on topics of interest to its pledging partners in the business, government and nonprofit sectors and to the general public and posts the materials online in its Archives section. Check the Calendar tab for upcoming programs and the Archives tab for material from past programs. More information at http://www.sustainablesiliconvalley.org/

PUBLIC EDUCATION & OUTREACH

RecycleWorks promotes recycling, composting, waste prevention, procurement, sustainability and green building and green business programs for County facilities, residents, employees, businesses and visitors in the unincorporated area of the county and throughout San Mateo County when appropriate.
http://www.recycleworks.org/index.html

Energy-efficiency web pages Flex Your Power will create and maintain a web page with energy efficiency tips for local governments and businesses at no cost. The page will appear to be part of the organization's site but be populated with content by Flex Your Power. Learn more about the program at
http://www.fypower.org/briefing_room/partnerpage.html

Footprint/ carbon calculators Many online calculators now exist to help businesses and individuals quantify the environmental impact of their purchases and activities. The original Ecological Footprint is comprehensive and well-researched. http://www.footprintnetwork.org/gfn_sub.php?content=footprint_overview.

Newer ones focus on carbon emissions, such as the Sierra Club's Cool It! Calculator. http://www.cool-it.us

The New York Times recommends Zerofootprint as a more accurate and advanced calculator of personal consumption habits. http://www.zerofootprint.net/calculators

Conversions for Publishing The EPA has a calculator that converts greenhouse gas emissions into more easily understood terms such as cars off the roads, trees planted, etc). http://epa.gov/cleanenergy/energy-resources/calculator.html

Leadership Acterra, an environmental non-profit based company in Palo Alto, offers a year-long environmental leadership curriculum called **"Be the Change,"** intended to develop more leaders in the business, government and nonprofit sectors. The program starts in September with applications due by the end of June each year. http://www.acterra.org/leadership/index.html

Acterra also offers a "**Green@Home**" program that educates residents on energy-saving upgrades and creates a customized conservation plan for each household.

Neighborhood groups

Acterra, a Palo Alto-based nonprofit company sponsors and administers the **Green Team Project** which provides neighborhood groups with a structured and supportive way to 1) reduce household energy and water use, 2) reduce waste and the use of chemicals, and 3) choose more environmentally-friendly transportation options. Measurements are taken to quantify the positive impact of Green Team member actions. Program information and additional resources are available at http://www.acterra.org/greenteams/index.html

The Neighborhood Climate Council Program is another neighborhood group program for individuals who want to reduce their impact on climate. Monthly topics are archived.
http://climlead.uoregon.edu/programs/neighborhood.html#goals

Eco-Teams are similar to the Green Team Project and have been used effectively in Portland OR, Santa Monica and many other areas. http://www.empowermentinstitute.net/files/SLP.html

The Low-Carbon Diet is an easy-to-read workbook based on material developed for Eco-Teams and designed to help individuals and households reduce their environmental impact. Bulk purchase discounts are available.
http://www.empowermentinstitute.net/lcd/index.html.

ENERGY EFFICIENCY

EQUIPMENT / APPLIANCES

Refrigeration A new product called eCube, which sells for approximately $50 in the UK, can reduce the energy used by commercial and industrial refrigeration equipment by 20-30%. The hockey puck-sized device triggers cooling cycles based on the temperature of the items stored in the cooler rather than its air temperature. White paper and company website at respective locations as follows:
http://www.fypower.org/pdf/eCube_WhitePaper.pdf; http://www.ecubedistribution.com/

Food Service Technology Center (FSTC) The FSTC program is funded by California utility customers and administered by PG&E under the auspices of the CPUC. They are a scientific testing facility for benchmarking the energy performance of equipment used in commercial kitchens. The FSTC develops comprehensive performance test methods, and applies them to equipment submitted by end-users and manufacturers. They also offer calculators to determine payback of efficient products and rebates to purchase said equipment.
http://www.fishnick.com/

LIGHTING

Energy saving lighting options The Monterey Regional Energy Plan gives a brief description of various kinds of energy efficient lights in its Appendix F, page A-12 at
http://www.ccag.ca.gov/pdf/USTF/docs/AMBAGAppendicesApr06.pdf

Compact Fluorescent Lights Environmental Defense offers a comprehensive buying guide for the "best" CFLs and LEDs. http://www.environmentaldefense.org/go/cflguide

Interior lighting

The **Right Lights** program provides free assessment and discounted lighting upgrades for San Mateo County businesses. http://www.rightlights.org/index.html

Long lasting fluorescent lamps The Sylvania Icetron has an average life of 100,000 hours, making it an attractive option for difficult-to-replace installations.
http://www.sylvania.com/BusinessProducts/LightingForBusiness/Products/Lamps/Fluorescent/Icetron/. The LED Folio TiLux uses 45 percent less power than two T8 lamps, is dimmable and recyclable. It contains no mercury. http://www.ledfolio.com/inc.php?inc=pro_tilux

Street lighting A comparison of different kinds of street lights and case studies are discussed in the National Capital Climate Protection Manual for Cities, at
http://www.climatemanual.org/Cities/Chapter5/BestBets/CPM_Chapter5_LocalActionPlan_BestBets_Infrastructure.htm#hesl

Traffic signals Basic facts and case studies about why LEDs are superior are the best choice for traffic lights can be found in the Natural Capital Climate Protection Manual at
http://www.climatemanual.org/Cities/Chapter5/BestBets/CPM_Chapter5_LocalActionPlan_BestBets_Infrastructure.htm

MANAGEMENT SYSTEMS AND RESOURCES

Energy Design Resources offers a valuable palette of energy design tools and resources that help make it easier to design and build energy-efficient commercial and industrial buildings in California. This is a key site for energy managers in California: http://www.energydesignresources.com/index.php

The International Performance Measurement and Verification Protocol has been adopted in California as the standard way to quantify and verify energy savings from energy efficiency, water conservation and renewable energy projects. It should be used by local jurisdictions when contracting with Energy Service Companies for an Energy Services Performance Contract. The protocol was updated in May 2007 and is available at the website of the Efficiency Valuation Organization at http://www.evo-world.org

ORDINANCES

See Ordinances & Policy section.

RESEARCH MEASUREMENT AND VERIFICATION

The Public Interest Energy Research supports energy research, development and demonstration (RD&D) projects that will help improve the quality of life in California by bringing environmentally safe, affordable and reliable energy services and products to the marketplace.
The PIER Program annually awards up to $62 million to conduct the most promising public interest energy research by partnering with RD&D organizations including individuals, businesses, utilities, and public or private research institutions.

SERVICES

ABAG Energy Watch is a partnership of the Association of Bay Area Governments (ABAG) and PG&E, and funded by public goods charges paid by rate-payers. The Energy Watch program offers a wide array of free consulting services to help local governments identify and implement energy efficiency measures. Services are available throughout the 9-county Bay Area on a first-come, first-served basis. They can include 1) energy assessments, 2) project prioritization,3) identification of funding options, 4) hands-on technical assistance, 5) aid in crafting policies and updating general plans and 6) developing climate protection plans. More information at: http://www.abag.ca.gov/abagenergywatch/about.html (general) and http://www.abag.ca.gov/abagenergywatch/services.html (services)

San Mateo County Energy Watch The City & County Association of Governments (C/CAG) is in discussion with PG&E about a future Local Government Partnership in San Mateo County. The program is intended to provide energy efficiency work to municipalities, businesses and residents in San Mateo County. Look for more information on this program starting in 2009 by visiting the C/CAG website: http://www.ccag.ca.gov/

Energy Service Companies (ESCOs) are private businesses that specialize in energy retrofits; ESCOs typically audit a facility, recommend and then pay for energy- efficient upgrades under a contract with the building owner. Both parties benefit financially – the owner via lower bills and no upfront costs, and the ESCO by sharing in the energy savings. When contracting with ESCOs, local governments should include language specifying the use of the International Performance Measurement & Verification Protocol (IPMVP). See more about IPMVP in the entry under Measurement and Verification, this section.

SVLG/SSV/QuEST Energy Watch funding and services are available for Silicon Valley Leadership Group and Sustainable Silicon Valley members- both businesses and local governments. Technical services are provided by QuEST. Call SVLG or SSV for more information.

TECHNICAL ASSISTANCE

CEC Energy Partnership Program (EPP) Technical Assistance Free guidance to cities, counties, special districts, hospitals, colleges and public care facilities on ways to increase energy efficiency in existing buildings and new construction as well as financing options. An application, relevant energy usage data and a resolution are required. Details at: http://www.energy.ca.gov/efficiency/partnership/

CEC Guide to Preparing Feasibility Studies for Energy Efficiency Projects A 183-page how-to and reference guide for identifying and evaluating energy-saving projects in government facilities. Published in 2000, it includes detailed comparative data such as energy use and life cycle-costs for many types of equipment. Document at: http://www.energy.ca.gov/reports/2000-03-20_400-00-002.PDF

WATER AND WASTEWATER PROCESSING

Water Treatment The Agricultural Pumping Efficiency Program (APEP) offers free services to local governments to improve the energy efficiency of water pumps and irrigation systems such as those used in parks and playing fields. This program focuses on energy efficiency and not on the amount of water used in such systems. See.- the resources listed under Water Conservation to save both water and energy. More info at: http://www.pumpefficiency.org/

Wastewater Treatment The California Wastewater Process Optimization Program (CalPOP) provides free services to local governments to help them reduce energy use in wastewater treatment facilities. Free audits, financial incentives for system upgrades and help establishing a co-generation are available. This program focuses on energy efficiency, not on the amount of water used in such systems. See the resources listed under Water Conservation to save both water and energy. More information at: http://www.calwastewater.com/

FINANCING/ FUNDING SOURCES

OVERVIEWS

The Financing Energy Efficiency in Buildings handbook offers an excellent explanation of the financial principles, options and programs specifically related to energy efficiency projects. It is an essential resource for all finance staff in the private and public sector who work on such projects. See entry under FINANCIAL ANALYSIS TOOLS, this section.

The California Local Energy Efficiency Program (California LEEP) provides an excellent overview of many funding resources on pp. 19-23 of the Workbook, Appendix B, at http://www.caleep.org/docs/workbook/CALeep%20Workbook%20Appendix%20B%20Resources%20Final%20050106.pdf

Check the Industry-Specific and Purchasing sections of this Resources list for other information about saving money on energy and water investments.

BONDS

Cities can issue bonds to cover the cost of capital improvements offering low rates and long-term repayment schedules. The administrative costs make them suitable mostly for large projects. The **Community Energy Authority** has the authority to issue bonds:

California Renewable Energy Bonds (CREBs) are financing mechanisms to enable local governments to fund renewable energy projects such as solar, wind, geothermal and landfill gas. CREBs are tax-credit bonds issued by a government entity and the proceeds are used to buy renewable energy systems. The buyer receives a tax credit in lieu of interest. The government entity repays the principal over 15 years—ideally, at a lower rate than prior utility bills and retains ownership of the system. HR 1821 and HR 1965 bills have been introduced in Congress to extend the program. http://www.crebs.org

CREDIT POOLS

ABAG Credit Pool Financing This program offers lease terms to cities, counties and special districts needing to finance capital projects and equipment and refinance existing lease financings with project costs between $800,000 and $10,000,000.

DEMAND RESPONSE PAYMENTS

PG&E offers lower rates to large customers that are willing to cut their demand during peak periods. Most cities are not large enough energy users to qualify for the rates on their own but can participate through the San Francisco Community Power program. Program members must have at least a $1000 monthly electric bill and be able to reduce demand by at least one kilowatt for four hours during peak demand (11 am-7 pm) during the summer months when asked to do so. In exchange, they are paid $10 for every kilowatt they agree to reduce whether or not they were called upon to reduce demand. http://www.sfpower.org Click Demand Response.

ENERGY EFFICIENCY

California Energy Commission (CEC) Energy Efficiency Financing Program The CEC provides loans to public agencies at a 3.95 percent interest rate with payments made from the project's savings.

http://www.energy.ca.gov/efficiency/financing/

Bright Schools Program ensures that up to $20,000 of energy efficiency consulting services is made available to a school district for both new and existing schools. An application and historical information must be submitted. http://www.energy.ca.gov/efficiency/brightschools/index.html

Savegas.com is a for-profit company who enables the owners of apartment buildings and hotels to save on utility bills by optimizing their use of natural gas to heat water. Hot water usage is tracked via the Internet so hot water is available when needed but not kept hot 24/7. For more information, see:
http://www.savegas.com

FINANCIAL ANALYSIS TOOLS

Financing Energy Efficiency in Buildings This is an excellent, easy-to-use handbook that is a must-read for government finance staff. It provides an overview of investment principles, financing options, energy saving performance contracts and state and utility programs that can be used to increase the energy efficiency of buildings. Look for Eric Number ED425626 when you find this guide by going to: http://www.eric.ed.gov/

GENERAL PURPOSE FUNDS

Revenue Recovery A for-profit company that works with governments, businesses and nonprofits to identify and recover any overpayments on utility bills. Approximately 90% of entities have overpaid in one or more of the following categories; gas, electric, water, waste disposal, and telecom including local and long distance land lines, cell, pagers, equipment, service contracts, and internet service. The company does not charge for its services, but keeps 50% of the savings or refunds obtained. In other words, there is no fee if there are no refunds or future savings obtained. They also audit workers compensation claims. Contact: Torri Stewart, 661.345.6070, revenuerecovery@gmail.com

LOW-INTEREST LOANS

See entry on California Energy Commission (CEC) Energy Efficiency Financing Program under ENERGY EFFICIENCY, this section.

NEW CONSTRUCTION

PG&E offers $400 per unit or $800 per unit for inland areas for **new single family homes** built according to the *Energy Star Performance Method*, which is 15 percent more efficient than Title 24 requirements. Builders must apply and be accepted to the program. http://www.pge.com Click-My Business >Energy Savings and Rebates >Incentives by Industry >Residential New Construction >Energy Star Performance Method.

As an alternative, new homebuilders can use the *Prescriptive Method* to qualify for financial incentives for specific energy efficient **equipment and lighting**. http://www.pge.com Click-My Business >Energy Savings and Rebates >Incentives by Industry >Residential New Construction >Prescriptive Method.

The **New Solar Homes Partnership** program offers cash to builders of new homes offering solar electric systems. New homes that exceed Title 24 requirements by 15 percent or more can get a $2.50/watt rebate, which will decrease over time. New homes that exceed Title 24 by 35 percent or more can get a $2000 rebate on top of the $2.50 per watt rebate. http://www.pge.com Click-My Business >Energy Savings and Rebates >Incentives by Industry >Residential New Construction >New Solar Homes Partnership.

The California **Multifamily New Homes** Program offers design assistance and cash incentives of up to $270/unit to builders developing new multifamily properties that exceed Title 24 requirements by 15 percent. Appliance and lighting incentives are also offered and other funding sources may be available through the program. http://www.h-m-g.com/multifamily/cmfnh/default.htm

POWER PURCHASE AGREEMENTS

California Solar Communities Program California Communities, a Joint Power Authority, has structured a power purchase agreement program to offer local governments a low-cost way to fund a photovoltaic system. PowerLight, it's for-profit partner, installs and manages the ~50 kW system charging the local government a one-time fee for the projected energy to be produced over a 25-year term thereby locking in the price of energy. The government funds the payment through a lease/leaseback arrangement with the JPA of unrelated government property. More information can be found at: https://www.cacommunities.org

Energy Services Companies (ESCOs) For-profit companies will enter a long-term contract with local governments to purchase install and maintain a solar electric or other renewable energy system on government facilities. The ESCOs then sell the resulting power to the government at a fixed price lower than the facility's usual utility bill.

REBATES

ABAG Energy Watch program provides rebates to local governments for up to 50-80 percent of the cost of certain energy efficiency retrofit projects such as lighting, motors, HVAC and natural gas and up to 100 percent for retrocommissioning projects. For eligible efficiency projects, the agency can receive 40 percent of the rebate before ordering the equipment. ABAG Energy Watch rebates are also available to private sector entities directly from PG&E.

California Solar Initiative (CSI) is a $3 billion long-term solar incentive program that will supplant the Self Generation Incentive Program (see below) intended to enable the solar industry to become self-sustaining. Rebates will decline over time as specific milestones in solar generation capacity are met. For governments, rebates start at $3.25 per watt for a small system's estimated output (small is <1 megawatt) and drop over time to $.70 per watt. Rebates on small systems will be paid upfront. Large systems (> I megawatt) will receive ongoing rebates of $.50 per kilowatt-hour declining to $.10 per kilowatt hour, based on actual system output. More information can be found at: http://www.gosolarcalifornia.ca.gov/ and http://www.pge.com/csi

PG&E Check http://www.pge.com for rebates and other financial incentives for individuals, small businesses, large businesses and government agencies. Special rebates apply to specific industries and types of equipment.

Flex Your Power The website lists rebates and other financial incentives for residential, commercial and institutional customers, searchable by zipcode. http://www.flexyourpower.org

RENEWABLE ENERGY

Find Solar provides a good introductory overview of the financial elements involved in acquiring a solar system and financing options for consumers. Although not detailed, it has a solid set of links to other websites. More information at: http://www.findsolar.com/index.php?page=rightforme&subpage=finance

PG&E's Self-Generation Incentive Program Per-watt incentives are available in 2007 for fuel cells and turbines ranging from $.60 to $4.50/watt. In 2008, only fuel cells and wind turbines will be eligible unless new legislation is passed. More information at: http://www.pge.com/selfgen/

Solar City is a for-profit company based in Foster City, offering a 30 percent discount to cities recommending its products and services to city residents. Solar City also offers discounts to neighborhood groups that buy solar systems in bulk. Solar City has recently launched a SolarLease program that is essentially a Power Purchase Agreement for residents. More information at: http://www.solarcity.com

Understanding Financial Analysis Methods for Photovoltaic Systems This site links to many resources that can help a building owner assess the financial impact of installing a solar electric system and it complements a class offered at PG&E's Pacific Energy Center on the topic.
http://www.pge.com/education_training/classes/energy_efficiency/resources/Understand_finance_PV_resourceS07.pdf

REVOLVING FUNDS

Ann Arbor Michigan's $100,000 fund became self-sustaining in eight years. The website identifies two components critical to the program's success: an initial funding source (available for 3-5 years) and a manager assigned to support and coordinate the fund and its projects. See http://www.a2gov.org Click- Green Living >Energy >Energy Fund.

SENIORS

ABAG Energy Watch offers Senior Energy Services comprehensive lighting services for both municipal and private senior facilities. The lighting retrofits are eligible for the very high rebate levels of $0.20/kilowatt hour saved per year; up to 100 percent of the project cost at senior facilities may also be covered. The program includes assessment, program management and oversight and product discounts.
http://www.calenergywatch.com/abag.htm

TAX CREDITS
The Energy Star program offers a wide range of federal tax credits for homeowners, homebuilders and manufacturers. The residential program covers windows and doors, HVAC equipment, roofing, water heaters, insulation and cars. For more information, see
http://www.energystar.gov/index.cfm?c=products.pr_tax_credits

TAX DEDUCTION

Energy Efficient Commercial Tax Deduction program provides a federal tax deduction to the owner of a commercial building that installs energy-efficient lighting, HVAC and/or hot water system as part of a plan to reduce energy use by 50 percent over an average building. All energy-efficient expenditures are deductible up to a cap of $1.80 per square foot of the property in question and must be taken in the year the expenditures are made. The program applies to buildings put into service in 2006 and 2007. For guidance on how to qualify, see: http://www.fypower.org/pdf/N-06-52_IRS.pdf for guidance on how to qualify.

GREEN BUILDING

BUILDING ORGANIZATIONS

Affordable Housing

Peninsula Habitat for Humanity is a nonprofit that provides affordable housing in the Peninsula. The houses are built with a variety of green features including engineered lumber, low VOC paints and solar installations. Fore more information, visit: http://www.peninsulahabitat.org/projects/projects_green.html

DESIGN ASSISTANCE /REVIEW

Energy Design Resources is a web-based clearinghouse for information about energy-efficient design, including guidelines, case studies, design briefs such as whitepapers, codes, specs, financial analysis and more. More information at: http://www.energydesignresources.com/

PG&E's Savings By Design is a program "designed" for new construction, PG&E provides advice and rebates for energy-efficient designs. More information can be found at:
http://www.savingsbydesign.com/overview.htm

LEED PROJECT TRACKING

Greenprint is an online project management tool for government agencies and other organizations that are managing multiple LEED projects. It can be used to list projects, track progress on LEED points, evaluate environmental and financial benefits based on the LEED points attained and generate reports. Visit this site to learn more: http://www.sfgreenprint.org/

M. Landman Communications and Consulting created a map of LEED buildings in San Francisco and lists of LEED buildings in the Bay Area and Northern California.
http://www.mlandman.com/gbuildinginfo/index.shtml

LOCAL EDUCATIONAL RESOURCES

Green Building Exchange is a one-stop marketplace for businesses and individuals committed to and working in green building or other parts of the green industry. The Green Building Exchange hosts the Eco Design Resources showroom and holds many educational workshops, trainings and events related to green building.
http://www.greenbuildingexchange.com/

The GreenHomeGuide is a residential green building information center online with product directories, expert resources and articles on how to build green. http://www.greenhomeguide.com/

ORDINANCES & POLICIES

See Ordinances & Policies section.

RATING SYSTEMS

San Mateo Countywide Guide to Sustainable Buildings is a guide developed by a local committee of architects, builders and government agency staff specifically for San Mateo County with 75 items to consider for new construction and/or remodels and comes complete with a checklist. The guidelines are voluntary.
http://www.recycleworks.org/pdf/GB-guide-2-23.pdf

Green Point Rating System is a voluntary program developed by Build It Green that awards points for energy efficiency, water conservation, indoor air quality, etc. The homeowner or builder's claims are verified by an independent inspector before the designation can be claimed. The program currently applies only to new residential construction, though will expand to include residential remodels in late 2007. http://www.builditgreen.org/greenpointrated/

Leadership in Energy and Environmental Design (LEED) Rating System is the most widely-adopted rating system that allocates points to buildings that demonstrate superior environmental design in five areas; 1) energy efficiency, 2) water conservation, 3) materials, 4) site issues, and 5) indoor air quality and innovative design. Buildings must be reviewed and approved by the USGBC before claiming the rating level designation of Certified, Silver, Gold or Platinum. http://www.usgbc.org/LEED/LEED_main.asp

Green Building Initiative Life Cycle Assessment Calculator is a database that provides a cradle-to-grave accounting of the energy and material flows into and out of the environment that are associated with producing a material, component, or assembly. It's an online storeroom of data collected on commonly used materials, products, and processes. See: http://www.thegbi.org

TECHNICAL ASSISTANCE

AccessGreen Directory is an online, searchable listing of green building products and services throughout the 9-county Bay Area. Listings meet specific criteria for energy and resource efficiency. http://www.builditgreen.org/guide/

Ask An Expert is a toll-free hotline and email service run by Build It Green. AAE provides answers to questions about green building from anyone in the 9-county Bay Area. More information available at: http://www.builditgreen.org/ask-expert

Design Specifications for Energy and Resource Efficiency was published by the Public Interest Energy Research (PIER) Program in 2004. This 431-page document provides detailed specifications for architects, engineers and lighting designers trying to optimize a building's energy efficiency. http://www.energy.ca.gov/reports/2004-05-24_500-04-015_A1.PDF

INDUSTRY-SPECIFIC

ALL

Cal-Arch Lawrence Berkeley Labs developed a benchmarking tool for California buildings allowing building owners to compare their building's energy efficiency with others of its types in its area such as food service, health care, lodging, retail, etc. http://poet.lbl.gov/cval-arch/archpres.pdf

Demand Response PG&E offers lower rates to large customers that are willing to cut their demand during peak periods and provides several available programs. http://www.pge.com/biz/demand_response/

Businesses that are not large enough energy users to qualify for the rates on their own can participate through the San Francisco Community Power program. Program members must have at least a $1000 monthly electric bill and be able to reduce demand by at least one kilowatt for four hours during peak demand (11 am-7 pm) during the summer months when asked to do so. In exchange, they are paid $10 for every kilowatt they agree to reduce, whether called upon to reduce demand or not. http://www.sfpower.org

EPEAT The Electronic Product Assessment Tool identifies environmentally preferable laptops and desktop computers and monitors. http://www.epeat.net

BUILDERS/DEVELOPERS

Energy-efficiency incentives Builders of new homes can recoup the cost of making energy-efficient new homes (single or multifamily) under several programs administered by PG&E. See details in the Financing/Funding Sources section of this Appendix.

Solar electric incentives Builders of new homes can receive a financial incentive of up to $2.50/watt for offering solar electric systems on new homes. See details in the Financing/Funding Sources section of this Appendix.

COMMERCIAL PROPERTY MANAGEMENT

BOMA is an association of building owners and managers that offers excellent training and program resources to make offices and multi-family buildings more sustainable. The San Francisco office is eager to partner with local governments in the county in regards to 1) increasing energy efficiency, 2) water conservation 3) recycling and 4) water reduction programs. It will extend its annual EarthAwards program to include San Mateo County buildings in 2008. http://www.bomasf.org/beep.html

Flex Your Power offers a Best Practices Guide for Commercial Office Buildings.
http://www.flexyourpower.org/bpg/index.html?b=offices

Lighting The Right Lights program offers free assessments and discounts on lighting upgrades for local businesses. http://www.rightlights.org/index.html

Retrocommissioning makes free services available to optimize building performance, increase energy efficiency and occupant comfort. Criteria: buildings with more than 100,000 sq ft of conditioned space, direct digital controls, central mechanical equipment in good working order, commitment to taking action on recommendations within a year. http://www.rcx-program.com/index.html.

FOOD AND BEVERAGE PROCESSORS

Flex Your Power has developed a Best Practices Guide for Food and Beverage Growers and Processors.
http://www.flexyourpower.org/bpg/index.html?b=food_and_bev

GREEN BUSINESS GROUPS

Business Alliance for Local Living Economies (BALLE) is a non-profit that catalyzes, strengthens and connects local business networks dedicated to building strong Local Living Economies. http://www.livingeconomies.org/

BC3 (Business Council on Climate Change – see Organizations > Climate Protection)

Sustainable Business Alliance

HOTELS

California Green Lodging Program The California Integrated Waste Management Board runs a program that provides resources for hotels that reduce their waste, energy and water footprints, and encourages travelers to seek out "green hotels." Resources for hotel operators are found at:
http://www.ciwmb.ca.gov/epp/GreenLodging/Hotels/

eCube – see Energy > EQUIPMENT_

Green Hotel Initiative Ceres is a national nonprofit group that promotes corporate social responsibility and has a national program for hotels that use environmental practices. Tools and additional information are provided at: http://www.ceres.org

Peninsula Hotel Nonprofit Collaborative is a program enabling hotels to reduce their waste stream by donating their still-usable discards such as furniture, linens, etc. to local nonprofits.
http://www.recycleworks.org/pdf/060330_PHNCflyer.pdf

MULTIFAMILY PROPERTIES/ RESIDENTIAL PROPERTY MANAGEMENT

PG&E Rebates are available for residential building owners that invest in energy efficient appliances and HVAC equipment, building envelope modifications, lighting and pool equipment for multifamily properties.
http://www.pge.com Click-My Business >Energy Savings and Rebates >Incentives by Industry >Property Manager and Owner.

BUSINESS – GENERAL

A Green Business Certification Program is offered by RecycleWorks-the Waste Management and Environmental Services section of San Mateo County Public Works. The program is regional and is growing statewide as the best program that insures compliance with State and local regulations as well as verification of initiatives such as Waste Prevention, Pollution Prevention, Energy Efficiency and Water Conservation.
http://www.recycleworks.org/green_business/index.html

eCube – see Energy > EQUIPMENT_

SMALL BUSINESS

Small Business Energy Alliance (SBEA) is a for-profit group that administers an Energy Savers program for small businesses, property managers, wineries and local agencies in Lake, Marin, Mendocino, Napa, Solano and Sonoma counties. http://www.sbeaonline.com/index.php

JOBS

Apollo Alliance was named after the space program Apollo and is a national organization advocating the development of clean energy and 3 million new green jobs. Oakland has partnered with Apollo to create a Green Jobs Corps. http://www.apolloalliance.org/

ORDINANCES & POLICIES

CONDITIONS OF APPROVAL

Conditions of Approval can be used to advance green building and energy conservation efforts. They generally stipulate that certain requirements must be met in order for the permit to be approved. Conditions of Approval can be mandated through a city council resolution or ordinance. Some examples include:

submitting a green building checklist with permit application
meeting with a green building consultant during the design phase of a project
a requirement to achieve a certain level of compliance with a green building point rating system

Green Building Ordinance of San Mateo County can be viewed at:
http://www.recycleworks.org/greenbuilding/gb_prog_policies.html Look for the link to Green Building Ordinance.

DEVELOPMENT AGREEMENTS

A Development Agreement is reached between the planning department of a city and a developer or business on a case-by-case basis. Development agreements can be used to encourage green building, energy efficiency and/or water conservation efforts often using a variety of incentives.

The Institute for Local Governments (ILG) has a site dedicated to this topic at:
http://www.cacities.org/index.jsp?zone=ilsg&section=land&sub_sec=land_process&tert=land_process_dev

GENERAL PLAN

The General Plan provides the direction and support for local energy initiatives. Energy and water conservation can be addressed within the mandatory seven elements consisting of; land use, circulation, housing, conservation, open space, noise and safety and/or within separate elements.

Resources

Local Government Energy Efficiency Report: General Plan Policy Options for Energy Efficiency in New and Existing Developments The report includes ideas for policies, programs and actions with sample General Plan language from California cities and counties, as well as additional resources for each policy idea. www.redwoodenergy.org/uploads/Energy_Element_Report.pdf

Monterey Bay Regional Energy Plan Appendix E of the 2006 report provides concise descriptions and examples of how to incorporate energy considerations into General Plan elements.
www.ccag.ca.gov/pdf/USTF/docs/AMBAGAppendicesApr06.pdf

The **California Planners' Book of Lists** is a log of all the cities within California that have addressed water and energy in their General Plans. http://www.calpin.ca.gov

ABAG Energy Watch offers a package of energy ordinances and other policies. Descriptions are at
http://www.abag.ca.gov/abagenergywatch/services.html

Examples

City of Palo Alto's General Plan referred to as the Comprehensive Plan has an Energy Element as a sub-section of the Natural Environment Chapter. This section lays out policies and programs related to maintaining the city's energy supply and using renewable resources.
http://www.cityofpaloalto.org/depts/pln/news/details.asp?newsID=654&targetID=85

Humboldt County The Energy Element provides a comprehensive discussion of its history and how it relates to other General Plan elements. www.redwoodenergy.org/uploads/Energy%20Element%20-%20Final.pdf

San Mateo County's General Plan calls for the promotion of energy conservation and sustainable building practices and improved energy efficiency in new homes.
http://www.co.sanmateo.ca.us/smc/department/home/0,,5557771_9420293,00.html

INCENTIVES

Incentives can be offered by a city, public utility or enforcing agency to both encourage and reward resource conservation efforts. Common incentives for energy efficiency and green building measures are:

priority/expedited permitting and design review processing
refunds on plan check fee (or a portion of the fee)
increased Floor Area Ratio (FAR) or density allowances
reduced parking requirements

PG&E and local water agencies also have specific incentive programs that can work in conjunction with green building and conservation programs. See Financing/Funding Sources > New Construction and the following link to the BAWSCA website has links and contacts to the various water agencies in the County:
http://www.bawsca.org/links.html
Cities and their residents should check with their local water agencies to find information on current rebates available.

Examples

City of Sunnyvale adopted an ordinance that allows a five percent Floor Area Ratio (FAR) giving builders and owners more square footage in their design as an incentive for buildings located in the industrial zoning districts when the building is designed and submitted for LEED certification.
http://sunnyvale.ca.gov/City+Council/Council+Meetings/2004/2004March/Reports/2744-04.htm

City and County of San Francisco offers an expedited permitting process with the Planning Department, Department of Building Inspection and Department of Public Works for projects that are designed to meet or exceed a LEED Gold standard. http://www.sfenvironment.org/our_programs/topics.html?ssi=8&ti=19

County of San Mateo also offers an expedited permit process and a 48-hour inspection incentive for meeting certain levels of a selected point rating system. Look for the link to Green Building Ordinance which can be viewed at: http://www.recycleworks.org/greenbuilding/gb_prog_policies.html

ORDINANCES

Energy Efficiency is an ordinance that requires the use of specific energy conservation measures in new construction, additions or remodels to reduce the total energy use to a percentage below the Title 24 standards which are typically 10-15 percent. An energy ordinance can also be applied at the time of sale or transfer and normally requires a certain percentage of the total sales price or cost of remodel to be invested in specific energy efficiency retrofits.

Legal Requirements The California Energy Commission must approve any energy ordinance that exceeds Title 24, and requires a study demonstrating that the ordinance is cost-effective. The CEC maintains a log of cities that have implemented ordinances that exceed the Title 24 building standards. Cities establishing ordinances that exceed the Title 24 requirements should file for such an approval. For more information, visit: http://www.energy.ca.gov/title24/2005standards/ordinances_exceeding_2005_building_standards.html

Energy Efficiency Ordinance Examples

Los Altos Hills has Energy Efficiency Standards for Single-Family Dwellings that require energy consumption 15 percent lower than allowed by Title 24 and provides for multiple approaches for meeting performance requirements. www.energy.ca.gov/title24/2005standards/ordinances/2006-12-20_LOS_ALTOS_HILLS.PDF.

Marin County's Single Family Dwelling Ordinance applies to homes with more than 3,500 square feet of conditioned space and additions greater than or equal to 500 square feet when total conditioned area is more than 3,500 square feet. The ordinance prohibits the covered homes from using any more energy than a 3,500 square foot home. Covered projects must submit Title 24 reports and the Marin County Energy Form and Worksheet. http://www.co.marin.ca.us/depts/CD/Forms/Energy_Efficiency_Ordinance_-_Applicant_Info.pdf

San Francisco The Residential Energy Conservation Ordinance (RECO) applies to all single- and two-family housing units, apartments and residential hotels. It includes standards for toilets, showerheads, faucet aerators, water heater blankets, pipe insulation and exterior door weather-stripping. The ordinance is enforced at time of sale, metering conversion, major improvements or condominium conversion. There is a cap on the amount of money that must be spent to bring housing into RECO compliance.
www.sfgov.org/site/uploadedfiles/dbi/Key_Information/ResidEnergyConsOrd1006.pdf

GREEN BUILDING ORDINANCE

A Green Building Ordinance is similar to an energy efficiency ordinance but usually addresses broader elements such as the site, water use and choice of materials. It normally targets new construction, but can also be applied to additions, remodels and swimming pools. The requirements can be defined in the ordinance or refer to another set of standards, such as the USGBC LEED rating system or Build It Green's GreenPoint rating system. A green building ordinance usually stipulates an applicable square footage threshold.

Green Building Resources

Build it Green Toolkit The Build It Green (BIG) Public Agency Council (PAC) Public Agency Implementation Toolkit contains model resolutions, model staff reports, presentations, BIG's guidelines and checklists, current legislation information and forthcoming links to city policies. The Toolkit is made available to members only.
http://www.builditgreen.org/local-governments

Build It Green City Roadmap for Creating a Green Building Program provides a framework and step-by-step process to assist California municipalities in developing a residential green building initiative.
www.ccag.ca.gov/pdf/USTF/reports/Roadmap6.5.06.pdf

Silicon Valley Leadership Group Green Building Initiative (SVLG) has created a Green Building Initiative to work with local governments on creating municipal standards and practices for green building. The goal is to assist governments to draft green building policies that provide flexibility and incentives important to the private sector while increasing the readiness to respond to future regulations.
http://www.svlg.net/campaigns/cleanandgreen/

RecycleWorks website has green building resource pages that can be very useful for learning about green building. There is also a Sustainable Buildings checklist that can be used as a rating system in .pdf format on this site. This checklist covers some areas such as siting of buildings and passive heating and cooling, etc. which are items that are not covered on other checklists such as Build it Green's. The RecycleWorks, Green Building page is http://www.recycleworks.org/greenbuilding/index.html

Green Building Ordinance Examples

Alameda County Stopwaste, the waste management joint powers authority for the county, lists jurisdictions in Alameda County that have adopted green building policies or ordinances. http://www.stopwaste.org/home/index.asp?page=492

The **Alameda County Stopwaste model ordinance** for cities uses the LEED standard. http://www.stopwaste.org/docs/final_model_civic_gbo.doc

City of Rohnert Park Green Building Ordinance applies to; 1) new single-family and multi-family dwellings, 2) single-family dwelling additions, 3) multi-family dwelling remodels,4) commercial tenant improvements, and 5) new commercial, mixed-use and city-sponsored buildings. The ordinance applies specific green building guidelines for each building type and sets compliance thresholds based on density, number of dwelling units or floor area ratio (FAR). Rohnert Park implemented an Energy Efficiency Ordinance as a preliminary step to creating its Green Building Ordinance. The mandatory green building guidelines require energy efficiency measures above Title 24. http://www.rpcity.org/content/view/468/1/

San Mateo County The Green Building Ordinance applies to all new residential construction, 50% remodels and above and new commercial construction exceeding 3,000 square feet. Projects must meet minimum requirements under the applicable Build it Green's Green Point Rated Checklist or the United States Green Building Council Leadership in Energy and Environmental Design (LEED) checklist. Expedited permit processing is available for achieving higher levels of certification. For more information, see: http://www.recycleworks.org/pdf/Green_Building_Ordinance.pdf

Water Conservation

Ordinance AB 1881 requires all cities and counties to adopt an **updated landscape ordinance** before Jan. 1, 2010. The new ordinance is likely to require more smart irrigation controls, separately metered irrigation lines, recycled water, storm water and water-frugal landscaping. http://info.sen.ca.gov/pub/05-06/bill/asm/ab_1851-1900/ab_1881_cfa _20060821_100234_sen_floor.html

POLICIES

Overviews

The **California Local Energy Efficiency Program** provides sample resolutions and policy initiatives in the Workbook, Appendix B, pp. 2-4 and 11-18.

Policy tools and options are also listed on p. 28 of the Summit findings document: http://www.caleep.com

Build It Green More examples of policies are listed in BIG's 2006 report on **Local Green Building Initiatives in Northern California**, at www.ccag.ca.gov/pdf/USTF/reports/PACSurvey03.06.pdf.

SVLG Policy Green Building Workshop Materials from a June 2007 workshop are available at http://www.svlg.net/events/gbpolicy0627/ppt/index.php

Examples

San Mateo County Sustainable Building Policy was adopted in 2001 requiring all new County buildings of more than 5000 sq ft to meet the highest practicable LEED standard. http://www.recycleworks.org/greenbuilding/sus_building_policy.html

RESOLUTIONS

Like ordinances, resolutions are legislative documents that must be approved by the city council. Resolutions, however, are more easily changed and updated because they don't require the extent of approval of an ordinance. Resolutions are used to set goals, to enact energy efficiency programs/projects and to recommend voluntary compliance with energy efficiency and/or green building standards. Resolutions can also be used in conjunction with ordinances to mandate green building programs. For example, an ordinance can mandate that a city will have a green building program and for what type of structures, while the resolution dictates the thresholds and compliance standards. This allows a city to easily adapt when federal and/or state laws change, technology improves and/or compliance standards are updated.

Examples

City of Oakland adopted green building standards as official city reference documents. http://clerkwebsvr1.oaklandnet.com/attachments/13518.pdf

Rohnert Park Rohnert Park uses a combination of ordinances and resolutions in its Green Building program. http://www.rpcity.org/content/view/468/183/

SOLAR PERMIT FEES

The Sierra Club has analyzed solar permit fees and policies in communities throughout Northern California. The report lists the fees for each, discusses the costs assigned to the local government and recommends ways to streamline the process and promote solar as a clean energy option. http://lomaprieta.sierraclub.org/global_warming/pv_permit_study.htm#Permit_Fee_Assessment_Differences

ORGANIZATIONS

Acterra is a Palo-Alto based environmental nonprofit group which sponsors the Green Team Project (see Education > NEIGHBORHOOD ORGANIZATIONS > Green Team Project), "Be the Change" environmental leadership training (see Education > PUBLIC EDUCATION & OUTREACH > Leadership > Acterra) and annual awards for sustainability. **http://www.acterra.org**.

Bay Area Alliance for Sustainable Communities is a 10-year old nonprofit group who brings together business, government, nonprofit and environmental leaders to improve the quality of life in the 9-county Bay Area. http://www.bayareaalliance.org/

Build It Green (BIG) is a Bay Area-based nonprofit organization whose mission is to expand the market for healthy, durable, energy and resource-efficient housing. BIG provides professional training and certification, convenes a Public Agency Council to share best practices and model policies, advocates at the state level, and administers the "Green-Point Rated" system for new residential construction. More information can be found at: www.builditgreen.org

Business Council on Climate Change (BC3) is sponsored by the UN Global Compact, the San Francisco Department of the Environment and the Bay Area Council. This coalition plans to offer support and tools to businesses ready to reduce their carbon footprint. http://www.bc3sfbay.org

ICLEI—Local Governments for Sustainability is an international nonprofit focused on sustainable development and climate protection. It offers technical services, consulting, training, emissions inventory software and a network of almost 500 cities across the globe that share information and experiences. Membership fees are based on a city's population ranging from $600 to $8000.[1] Joint Venture Silicon Valley Network is working with ICLEI to try to find a way to help all cities in San Mateo and Santa Clara County to join the group. National headquarters based in Oakland. http://www.iclei-usa.org

Joint Venture Silicon Valley Network (JVSVN) analyzes and takes action on issues affecting the economic vitality and quality of life of the region. It is starting a Climate Protection Task Force of senior city staffers in San Mateo, Santa Clara and southern Alameda Counties. The task force will work collaboratively to analyze and specify climate protection solutions. The goal is to lower costs and speed up deployment of programs and technologies to reduce lower greenhouse gas emissions in the area. http://www.jointventure.org/index.html

Local Government Commission (LGC) is a nonprofit based in Sacramento that aids elected officials in establishing livable, sustainable cities. Its Local Government Sustainable Energy Coalition (LGSEC) will be a central resource for California public agencies to learn and share information about energy issues. http://www.lgc.org/freepub/energy/newsletter/mar_apr2007/page01.html

RecycleWorks is a countywide clearinghouse for information on recycling, composting, waste reduction, green building, climate protection and sustainability generally, RecycleWorks has a website and hotline, hosts brownbag lectures and tours, runs programs, publishes brochures and more. http://www.recycleworks.org

Sierra Club is the nation's oldest and largest environmental nonprofit. http://www.sierraclub.org

Among Sierrra Club's efforts to combat global warming is the Cool Cities project which is aligned with the US Mayors Climate Protection Agreement. Cool Cities promotes three main strategies; 1) green vehicle fleets, 2) energy efficiency and 3) renewable energy. San Mateo, San Bruno and several other Bay Area cities have signed up. http://www.coolcities.us/

Silicon Valley Leadership Group (SVLG) convenes business and government leaders to address policy issues affecting the quality of life and economic health of Silicon Valley. http://www.svlg.org/.

The Clean and Green Energy Action plan includes multiple initiatives to lower the region's greenhouse gas emissions, such as the "Cool Commutes" competition for local employers, advocacy for improved transit options, demonstration projects and a green building initiative for cities.
http://www.svlg.net/campaigns/cleanandgreen/

Sustainable San Mateo County is a nonprofit which publishes an annual report on sustainability indicators, presents annual sustainability awards and in conjunction with RecycleWorks and the local chapter of the AIA—they also present a green building award. They have recently begun to partner with PG&E to produce a "Green Guide for San Mateo County" to combat climate change.
http://www.sustainablesanmateo.org/

Sustainable Silicon Valley (SSV) was started in 2001 by the Silicon Valley Leadership Group, California EPA and environmental nonprofits. SSV urges its members from the business, governmental and nonprofit sectors to reduce CO_2 emissions 20% below 1990 levels by 2010. SSV sponsors educational and information-sharing forums and publishes a report of its members' emissions reductions. Educational forum materials are available in the Archives section of the site. Annual membership fees are $1000 for cities. San Mateo County and Portola Valley are members of SSV. http://www.sustainablesiliconvalley.org/

US Green Building Council (USGBC) is a national nonprofit coalition of builders, manufacturers, architects, public agencies and others. USGBC focuses on improving the environmental performance of the built environment. The USGBC provides professional training, research and advocacy, and administers a growing array of Leadership in Energy and Environmental Design rating systems for new construction, existing buildings, core and shell, interiors, as well as special projects like new developments, universities and hospitals. More information can be found at: http://www.usgbc.org

PURCHASING

ENVIRONMENTALLY PREFERABLE PURCHASING

Overview Alameda County's Stopwaste.org provides a good overview of the benefits of an environmentally preferable purchasing policy, including a resource guide, fact sheets and FAQ.
http://www.stopwaste.org/home/index.asp?page=372

Recycled Content The EPA offers ReCon software free of charge to aid purchasers in estimating the lifetime energy and greenhouse gas impacts of materials made with various levels of recycled content.
http://epa.gov/climatechange/wycd/waste/calculators/ReCon_home.html

California State Association of Counties The U.S. Communities' Going Green Program provides resources on green purchasing for government agencies.
http://www.uscommunities.org/green/

COMPUTER EQUIPMENT

EPEAT The US EPA developed the Electronic Product Environmental Assessment Tool (EPEAT) to help large purchasers evaluate and select laptops, desktop computers and monitors according with preferred environmental attributes. http://www.epeat.net/
PGE Rebates PG&E was the first utility in the nation to offer rebates on energy-efficient information technology equipment. The rebates cover highly efficient equipment and software. For more information, see:
http://www.pge.com Click-For My Home >Save Energy >Rebates >Home Electronics.

Silicon Valley Toxics Coalition is a longtime advocate for a safer electronics industry. It offers guidance on how to influence the computer industry through purchases at
http://www.computertakeback.com/purchasing/index.cfm

ENERGY STAR

The Energy Star program offers online training and guidelines for procurement professionals. The Energy Star

rating is used for many residential and commercial equipment and appliances.
http://www.energystar.gov/index.cfm?c=bulk_purchasing.bus_purchasing

GREEN BUILDING PRODUCTS

GreenerBuildings.com is the publisher of *Environmental Building News*, the GreenSpec Directory and BuildingGreen online tools. It accepts no advertising and is widely recognized for its accurate and unbiased analyses of green building products. http://www.buildinggreen.com/

Build it Green maintains the AccessGreen Product Directory which lists green products and the retailers that stock them. http://accessgreen.builditgreen.org/

Green Seal is an independent non-profit organization dedicated to safeguarding the environment and transforming the marketplace by promoting the manufacture, purchase, and use of environmentally responsible products and services. They certify a variety of products using a number of green criteria.
http://www.greenseal.org

The GREENGUARD Certification Program[SM] is an industry-independent, third-party testing program for low-emitting products and materials. http://www.greenguard.org

POLICIES

Model Policy Alameda County's Stopwaste.org offers a detailed policy that addresses source reduction, recycled content, energy and water conservation, buildings, landscaping, toxics prevention, forest conservation and bio-based products. Text and implementation guidance is available at:
http://www.stopwaste.org/home/index.asp?page=439
http://www.stopwaste.org/home/index.asp?page=468

PURCHASING POOLS

Governments

Joint Venture Silicon Valley Network (JVSVN) The Climate Protection Task Force intends to assess new technologies and aggregate demand to reduce costs for solar electric systems. You will find JVSVN listed under organizations.

Neighborhoods

Solar Systems Foster City-based Solar City offers discounts of up to 30 percent when residents in a city band together and purchase at least 175 kW of installed capacity. http://www.solarcity.com

They recently also introduced a solar lease program that finances installations with a very small investment on the part of the building owner and gives Solar City ownership of the system. In turn, the building owner gets a discounted rate on their energy use and the satisfaction of knowing they are using green energy for most of their needs.

WASTE REDUCTION

Ordinance AB 939 was established in 1989 to define and delineate the current organization, structure and mission of the California Integrated Waste Management Board (CIWMB). It directed attention to the increasing waste stream and decreasing landfill capacity, and mandated a reduction in waste disposal. Jurisdictions were

required to meet diversion goals of 25 percent by 1995 and 50 percent by the year 2000. More at: http://www.recycleworks.org/ab939.html

GHG IMPACT

The US EPA offers a calculator to estimate the reduction in greenhouse gas emissions corresponding to specific waste diversion efforts. This program is known as the WARM model. It can be found at: http://epa.gov/climatechange/wycd/waste/calculators/Warm_Form.html

REUSE

CalMAX Exchange offers a way for businesses to offer nonhazardous materials to other organizations or schools that can use them. The local exchange for San Mateo and Santa Clara counties is: http://www.ciwmb.ca.gov/CalMax/Ad/default.aspx?Partner=BayMAX

Community Wishlist matches people or organizations with items to donate and local nonprofits that seek them. http://communitywishlist.org/index.php

Craigslist Popular online community lists items for reuse. http://www.craigslist.org

Freecycle is an online listing service for items that one person wants to dispose of and another wants. Freecycle has several chapters in San Mateo County:
Coastside (http://groups.yahoo.com/group/Coastside_freecycle/),
San Bruno (http://groups.yahoo.com/group/SanBrunoCAFreecycle/)
San Mateo (http://finance.groups.yahoo.com/group/SanMateoFreecycle/)

Goodwill Community thrift store takes many items for free even e-waste. http://www.goodwill.org

St. Vincent de Paul Independent charity that operates thrift stores nationwide. http://svdpusa.org/

WATER CONSERVATION

Bay Area Water Supply and Conservation Agency (BAWSCA) represent the interests of 25 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. BAWSCA is the only entity having the authority to directly represent the needs of the cities, water districts and private utilities consisting of wholesale customers that depend on the regional water system. The BAWSCA site also has information about local rebate programs: http://www.bawsca.org/conserve.html

Recycled Water: Local effort to recycle water are explained on the BAWSCA website. http://www.bawsca.org/recycle.html

COMMERCIAL EQUIPMENT

Food Service Technology Center (FSTC) program is funded by California utility customers and administered by PG&E under the auspices of the CPUC. They are a scientific testing facility for benchmarking the energy performance of equipment used in commercial kitchens. The FSTC develops comprehensive performance test methods, and applies them to equipment submitted by end-users and manufacturers. They also offer calculators to determine payback of efficient products and rebates to purchase said equipment. http://www.fishnick.com/

Cooling Towers Sandia National Laboratories has done extensive work on water conservation related to

cooling towers of which they have 50 and there are many other topics related to water conservation at their website: http://www.sandia.gov/aqua/coolingtowers.htm

Food Steamers, conventional boiler based systems use as much are 30 times more water than an efficient, connectionless unit. The following 42-page study has all the information on this topic: http://www.cuwcc.org/products/commercial-food-steamers.aspx

Dishwashers updating also have the potential to save water not just energy as is explained in the Energy Strategy. Water used in dishwashers is heated and less water equals less energy. There are newer, more energy efficient models of both Commercial and Residential dishwashers. Residential site is: http://www.energystar.gov/index.cfm?c=dishwash.pr_dishwashers

Commercial site is:

http://www.energystar.gov/index.cfm?c=comm_dishwashers.pr_comm_dishwashers

Heated Water High efficiency tank and demand type water heaters can reduce water use in addition to possibly being marginally more efficient on energy use. The American Council for an Energy Efficient Economy (ACE3) has good site that explains these units and compares the various attributes: http://www.aceee.org/consumerguide/waterheating.htm

Clothes Washing is another process that uses a lot of water. The following BAWSCA link explains a commercial clothes washers rebate program: http://bawsca.org/commercial.html

The Residential Rebate Program offered by many Bay Area water agencies gives rebates of $50-$200. http://www.conservationrebates.com/programs/wat/ClotheswasherRebate.aspx

Residential Outdoor water conservation tips are available on CD from BAWSCA. Find this program and other tips at http://www.bawsca.org/res_outdoor.html

FIXTURES

Toilets Some cities provide financial support to residents to upgrade to ultra low flow/high-efficiency toilets which can save 20 percent or more water per flush. You will find more information on the toilets and the cities involved in the rebate programs at: http://bawsca.org/res_indoor.html

Urinals High-efficiency urinals can save thousands of gallons per year. Waterless, is one of the long time manufacturers of waterless urinals and has a website that explains the system. http://www.waterless.com/conservation.php

Shower Heads, Faucets, Aerators, Hose Sprayers: There are numerous manufacturers and suppliers of these items, and they can be purchased locally at any hardware store or plumbing supply houses. All of these items can do a lot to save water for a very inexpensive and simple installation.

GREYWATER/ REUSE

Greywater (or graywater) is water that has been used for household washing. It is generally combined with blackwater (wastewater from toilets) and sent through sewer lines to be treated. But because greywater has less nitrogen and fewer pathogens than blackwater, it can be captured and reused for landscaping or toilet flushing to reduce the use of potable water. Outdoor-use greywater systems are legal in Arizona and New Mexico and permitted under limited circumstances in Berkeley and Oakland. During the Bay Area's last drought, non-permitted, low-tech greywater systems such as a garden hose carrying washing machine discharge to a garden were common.

Case studies from Oakland, Santa Barbara and Sacramento are at
http://www.oasisdesign.net/greywater/SBebmudGWstudy.htm

The **AQUS Watersaver** captures sink water and uses it to flush toilets. It may be eligible for 1-2 points under the LEED rating system. http://www.watersavertech.com/AQUS-Diagram.html

LANDSCAPING and Turf

Guidelines

Bay-Friendly Landscape Guidelines were developed by Stopwaste.org in Alameda County and were adopted in 2006-2007 by a regional coalition. Separate guidelines exist for professional landscapers and homeowners with a shared emphasis on reducing the use of water and chemicals in commercial and residential landscaping. More information can be found at: http://www.stopwaste.org/home/index.asp?page=141

Sustainable Gardening Guidelines The RecycleWorks website provides information on healthy gardening techniques, composting, workshops and events.
http://www.recycleworks.org/compost/sustainable_gardening.html

Irrigation Studies The following link has studies completed by Irvine Ranch Water District on Artificial Turf, Residential Programs, Landscape and Agricultural, Commercial, Industrial and Institutional programs.
http://www.irwd.com/Conservation/water_conservation_research.php

Ordinances See Ordinances and Policies

[1] For cities in San Mateo County, the relevant ICLEI membership dues are $600 for cities with 1-50,000 residents and $1200 for cities with 50,001-100,000 residents.