Strategic Energy Planning Guidebook

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SECTION 1.
EXECUTIVE SUMMARY

The State of California is an international leader in the global fight against climate change. With the passage of the California Global Warming Solutions Act (AB 32) in 2006, the State committed to a reduction in overall greenhouse gas (GHG) emissions of at least 20 percent below 1990 levels by 2020. The deadline for this target is fast approaching and the urgency to address the degradation of our environment is more important than ever. As such, Governor Brown, recently issued Executive Order B-30-15 on April 29th, 2015, calling for the further reduction of GHG emissions to 40 percent below 1990 levels by 2030.

Reducing the use of energy is a critical component of meeting the GHG reduction goals outlined above. To achieve this, the state legislature has just passed and the Governor has signed the Clean Energy and Pollution Reduction Act of 2015 (SB 350). This bill increases the existing Renewable Portfolio Standard (RPS - the procurement of electricity from renewable sources) from 33 percent to 50 percent and doubles the targets for energy use reduction from efficiency and conservation by 2030.

Strategic Energy Planning

- *Respond to state mandates for energy use and GHG emissions reductions*
- *Local governments can play a vital role in achieving these goals*
- *LG-SEP Template provides a Roadmap and Toolkit for the creation of Strategic Energy Plans for the cities of the East Bay*

Local governments will play a unique and vital role in helping to achieve these goals to reduce energy usage both in municipal facilities as well as in the larger community. In 2014, 41% of total U.S. energy consumption was consumed in residential and commercial buildings, or about 40 quadrillion British thermal units. Meanwhile, most city buildings can reduce their energy consumption by an average of 10-15 percent or more through energy efficiency measures. This represents a significant source of cost savings for both the City and its constituents. Most energy-efficiency projects have a simple payback period of just 3-7 years, often satisfying the requirements of even the most conservative financing policies. Implementing energy-saving strategies can be a vital component of good governance, allowing municipalities to utilize these freed-up dollars for other pressing operations or capital improvement needs, and creating local economic opportunity in the process. Local governments have broad discretion to adopt policies and regulations to reduce energy use for both municipal uses as well as within the community. It is crucial that local governments seize this huge environmental and economic opportunity through long-term, strategic energy planning.

However, this call to action comes at a time when resources and budgets are as limited as ever. Many cities have not recovered from the economic downturn of 2008-2009, still suffering from reduced staff and limited resources. Some cities are further along the path to significant energy-use reduction and sustainability than others, and have both the expertise and resources that others don't. To address this challenge, PG&E's Local Government Partnership, the East Bay Energy Watch (EBEW), has created a Local Government Strategic Energy Plan (LG-SEP) Template designed specifically for municipalities in Contra Costa and Alameda County. The Template was created with the assistance of consultants Newcomb Anderson McCormick and QuEST, and is the result of pilot efforts from the Cities of Emeryville and Oakley that used the Template process to develop Strategic Energy Plans for their cities. The Cities of Oakland

and Berkeley, EBEW Strategic Advisory Committee, and Stopwaste.org provided additional advice and recommendations for the development of the Template.

City of Emeryville, Town Hall

A Strategic Energy plan should be a living document and a long-term roadmap to orient and assist efforts and actions toward a defined energy vision. Such a plan articulates goals, develops strategies to meet goals, and identifies and allocates resources to assure the success of these strategies. The LG-SEP Template is intended to serve as a toolkit to guide cities to a more efficient energy future. It has been designed with flexibility to create a plan that is tailored to the specific conditions and needs of each city. The best approach depends on local conditions, available resources, community values, and organizational structure. While the creation of this Template was developed in collaboration with the "pilot cities" of Emeryville and Oakley, it is designed to be used by any municipality or county government.

As described herein, the Template is focused on broad, long-term energy planning for municipal facilities and energy loads. It is designed to assist cities in the articulation of an ***Energy Vision***, the development of ***goals, timelines, and criteria for success,*** and provides ***examples of potential program and projects*** to achieve the energy vision. Cities undertaking this process should view this as a ***menu of possibilities*** and should ***prioritize their efforts*** based on their own goals and objectives, areas of interest, capabilities, and available resources. The Template provides tools for the development of an ***Action Plan*** and strategies to ***measure results*** of program implementation. Above all, this process is designed to be ***inclusive and collaborative*** and should involve city staff from various departments – public works, planning, finance, administration - in its implementation. This model will provide the broadest range of expertise, knowledge, energy, and enthusiasm for the creation of the plan and will ensure that its implementation will impact all parts of the City organization. Finally, energy planning and city General Plans should go hand in hand and be consistent. If a city has completed a Climate Action Plan (CAP), the Strategic Energy Plan should be crafted as a means of achieving those goals and criteria adopted by the CAP.

The following pages identify the ***policy and regulatory drivers*** that are behind many of these initiatives, and outline the ***recommended steps and the tools*** to assist cities with their planning efforts. In addition, they explain how to assess the current ***Energy Profile*** to better understand current energy usage and establish a ***"benchmark"*** for future planning, and provide information about ***financial and technical resources*** available for project implementation.

Although this guidebook is specific to energy planning for city facilities and operations, it could be expanded to include the larger community. While the impact could be larger, considerations should include the capacity of the City to implement the SEP activities beyond the scope of municipal buildings

and their operations. Should the City wish to create a community-wide plan, be sure to obtain input and engage key stakeholders with influence and knowledge of the larger community.

It is intended that this Strategic Energy Planning Template be a valuable resource for East Bay municipalities in their quest for a more energy efficient future!

SECTION 2.

HOW TO USE THIS GUIDEBOOK

The Local Government Strategic Energy Plan Template is designed to be used by any of the East Bay municipalities to create city-specific Strategic Energy Plans. The Template consists of the following three elements and is described in more detail below:

- ***The Local Government Strategic Energy Plan Guidebook.*** The Guidebook describes the "start to finish" planning and implementation process of creating a municipality-specific Strategic Energy Plan, includes a list of potential energy programs and projects, and identifies resources to assist the East Bay municipalities with program implementation.

- ***The Action Plan Checklist.*** This MS Excel workbook is used by the City to select and track energy projects, and to manage and report progress internally and to the community.

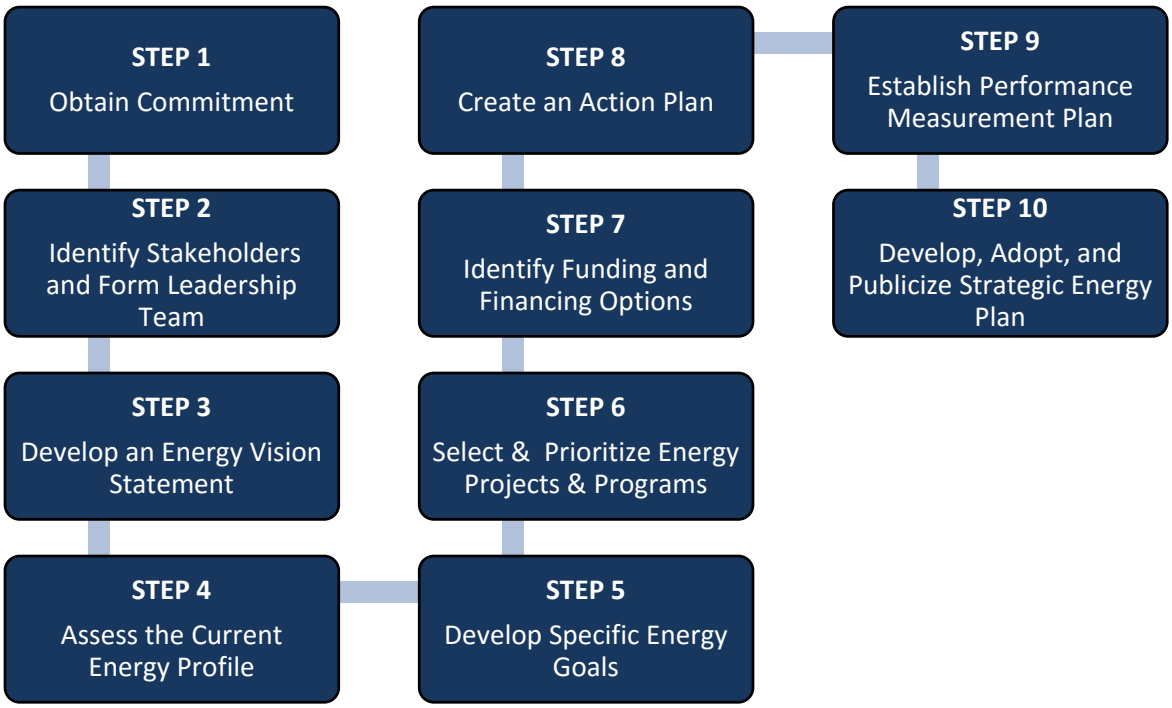
- ***The Local Government Strategic Energy Document Template.*** This MS Word document file is used by the City to create a customized Strategic Energy Plan document as an outcome of the planning process.

The graphic below illustrates the relationship of the Template elements. The subsequent sections of the Guidebook describe, in more detail, each of these elements or "tools" and how to use them.

LG-SEP Planning Guidebook	Action Plan Checklist	LG-SEP Document Template
• Describes the start-to-finish, 10-step LG-SEP creation and implementation process • Includes extensive menu of energy programs and projects • Identifies and provides resources and best practices throughout	• Macro-enabled MS Excel Spreadsheet used with the Guidebook to help select and manage different energy projects • Project management tool used to select and track energy projects • Matches the projects described in the LG-SEP Guidebook	• MS Word file containing Plan elements, organization, formatting, and instructions to assist in creating the customized LG-SEP • Contains template language and fill-in-the-blanks • Reduces time spent writing and reporting • Fully customizable
Utilized throughout LG-SEP process	*Completed in **STEP 8** of the LG-SEP process*	*Completed in **STEP 10** of the LG-SEP process*

LG-SEP PROCESS AND OUTCOMES

The following flow chart illustrates the recommended process for the development of an effective strategic energy plan described in this Guidebook. This systematic approach will guide the City through a process developed from experience with community, city, and state energy planning. It is important to remember that even once the completed SEP is in place, revisiting, revising, and updating the plan is crucial to its success.



A brief summary of this process is described below. The details of each planning step are described in subsequent sections of this Guidebook.

A key prerequisite for this process is to ***obtain commitment from a local, executive level sponsor*** such as the mayor, City Council, or City Manager for the planning and execution of the strategic energy. Without this commitment, it will be very difficult, if not impossible, to successfully implement the programs and projects established.

After gaining the necessary commitment, the next step in developing a Strategic Energy Plan is to ***identify stakeholders and establish a Leadership Team*** to manage the planning and implementation process. Above all, this should be an inclusive, collaborative process which should include individuals from a variety of city departments in its implementation.

The next step is to define an ***Energy Vision*** which will be the overarching statement that encapsulates why the City is developing and implementing a Strategic Energy Plan. A clear and articulate vision will help give guidance and direction throughout each step of the SEP process. Before the vision statement is made more tangible and actionable through the creation of concrete goals and the selection of projects, the

City should conduct a thorough assessment of its ***current energy profile***. Reviewing what has already been accomplished and gaining an understanding of the current energy use baseline and forecasted energy use will ensure that the SEP is tailored and relevant to the City's needs and limitations.

Since strategic energy planning can be a difficult task, ***defining focused goals and objectives*** will help the City prioritize the most important actions and projects to implement later in the process. It will also be important to understand the desired outcomes, criteria for success, and timelines for program implementation prior to beginning this process. This will set the bar for successful program implementation and allow measurement of activities against the plan.

The heart of the strategic energy planning process will be the ***selection and prioritization of energy programs and projects*** that will be undertaken by the City in the execution of the SEP. These will fall under a variety of categories, including lighting, building envelope, HVAC systems, water heating, and power systems. This will require significant effort on the part of the Leadership Team to review the entire menu of possibilities, select programs and projects that best meet the goals and objectives established for the plan, and prioritize those which are realistic given the time, resources, and funding available for plan implementation. A detailed list and description of a wide variety of potential programs and projects is included in Step 6.

The financing and funding of these projects is often the most critical factor in determining their feasibility. It is crucial to ***identify funding and financing options*** for each project selected in the SEP and to establish financing strategy that reflects the priorities of the City. Step 7 provides a detailed list of potential funding resources available to the City and elaborates upon several economic factors to consider when evaluating which programs and projects to pursue.

The next step in the strategic energy plan implementation will be to ***create an action plan*** designed specifically for each of the energy programs and project selected by the City. The Leadership Team will be tasked with completing the ***Action Plan Checklist*** which will outline the specific tasks, responsibilities, process changes, timelines, criteria, and estimated costs for all selected programs and projects. Details for creating an Action Plan are included in Step 8.

As with any successful program, ***performance should be monitored and compared to goals and criteria***. This will require ongoing participation of the Leadership Team and City staff. The results of the SEP activities should also be reported and communicated to the larger city community on a regular basis. Step 9 describes, in detail, the process for measuring program progress and reporting results

The last step of the SEP process is to ***develop, adopt and publicize the Strategic Energy Plan***. As described above, the ***LG-SEP Template Document*** provides a fully customizable format for the City to compile all the work generated in each of the SEP process steps. Step 10 of the Guidebook elaborates on how to use the template document and provides tips and tools to help adopt and publicize the plan.

SECTION 3.
LEGISLATIVE LANDSCAPE

The State of California and local agencies have been on the forefront of establishing aggressive policies and standards for environmental protection and reducing greenhouse gas (GHG) emissions that contribute to global warming. In 1970, the State adopted the California Environmental Quality Act (CEQA) with the goal to inform governments and the public about potential environmental impacts of projects. From 2005 onward, legislation has been passed to directly regulate GHG emissions, encouraging the creation of incentive mechanisms and cap-and-trade programs and the participation in voluntary activities such as purchasing emissions offsets and offering renewable energy certificates (RECs).

Policy and Regulatory Drivers

- *California is at the forefront of sustainability policy and regulations*
- *Local and regional environmental programs and requirements should be a consideration*
- *There are many challenges and opportunities for the cities of Contra Costa and Alameda Counties in regard to satisfying these requirements*

In October 2015 the most recent and significant legislation, the **Clean Energy and Pollution Reduction Act of 2015 (SB350),** was signed into law by California Governor Jerry Brown. This bill mandates an increase in California's Renewables Portfolio Standard (RPS) to 50 percent and the doubling of building energy efficiency, both by 2030. Implementation of this bill is likely to result in expanded utility efficiency programs that may benefit local governments.

The following list outlines key legislation geared towards reducing GHG's and improving sustainability as of the publication of this document. Legislation and public policy is a constantly changing landscape and it will be important for the City to stay updated on these evolving issues.

- **Warren Alquist Act 1974** – Created the California Energy Commission (CEC) mandate to develop and regularly update Building Energy Efficiency and Equipment Standards, now known as Title 24 and Title 20 codes. These standards are largely credited with holding California's per capita energy consumption essentially flat since the mid-1970s.

- **AB 4420, 1988 (Sher)** – Directed the CEC to inventory and study greenhouse gases (GHGs) and the impacts of climate change on the states' economy and environment.

- **SB 1771, 2000 (Sher)** – Established the State's Climate Action Registry and established GHG baselines and ongoing monitoring.

- **AB 1493, 2002 (Pavley)** – Landmark "Clean Car Legislation" after California received authorization form the US EPA to regulate these emissions. Initially, these rules were heavily fought by the auto industry, but have since become the standard for the nation.
- **SB 1078, 2002 (Sher); SB 107, 2006 (Simitian); SB X1-2 (Simitian)** – Establishing the State's Renewable Portfolio Standard (RPS) goals with increasing targets, currently requiring all retail sales of electricity to include 33% renewable power by the end of 2020.

- **AB 32, 2006 (Nunez)** – Global Warming Solutions Act of 2006; Established goal to reduce California's GHG emissions below 1990 levels by 2020 and 80% below these levels by 2050.

- **California Long-Term Energy Efficiency Strategic Plan (CEESP) drafted by the CPUC in 2008 and updated 2011** – Outlines "big and bold" goals including 40% of residential building to be zero net energy (ZNE) by 2030 and 50% of commercial building to meet this criteria by 2040.

- **AB758, 2009, (Skinner)** – Comprehensive Energy Efficiency Program for Existing Buildings; requires the CEC to create and implement an Existing Building Energy Efficiency Action Plan, in coordination with the CPUC and stakeholders.

These policies are progress and commitment that should be recognized and incorporated into the City's strategic energy plan along with any local mandates or policies. Any action taken within the City since the adoption of any energy related legislation should be captured and elaborated upon. Again, not only is the goal of the SEP to lay the foundation for future strides in energy efficiency and/or generation but also to take credit all the progress that has already been made in this effort. Without a thorough assessment and understanding of progress made it will be difficult to create a clear path for future conservation.

SECTION 4.

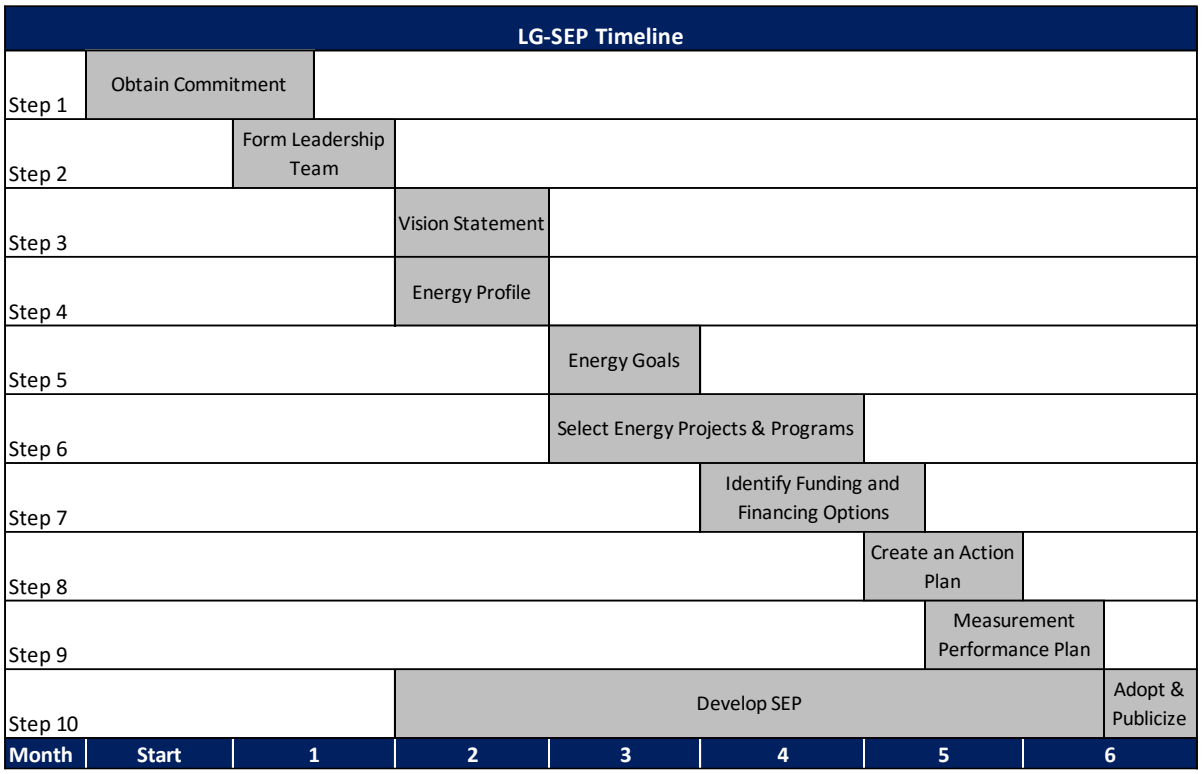
STRATEGIC ENERGY PLAN PROCESS

As explained above, Section 4 of this Guidebook will elaborate upon and provide examples and tools for the 10-step Local Government Strategic Energy Plan Template, which will result in an actionable Energy Plan specific to the City. This process was informed by a variety of sources and successfully utilized by cities throughout the U.S, including the LG-SEP Pilot Cities: Emeryville and Oakley. Despite its success, each municipality is unique and bound by different constraints and resources. As such, the City should not hesitate to make modifications to the process or omit certain action items, as necessary. Concerns about the robustness of the final plan should not deter the City from the most important task of all – getting started.

STEP 1 – OBTAIN COMMITMENT

A prerequisite for the Local Government Strategic Energy Plan (LG-SEP) is to obtain commitment from the highest levels of city administration early in the planning process. Ideally this would come from the Mayor, City Council or City Manager and be supported by key department heads from local government operations. An executive-level sponsor is important as it will authorize the LG-SEP programs and projects to receive the support and resources they need to be successful. Without this commitment, it will be very difficult to implement the plan successfully. Before approaching the executive-level sponsor, however, a high-level plan, outlining the scope, timeline, budget, and value of the LG-SEP effort should be developed.

The process flowchart shown in Section 2.1 above can be used to illustrate the planning process. The timeline to implement the plan and carry out the key phases outlined below and in subsequent chapters may vary depending on the scope and complexity of the SEP and factors distinct to each municipality. However, as shown in the graphic on the following page, six months can be used as a reasonable duration for the completion of the planning process.



The LG-SEP Template is designed for implementation by City staff without significant expense to hire technical experts or consultants. If implemented in-house, an estimate of staff hours needed for the project should be developed. If City staff resources are not available or are limited, an energy consultant can be engaged to work in coordination with the City to develop the plan, provide technical analysis, and conduct stakeholder outreach. A reasonable estimate for consultant assistance would range from $50,000 - $75,000.

It is important to describe the potential benefits of implementing the SEP initiative when engaging the executive-level sponsor. Highlighting and quantifying the operational and cost efficiencies that will be achieved is especially compelling to justify the investment of staff time and consultant resources. Additional benefits may include increased public recognition for environmental awareness and leadership.

After presenting the concept plan and receiving support from the sponsor, the commitment should be formalized and shared internally or community-wide by means of a Council Resolution or Letter of Support from the City Manager. The following is sample text for the commitment:

The City Council recognizes the necessity for the City to become more energy efficient based on legislative requirements and the need to be more environmentally, economically, and socially sustainable to face the challenges of the 21st century. Based on this, the City Council hereby supports the establishment of a Strategy Energy Plan for the City and will provide the resources necessary for its development.

Copies of the Resolution or letter should be presented to the Leadership Team (see Step 2) and made part of the Strategic Energy Plan document.

STEP 2 – IDENTIFY STAKEHOLDERS AND FORM LEADERSHIP TEAM

After gaining the necessary commitment from city leadership, the next step in developing a Strategic Energy Plan is to ***Identify Stakeholders and Form a Leadership Team*** to manage the planning and implementation process.

Crucial to the Leadership Team is the establishment of a ***Team Leader,*** who will be the lead administrator for the LG-SEP process. The Plan Manager will be responsible for providing support to the Leadership Team and for managing logistics and day-to-day work required to develop the plan. These tasks include scheduling meetings, creating agendas, facilitating Leadership Team discussions, managing the development and drafting of the LG-SEP, and publicizing the plan. Potential candidates for the Plan Manager role include Public Works Manager, Energy Manager, Sustainability Coordinator, Planning Director, Finance Manager, a volunteer from a subcommittee of the City Council, or other interested and capable staff.

LG-SEP Leadership Team

- *Manage the Planning and Implementation Process*
- *Inclusive and Collaborative*
- *Include Representatives from a variety of departments and agencies*
- *City leaders and those with technical expertise*
- *Represent the interests of the larger community*
- *Will do the "heavy lifting" of creating and implementing the plan*

One of the first tasks of the Plan Manager is to form the Leadership Team, which should be drawn from influential and committed City staff who will be charged with driving the LG-SEP process. Candidates should include individuals who routinely provide leadership on city issues, as well as those who represent key elements of the City organization to ensure all stakeholders are engaged in the process. Above all, this should be an ***inclusive, collaborative process*** which should include leadership from key city departments. The Leadership Team should include representation from:

- City Administration or City Manager's Office
- Sustainability and Energy Management Staff
- Public Works
- Water and Wastewater
- Building and Inspection
- Planning and Community Development
- Finance
- Economic Development
- General Services, Facilities, and Fleet Management
- Housing
- Transportation
- Planning
- Economic Development
- Information Technology
- Procurement
- Parks and Recreation

The Leadership Team should be a standing committee with members that meet on a regular schedule, and meeting minutes and action items should be recorded and tracked. Roles and responsibilities should be defined for Team members, and a ***governance structure should be established for running meetings, decision-making, and reporting out to City administration***. The Committee should also be responsible for establishing a schedule with deliverables for the energy planning process and be responsible for its implementation within the established timeframe and budget. ***The Leadership Team will do the "heavy lifting" of creating the plan*** and its members should have the required amount of available time, the commitment to attend meetings, and the ability to perform other tasks as necessary. Due to anticipated time commitments required by team members, the City may wish to offer a stipend to committee members to compensate for the additional responsibilities. This allows for inclusion of highly sought after personnel who may otherwise be too busy to participate.

City of Oakley, City Hall Building

The Leadership Team must also ***represent the interests of the larger community*** in the energy planning process. Outreach efforts to communicate the planning activities and solicit feedback from the City Council and City staff should be made at regular intervals. Periodic workshops and presentations should be conducted in venues that are convenient for participation by a wide audience, and a process should be employed to encourage meaningful participation by all interested parties. To build support for the energy planning efforts, outreach activities should go beyond the City organization and extend to the local community, as well as local utilities, public agencies, industry experts, and businesses.

STEP 3 – DEVELOP VISION STATEMENT

The first task of the Leadership Team is to create an effective energy vision statement that captures, in one sentence, what the City would like to achieve with the Strategic Energy Plan. It is important that the vision statement receive approval and support from the City administration early in the planning process. The vision statement should paint an inspiring picture for the future that is both ambitious, yet achievable, convey the scope of the LG- SEP effort, and speak to the social, economic and environmental benefits to the City and the community. Sample energy vision statements from the LG-SEP Pilot Cities, the City of Emeryville and Oakley, are provided blow.

City of Emeryville

The City of Emeryville will be a model and leader in energy planning through the development and implementation of innovative municipal policies and programs that enhance the environment, boost economic vitality, and inspire and empower our community.

City of Oakley

Oakley will consider energy-efficiency in its operations, striving to provide positive and achievable examples to others in the community, and demonstrating that financially viable and sustainable energy-wise options exist that can both reduce overall costs and lower greenhouse gas emissions, without creating negative environmental impacts or lowering the quality of life of its residents.

STEP 4 – ASSESS THE CURRENT ENERGY PROFILE

Before establishing goals, priorities, and implementation programs for the Strategic Energy Plan, an assessment of the City's current energy profile should be completed. Understanding existing energy usage patterns and trends, actions already taken to improve energy efficiency, and future planned activities is a vitally important step in Strategic Energy Planning. A thorough assessment will ensure that the City has an accurate starting point for planning and a benchmark to measure progress of the SEP's implementation.

East Bay cities have the advantage of having recently completed an Energy Usage Benchmarking Study performed by the East Bay Energy Watch Technical Implementation Team. The Benchmarking Studies compared the energy performance of a city's buildings and facilities against a baseline of energy usage from a previous year. The results of the study identifies high-use facilities (measured in Energy Use Intensity, or energy use per square feet) and helps pinpoint further evaluation and actions to reduce energy use at those facilities. The benchmark studies performed by EBEW also contain recommendations and improving energy performance at city facilities. If a city has not recently performed an energy usage benchmarking study (within the last two years), and new study should be performed prior to initiating the planning process. An example of an Energy Usage Benchmarking Study is included within the City of Oakley and Emeryville Strategic Energy Plans, which are included in Appendix F and G, respectively.

Finally, if the City has already established plans for energy efficiency measures as part of the annual Capital Improvement Program (CIP) plans, or will be participating in energy programs through utilities, regional agencies, or local non-profits, these should be identified and published with the Strategic Energy Plan. These activities will become part of the Action Plan going forward for the implementation of the SEP.

STEP 5 – DEFINE ENERGY GOALS

Once the results of the energy profile are complete, the Leadership Team should create realistic and relevant long-term goals and near-term strategies. The graphic below illustrates the role these goals play in linking the conceptual energy vision to tangible, cost-effective energy projects and programs.

Since energy planning can be a daunting task, defining focused goals and objectives will help the City prioritize the most important actions later in the process. This is especially important if the City has limited resources and for team members with busy schedules. The Leadership Team should refrain from attempting to tackle all issues at once; rather, the more prudent approach is to focus the Team's efforts on what is most important to the City. The development of specific goals, criteria, and priorities should be created through a brainstorming process of the Leadership Team. Ideas can come from Team members or can be gleaned from the Energy Programs and Projects listed in Step 6 of the Guidebook or the Action Plan Checklist found in Appendix D.

Setting specific criteria for success is important because without targets or benchmarks it will be difficult to assess whether the results achieved from executing the plan were the results that program stakeholders wanted or expected. For cities undertaking this for the first time, understanding what reasonable targets or criteria are may be difficult task. Oftentimes setting the bar too high can have the same effect as setting it too low – either can lead to an ineffective plan. Setting appropriate goals also depends on the resources, funding, and staff time available to implement projects. Fortunately, there are many examples of goals successfully implemented at other cities that can be a valuable resource for best practices and lessons learned.

Criteria assigned to a goal should contain both a measurable target and a timeframe by which to achieve the target. These are sometimes called SMART Goals (Specific, Measurable, Achievable, Relevant, Time-bound). A few examples of goals set by other cities include:

Topic	Established Goal
Energy Use	Seek ways to reduce annual energy usage for existing facilities. Explore opportunities for energy efficiency, demand reduction, and/or clean self-generation measures. Evaluate and begin implementing viable measures that meet economic criteria by December 2017. Low-cost and no-cost measures should be prioritized for immediate implementation. (*Source: City of Oakley Strategic Energy Plan*) Reduce annual energy usage for existing facilities from a 2010 baseline by 10% by the end of 2020 (as identified in the City CAP) by targeting opportunities from the Civic Center energy audit provided by QuEST in 2015 and additional energy audits to be performed on the remaining City facilities. (*Source: City of Emeryville Strategic Energy Plan*)
Energy Generation & Procurement	15% of the electricity used by the City to come from renewable energy sources by 2025. (*Source: City of Phoenix*) Explore local opportunities for clean energy generation and procurement. Evaluate and begin implementing viable measures that meet established economic and fiscal criteria by 2017. (*Source: City of Emeryville Strategic Energy Plan*)

Greenhouse Gas Reduction	Reduce greenhouse gas emissions to 80% below 2000 levels [in municipal facilities] by 2050. The interim goals is a 33% reduction by 2020. (*Source: City of Berkeley Climate Action Plan Progress Report on Municipal Facilities*) Leverage the GHG inventory conducted in 2013 (or any more recent study), the adopted SEP, and the EBEW Civic Spark intern program to plan and develop a Climate Action Plan (CAP) for the City. Planning for the CAP should occur in early 2016. (*Source: City of Oakley Strategic Energy Plan*)
Community Awareness & Engagement	Engage City staff and the larger community in SEP implementation by developing and offering Education and Awareness Programs to reduce energy use beginning in 2016. (*Source: City of Oakley Strategic Energy Plan*)
Economics	Evaluate existing economic and fiscal criteria commonly used for the evaluation and implementation of energy use reduction and energy generation strategies. Adopt economic and fiscal criteria from these common examples, or develop and adopt new criteria determined most appropriate for the City of Oakley by December 2016. (*Source: City of Oakley Strategic Energy Plan*)

STEP 6 – SELECT AND PRIORITIZE PROGRAMS AND PROJECTS

After finalizing the City's energy goals in Step 5, a list of programs and projects should be chosen by the Leadership Team to achieve them. This step will require "heavy lifting" by the Leadership Team to transform the Vision and Goals defined earlier into specific projects and deliverables that are customized to meet the needs of the municipality. This is accomplished by selecting from the menu of possibilities outlined below and ***prioritizing those programs and projects that best meet the goals and objectives established for the plan***, and are realistic given the time, resources, and funding available.

The programs and projects listed in this section are grouped into the subsections indicated below:

1. Management And Organizational Structure
2. Energy Efficiency
3. Facilities Operation
4. Sustainable Building Practices
5. On-Site Generation And Renewable Energy
6. Outreach & Awareness

This menu intended to be a starting point for planning, and the City is encouraged to think innovatively to identify projects that may not have been addressed here but suit the City's unique circumstances and needs. For each program and project selected, the City should prepare an Energy Action Plan that identifies specific steps, timing, responsibilities, and outcomes for implementation (see Step 8). An Action Plan Checklist and an Energy Plan Document Template that corresponds to the projects and programs in this section has been created to assist the City with this effort and are described in Section 2: How to Use This Guidebook.

1. MANAGEMENT AND ORGANIZATIONAL STRUCTURE

PROGRAM GOALS

In order to implement an effective Strategic Energy Plan, it is important for a city to have a policy mandate for energy and/or sustainability, the organizational structure required to manage the process, and the financial and technical resources to accomplish the plan goals.

IMPLEMENTATION PROGRAMS AND PROJECTS

The following implementation programs should be considered by the City to meet this goal:

1.1 ADOPT A CITY ENERGY POLICY / VISION STATEMENT

The City should demonstrate its commitment to environmental, fiscal, and social sustainability by adopting a policy that provides a mandate to develop and implement a Strategic Energy Plan. This policy should articulate the mission, vision, and goals of the City and authorize the Leadership Team and City members to develop the necessary plans, programs, and actions necessary to achieve them.

1.2 APPOINT AN ENERGY MANAGER

Implementation of a Strategic Energy Plan will require time, effort, continuity, and leadership. It is important to establish the management and support infrastructure to meet these needs. This can be fulfilled by appointing an Energy Manager (or "Sustainability Coordinator") to work with City staff and employees, elected officials, and community members and outside organizations to identify, implement, and monitor the energy efforts within the City. The duties of the Energy Manager should include the following:

1.2.1 Manage the Process

A comprehensive Strategic Energy Plan will require coordination of activities and action plans, meeting schedules and deliverables, delegating responsibility, and managing internal and external resources to accomplish the goals of the program. Appointing an individual with the responsibility, authority, and accountability to manage this process will be critical for its success.

1.2.2 Champion for Energy and Sustainability Projects

Large projects, particularly those that span a long period of time, require an enthusiastic individual to follow through with efforts. The Energy Manager should be passionate about sustainability and be excited about working towards City goals despite potential financial, political, and logistical difficulties.

1.2.3 Point of Contact

Sustainability as a whole often begins at the grassroots level, and sustainability efforts can often be sporadic and lack coordination without designated leadership. The Energy Manager can serve as a main point of contact for sustainability efforts at the City and help grassroots projects gain the critical mass required for long term success.

1.2.4 Qualities and Credentials

When hiring an Energy Manager the City should look for candidates that have an engineering or environmental related undergraduate degree and relevant work experience. It is recommended that candidates for this position have 5-10 years of experience in a similar position.

An Energy Manager should be a Certified Energy Manager (CEM) issued by the Association of Energy Engineers (AEE), at a minimum. A Professional Engineer (PE) in mechanical engineering licensed by the State of California would be preferred. A Sustainability Coordinator should be familiar with all aspects of sustainability but should be specialized in at least one aspect, such as energy efficiency. Project management skills are necessary since the City will be undertaking many projects to reach their goals. Preferably, the candidate will have had experience with undertaking sustainability, energy, or climate action planning in the past.

Most importantly, the individual needs to be able to communicate effectively with different groups of people of different technical backgrounds and should have experience in managing stakeholder processes and expectations.

1.3 APPOINT A CITY ENERGY LEADERSHIP TEAM

The City's Energy Team should consist of City staff from a variety of departments such as public works, planning, budget/finance office, transportation, etc., as well as industry experts, and representatives from energy utilities. Should the City like to expand their Strategic Energy Plan beyond municipal buildings to include the broader community, interested community members, groups, and representatives from local businesses should also be included within the Leadership Team. In general, the Team should be designed to provide a broad perspective on energy and sustainability programs and activities within the City. The Team may or may not have authority over plan implementation but, at a minimum, should provide input and recommendations regarding performance of plan activities and play an advisory or management role in the process. More information on the advantages of establishing a Leadership Team is provided in Step 2.

1.4 FUNDING AND RESOURCES TO SUPPORT ENERGY PLAN ACTIVITIES

Develop a funding plan and budget for the implementation of energy plan activities. Sources of funding may be from internal City budgets or from grants, endowments, or other fundraising activities or revenue streams.

Additional funding and technical or programmatic resources may come from local or state agencies and energy utilities. Step 7: Identify Funding and Financing Options provides a list of funding and financing options available for the cities of Contra Costa and Alameda Counties.

1.5 ENGAGE ENERGY PROFESSIONALS AS REQUIRED

Many of the projects identified in the plan may require a level of technical or programmatic expertise not available among City personnel. Where appropriate, specialists should be hired to assist in the design and implementation of energy projects to guarantee project success.

Ensure that the individual or company being hired has past experience that is relevant to the project for which they are being hired. Experience working with other cities is also a plus.

1.6 INTEGRATE ENERGY PLANNING INTO CITY GENERAL PLAN OR CLIMATE ACTION PLAN

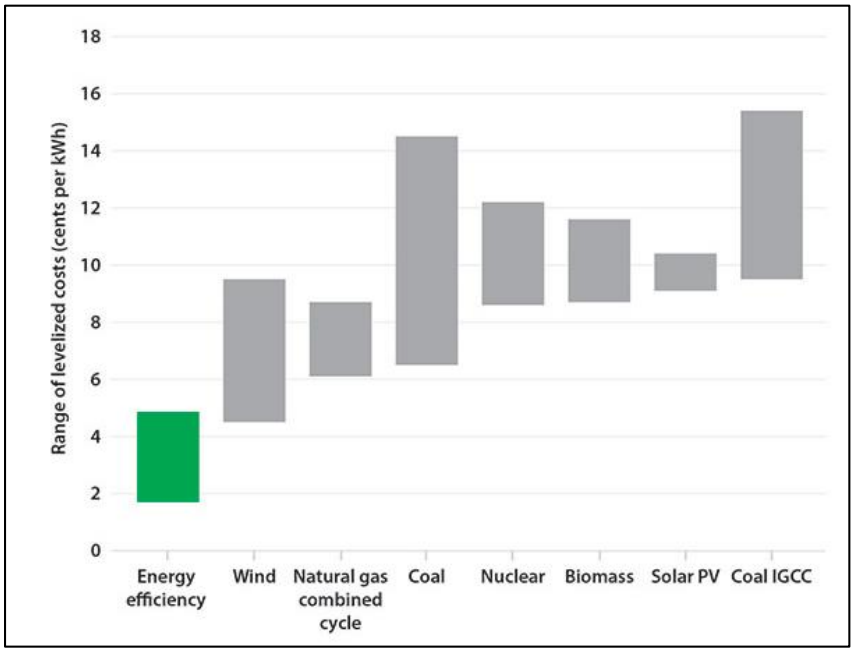
City General Plans and energy planning should go hand in hand. The Strategic Energy Plan should be consistent with the policies and programs of the General Plan, however, the SEP may also be used to drive General Plan changes and the adoption of new energy efficiency or sustainability City policies. In addition, the SEP should be consistent with a city's Climate Action Plan (CAP), if it has one in place, and, ideally, be used to implement the broader goals typically contained in the CAP.

2. ENERGY EFFICIENCY

PROGRAM GOALS

Energy efficiency is one of the most cost effective ways to reduce City energy use and its carbon footprint. When implemented properly, efficiency measures can decrease energy use without compromising comfort and can improve indoor air quality and enhance employee and staff performance. Energy efficiency will be a higher priority than renewable energy due to more favorable economics and to avoid over-sizing renewable energy systems.

The chart below illustrates a comparison of the cost effectiveness of energy efficiency to power generation. These costs do not account for externalities, such as health costs, pollution costs, and costs incurred from environmental damage and cleanup.



Costs of electricity resource options, March 2014. ***Source:*** *American Council for an Energy-Efficient Economy*

IMPLEMENTATION PROGRAMS AND PROJECTS

The following Energy Efficiency Implementation Programs and Projects should be considered by the City.

2.1 SET ENERGY EFFICIENCY GOALS

Establish energy use reduction goals for the City. These goals should be to reduce energy use above and beyond what is required by the California Title 24 Energy Code and can be set by each city based on their desires and capabilities. For example, goals could be set to exceed Title 24 by at least 10% for new construction project and major renovation projects. Performance should be monitored annually to determine if goals are met, and should be re-evaluated every five years to establish new goals. See Step 5 for more details about setting appropriate goals.

2.2 EVALUATE MECHANISMS FOR THE IMPLEMENTATION OF ENERGY CONSERVATION AND EFFICIENCY PROJECTS

Evaluate various mechanisms for the identification and implementation of energy efficiency projects and programs, including the use of in-house staff, engineering consultants, contractors, and performance contracting vehicles through Energy Service Companies (ESCOs).

2.3 CONDUCT A FACILITY PRIORITIZATION SURVEY

Conduct a prioritization survey of all facilities managed by the City. The surveys can be used to establish priorities for conducting comprehensive facility energy audits. Buildings should be prioritized based on energy use intensity (EUI) (i.e. electricity and natural gas use per gross square foot per year), with buildings with the highest energy use intensity given highest priority. The surveys should include leased facilities to the extent practicable and to the extent that the recommendations of such surveys and audits can be implemented under the terms of the lease.

2.4 CONDUCT COMPREHENSIVE FACILITY ENERGY AUDITS

An Energy Efficiency auditing plan should consist of the following elements:

1. The City should develop and begin implementing a long term plan to conduct or obtain comprehensive facility energy audits, which can be based on prioritization surveys.
2. The City should conduct energy audits for approximately 20% of their facilities each year, beginning within 6 months of the establishment of the City's Energy Plan. This can be carried out either independently using public agency resources, through Energy Savings Performance Contracts, state programs such as the California Energy Commission Technical Assistance program, utility energy-efficiency technical assistances, or energy engineering consultants hired by the City.
3. Comprehensive audits of facilities performed within the last 3 years may be considered current for the purposes of implementation.
4. "No-cost" audits should be utilized to the extent practicable.
5. The level of details and energy savings calculations should be that of an ASHRAE Level II audit. An ASHRAE Level II audit includes an analysis of energy use at a facility and identifies no-cost, low-cost and capital improvement energy efficiency measures with detailed energy and financial calculations.

2.4.1 Implement New and Existing Audit Recommendations

Within 90 days of the completion of the comprehensive facility audit of each facility, the City should begin implementing cost-effective recommendations for installation of energy efficiency and renewable energy technologies. The City should also do the same for energy audits of facilities performed within the past 3 years. In making decisions about investments in energy efficiency and renewable energy projects, the City should use life-cycle cost analyses, targeting projects with low and no additional life cycle costs first. Savings from low and no-cost measures can be used to support projects requiring more capital investment. Where appropriate, the City should consider the life-cycle costs of combinations of projects, particularly to encourage the bundling of energy efficiency projects with renewable energy projects.

2.5 IMPLEMENT ONGOING ENERGY MONITORING

For City facilities believed to be major energy users, which are likely to be larger buildings or those with technical areas, the City should install permanent meters on all energy inputs (e.g. electricity, natural gas, chilled water, hot water) to allow for continuous energy monitoring and evaluation of the impact of efficiency projects. If a central plant system is installed at a City facility, the City should include metering and monitoring of hot and chilled water circulation from the plant as appropriate. Metering should be connected to energy management systems (EMS) to aid in the monitoring and analysis of energy use.

2.6 PARTICIPATE IN DEMAND RESPONSE (DR) PROGRAMS

PG&E offers Demand Response programs that incentivize cities to reduce energy use of their facilities during times of peak demand. The City should contact their PG&E account representative for enrollment. For more information, visit the link below:

http://www.pge.com/en/mybusiness/save/energymanagement/index.page

2.7 IDENTIFY AND TAKE ADVANTAGE OF GRANT AND INCENTIVE PROGRAMS

Identify and take advantage of all grant and incentive programs available for energy efficiency and conservation projects, including energy utility incentive programs and the CEC low-interest energy project loan programs. See Step 7 for more details on funding opportunities.

2.8 ENERGY EFFICIENT EQUIPMENT

Purchase and utilize energy efficient equipment whenever possible. Employ the following strategies to accomplish this goal.

2.8.1 Establish an Energy Efficiency Purchasing Policy

Establish a city-wide policy for all purchases of energy-using equipment, stipulating where life-cycle cost-effective, energy efficient products will be selected. Products with an ENERGY STAR® label are certified to not only be energy efficient but to also have a reasonable payback period, and ENERGY STAR® labeled equipment should be purchased whenever available. For product groups where ENERGY STAR® labels are not yet available, the City should select products that are in the upper 25% of energy efficiency for their respective product categories. The City should incorporate energy efficient criteria consistent with ENERGY STAR® and other designated energy efficiency levels into all guide specifications and project specifications developed for new construction and renovation, as well as into product specification language developed for Basic Ordering Agreements, Blanket Purchasing Agreements, and all other purchasing procedures.

2.8.2 Efficient Lighting and Lighting Controls

Install current generation of energy efficient lighting and lighting controls for interior and exterior applications. Energy efficient lighting technologies include low-wattage linear fluorescent lights, compact fluorescent lights, LEDs, and induction lighting. Examples of lighting

controls include occupancy sensors, photocell installations for turning off lights when there is enough daylight, and time clocks for scheduling lights on and off automatically.

2.8.3 Install Energy Efficient HVAC Systems

In addition to buying energy efficient air conditioners, chillers, and boilers, the City should further increase the energy efficiency of their HVAC systems by pursuing the following measures.

Install Economizers

Air-side economizers can be added to allow the use of "free cooling", which is to use outside air to ventilate the building when outside air temperatures are favorable. Air-side economizers can be installed on both package units and buildings with central plants. While most cities do not have central plants, those that do can install waterside economizers to further reduce chiller use.

Enhance Control of Equipment

Installing variable frequency drives (VFDs), also known as variable speed drives (VSDs), on HVAC fans and pumps can save a significant amount of energy, as fans and pumps use more energy at higher speeds. VFDs are most effective when incorporated into an EMS for better control but can also be locally controlled if needed.

Managing Plug Loads

"Plug Loads" are energy consuming equipment that draws electricity from a wall socket. Examples of plug loads include computers, printers, refrigerators, and space heaters. Manage plug loads by activating any energy saving features on your plug load equipment and by using occupancy sensor plug load shut-off devices, such as occupancy sensed power strips.

Appropriately Size Equipment

Oversized equipment can waste energy by using more power than needed to meet the need. Ensure that all equipment is sized appropriately for its load or has the ability to ramp down through controls instead of cycling on and off repeatedly when loads are low.

Reduce Unnecessary Heat Gain and Loss

Avoid unnecessary cooling and heating by reducing unwanted heat gain or loss. Examples of unwanted heat gains in buildings can be prevented by shading south and west facing windows or by "cool roofing" strategies and painting roofs white. Prevent unwanted heat loss in pools by using pool covers to reduce heat loss from pools, thereby reducing boiler usage.

Perform Regular Maintenance on Equipment

Effective preventive and regular maintenance programs keep equipment and systems operating optimally and reduce excess energy use. Set up a routine maintenance schedule to ensure proper maintenance is performed.

Replace equipment with energy efficient models

As old equipment is taken offline, replace it with energy efficient models. See Program 2.8.1: Establish a Purchasing Policy, above, for more guidelines.

3. FACILITIES OPERATION

PROGRAM GOALS

In addition to installing energy efficient equipment, cites should strive to operate high-performing facilities, buildings, and energy infrastructure systems that are optimized for inhabitant comfort, productivity, and energy and resource efficiency.

IMPLEMENTATION PROGRAMS AND PROJECTS

The following implementation programs should be considered by the City to meet this goal:

3.1 ENCOURAGE AND SUPPORT ENERGY EFFICIENCY TRAINING OF STAFF

Cities should encourage staff to become trained in energy efficiency and offer support by paying for certification and class fees. Staff can take classes at the IOU energy centers or go through Building Operator certification, a nationally recognized program. For more information, visit: http://www.theboc.info

3.2 INSTALL ENERGY MANAGEMENT SYSTEMS

Maximize use of computerized EMS to provide centralized reporting and control of City energy related activities. City staff should strive to achieve optimum efficiency in the use of natural gas, electricity, or other energy resources to meet the heating, cooling, and lighting needs of the buildings and/or facilities. Except for areas requiring special operating conditions, such as electronic data processing facilities, or other scientifically critical areas, where rigid temperature controls are required, building and/or facility temperatures should be controlled to fluctuate between the limits stated below.

3.3 ADJUST TEMPERATURE SET POINTS AND SCHEDULE OPERATING TIMES

Avoid overcooling and overheating by raising cooling temperature set points and lowering heating temperature set points. If there is a central plant to meet the heating and cooling needs, implementing supply air temperature resets, chilled water and hot water resets, and chilled water and hot water set point changes can help avoid wasting energy during milder weather.

Cities should heat buildings at or below 68°F and cool facilities at or above 78°F in order to avoid excess heating and cooling. In order to avoid unnecessary heat loss, domestic hot water temperatures should

not be set above 120°F. These limits will not apply in areas where other temperature settings are required by law or by specialized needs of equipment or scientific experimentation.

3.4 OPTIMIZE BUILDING OCCUPANCY SCHEDULING

Scheduling of building and/or facility usage should be optimized consistent with operational needs to reduce the number of buildings operating at partial or low occupancy. Furthermore, the scheduling of buildings should be implemented in a manner to promote individual building air conditioning system shutdown to the greatest extent possible during the weekend and other holiday periods. If possible, four day workweeks can also be utilized to reduce energy use in buildings. City staff should make all attempts to change or update building operating schedules to match the changes in operational needs on a continuing basis.

3.5 OPTIMIZE HVAC EQUIPMENT SCHEDULING

All air conditioning equipment, including supply and return air fans, should be shut off on weekends, holidays, and for varying periods each night, except where it would adversely affect instruction, electronic data processing installations, or other scientifically-critical or 24-hour operations.

Avoid cooling and heating spaces when unnecessary. This can be done by scheduling HVAC systems off during unoccupied times while implementing a pre-cooling strategy to cool the building in the early hours of the morning before outside temperatures heat up. If there is a central plant, scheduling lockouts for chillers and boilers can be used to avoid running this equipment when unneeded.

3.6 ACTIVATE ENERGY-SAVING FEATURES FOR APPLIANCES AND COMPUTERS

Activate energy-saving features on all appliances and computer equipment within City facilities, for example, power-saving modes on PCs, copiers, printers, and other office equipment. Install server and desktop virtualization and PC power management systems to reduce computer energy use.

3.7 PURSUE MONITORING-BASED COMMISSIONING (MBCX)/RETRO-COMMISSIONING (RCX)

For buildings or central plant systems that are determined to be high energy users, the City should install whole-building energy metering and a Monitoring-based Commissioning (MBCx) process should be implemented. Monitoring-based Commissioning is a process that optimizes building performance for comfort and energy use. Retrocommissioning (RCx) is a process that identifies individual energy efficiency projects to improve the control of the system to reduce energy use.

4. SUSTAINABLE BUILDING PRACTICES

PROGRAM GOALS

Construction and renovation of new and existing facilities provides a significant opportunity to reduce the environmental impacts of the built environment through sustainable building practices. The City should incorporate energy and resource efficient “Green Building” practices in the design and construction of all new and renovated facilities.

IMPLEMENTATION PROGRAMS AND PROJECTS

The following implementation programs should be considered by the City to meet this goal:

4.1 ESTABLISH A GREEN BUILDING STANDARD

Green Building Standards for new construction and renovation projects should be adopted based on Best Practices, industry standards, professional organizations, institutions of higher learning (UC, CSU, or CCC) or other local governments. All new construction and major remodeling projects should be designed to achieve at least a U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) Silver rating or equivalent performance.

For more information about LEED ratings, visit the following link:
http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222

4.2 IMPLEMENT SUSTAINABLE DESIGN PRACTICES

All City new construction, renovation, maintenance, and repair projects should be designed with consideration of optimum energy utilization, low life cycle operating costs, and compliance with the City's goals and all applicable energy codes and regulations. Energy efficient and sustainable design should be addressed early in the project planning and design phases to maximize cost effectiveness and should be considered in balance with the academic program needs of the project. The following elements should be considered in the design of all buildings for the City:

- Siting and design considerations that optimize local geographic features to improve sustainability of the project, such as proximity to public transportation, consideration of microclimates, and passive or active solar energy opportunities
- Durable systems and finishes with long life cycles that minimize maintenance and replacement
- Optimization of layout and design of spaces to accommodate reconfiguration, with the expectation that the facility should be renovated and re-used (versus demolished)
- Systems designed for optimization of energy, water, and other natural resources
- Designed to maximize natural daylighting and ventilation
- Optimization of indoor environmental quality for occupants
- Utilization of environmentally preferable products and processes, such as recycled content materials and recyclable materials
- Procedures that monitor, trend, and report operational performance
- Space should be provided in each building to support an active program for recycling and reuse of materials
- Design outdoor spaces to minimize parking lots, use permeable pavement, and avoid blacktopping pavement and plant trees to shade parking lots to prevent the heat island effect. Utilize sustainable landscaping practices
- Any energy-using equipment acquired for the furnishing of new and renovated buildings should be ENERGY STAR® rated or equivalent in accordance with the purchasing policy adopted by the City

4.3 USE AN INTEGRATED SYSTEMS APPROACH IN BUILDING DESIGN

Sustainable building goals should be evaluated in a cost effective manner by identifying economic and environmental performance criteria, evaluating life cycle savings, and adopting an integrated systems approach. Such an approach treats the entire building as one system and recognizes that individual building features, such as lighting, windows, heating and cooling systems, should be evaluated and designed as interactive systems.

4.4 HIRE SUSTAINABLE BUILDING DESIGN PROFESSIONALS

The City should consider utilizing architectural firms, consultants, and energy engineers experienced in all phases of the sustainable building design process to assist in constructing energy and resource efficient buildings. The City should take advantage of the utility provided energy efficiency new construction design programs, such as Savings by Design.

4.5 COMMISSION NEW BUILDINGS

All new buildings should be commissioned after construction to ensure that systems were installed and operating as designed. Individual systems should also be commissioned to ensure that they run as efficiently as possible.

5. ON-SITE GENERATION AND RENEWABLE ENERGY

PROGRAM GOALS

The City should develop a strategic plan for the reduction of demand on the electricity grid via the installation of economically feasible renewable and on-site power generation, as well as the procurement of electricity from renewable sources. Renewable generation implementation should occur only after significant efficiency and conservation plans have been implemented to ensure that any self-generation or demand response programs or projects are sized appropriately.

IMPLEMENTATION PROGRAMS AND PROJECTS

The following implementation programs should be considered by the City to meet this goal:

5.1 EVALUATE CLEAN COGENERATION AND RENEWABLE ENERGY GENERATION

Evaluate and implement cogeneration projects, such as cogeneration powered by renewable resources like biomass and landfill gas, and renewable energy generation technologies in order to reduce greenhouse gas emissions and to improve city energy efficiency, utility reliability, and service diversity. Evaluate the feasibility of solar photovoltaic (PV) systems, wind power, solar thermal water heating for pools and domestic use, biomass and biogas generation, fuel cells, wind energy, and geothermal heat pumping applications.

5.2 EVALUATE LOAD SHIFTING TECHNOLOGIES

Evaluate load shifting technologies, such as Thermal Energy Storage (TES), to reduce HVAC energy and power consumption during peak hours. Participate in utility-provided Demand Response (DR) programs. For more information about DR programs, see section 2.7.

5.3 MINIMIZE GREENHOUSE GAS INTENSITY OF PURCHASED ELECTRICITY

Where direct access to energy providers is permitted by law, the City should consider the source of the electricity and strive to minimize the greenhouse gas intensity of purchased electricity. The City should include provisions for the purchase of electricity from renewable energy sources as a component of their requests for bids whenever procuring electricity and evaluate any climate change mitigation programs offered by providers. The City should strive to exceed the State of California RPS in procuring energy. The City should set more aggressive renewable energy purchasing goals than the statewide RPS and set a long term goal to only use and purchase renewable energy.

5.4 EVALUATE PARTICIPATION IN COMMUNITY CHOICE AGGREGATION

Evaluate participation in Community Choice Aggregation (CCA) efforts if available. CCA permits public agencies to aggregate the electric loads of residents, businesses, and facilities to facilitate the purchase and sale of electrical energy. CCA Programs usually have higher RPS than the investor owned utilities. For example, CleanPowerSF, the San Francisco CCA Program, aims to be 51% renewable energy by 2017, which is almost double the statewide RPS of 33% renewable energy generation.

For the CCA Programs currently available, visit:
http://www.cpuc.ca.gov/PUC/energy/Retail+Electric+Markets+and+Finance/070430_ccaggregation.htm

Many other cities and counties are currently evaluating the feasibility of a CCA program.

5.5 IDENTIFY AND TAKE ADVANTAGE OF GRANT AND INCENTIVE PROGRAMS

Identify and take advantage of all grant and incentive programs available for self-generation or renewable energy through the local utilities. See Step 7: Identify Funding and Financing Options for more details.

6. OUTREACH & AWARENESS

PROGRAM GOALS

The effectiveness of a Local Government Strategic Energy Plan is highly dependent on the actions of individual City staff and employees. While energy efficient equipment and the installation of solar panels will make a city more energy responsible, cultural and behavioral changes can have a large impact on the effectiveness of these projects as well as the likelihood of the continued prioritization of sustainability within City operations and buildings and within the community itself. Additionally, it is important to maintain transparency and keep employees and the community informed of the City's progress with energy planning and action. Ideally, the Local Government Strategic Energy Plan will act as a springboard

toward more robust activities within the larger community. This section has been included to address broader sustainability issues beyond energy usage at City facilities.

Several programs and project to accomplish the above are recommended below.

IMPLEMENTATION PROGRAMS AND PROJECTS

6.1 CREATE A WEBSITE DEDICATED TO CITY SUSTAINABILITY

Create a page on the City website dedicated to sharing information about sustainable energy practices. The website should host the latest version of the City's completed SEP and provide a summary of the vision, goals, and current, past, and planned projects. The website can be a great platform to celebrate successes by detailing the energy savings realized by implemented energy projects and can serve as a publicity tool for sustainability events. In addition, the website can serve as a valuable resource for the community, providing information on available incentive programs offered through the local utility and hosting links to energy and sustainability related educational webpages. The Energy Manager/Sustainability Coordinator or a member of the Leadership Team should manage the webpage and ensure that it is kept up to date with the latest City developments and project results.

Below are two local examples of existing city sustainability websites:

City of Berkeley - Office of Energy and Sustainable Development:
http://www.ci.berkeley.ca.us/SubUnitHome.aspx?id=15404

City of Oakland - "Sustainable Oakland":
http://www2.oaklandnet.com/Government/o/PWA/o/FE/s/SO/index.htm

6.2 HOLD WORKSHOPS AND PRESENTATIONS

Hold open workshops or presentations to allow City employees to stay informed about sustainability activities, ask questions, and participate in decisions. Workshops and presentations should be well publicized and open to all, and they should be led by individuals who can knowledgably field questions from the audience and efficiently facilitate the workshop process.

6.3 SUSTAINABILITY EVENTS

6.3.1 Coordinate Sustainability Events

Hold fairs or celebrations for local, national, or global sustainability events to spread awareness of worldwide sustainability. These events are also a good avenue for publicity for achievements. Notable national or global events surrounding sustainability include Earth Day on April 22, 350.org in the fall, and Earth Hour in the spring.

Learn more and find resources for publicizing the events at the following websites:
Earth Day: http://www.earthday.org/
350.org: http://www.350.org/
Earth Hour: http://www.earthhour.org/

6.3.2 Hold Sustainability Challenges and Competitions

Challenge City employees to think actively and creatively about solutions for making the City buildings and operations more sustainable. Use constructive competition to encourage water conservation, energy conservation, reduction in single passenger vehicles driven, or any other sustainability goal. Offering small cash prizes to assist in implementing small sustainability changes can spread awareness and get people thinking about possible changes. If appropriate, the challenge or competition can be extended to the local community to encourage sustainable habits beyond city operations.

6.4 CITY ORGANIZATION OUTREACH AND AWARENESS

6.4.1 Post Behavioral Reminders

Remind City employees to conserve energy, water, reduce and sort waste, turn off car engines to prevent idling, and encourage other sustainable habits by posting reminders where appropriate. Posting reminders with statistics of wasted energy, water, and gasoline and their associated costs can help encourage behavioral changes.

6.4.1 New Employee Onboarding

When hiring a new employee, introduce them to the City's strategic energy plan and other sustainability plans and goals so that they are aware of the City's culture of conservation and environmental commitment. Encourage employees to participate on the Leadership Team or get involved in other areas of sustainability within the City.

6.4.2 City Employee E-Newspaper or Newsletter

Integrate updates on the Strategic Energy Plan and energy projects within regular City e-newsletters or updates. The City Energy/ Sustainability Coordinator or a member of the Leadership Team should coordinate with the employee responsible for creating the newsletter to ensure City employees stay informed on successes, new developments, and progress to defined goals.

6.5 COMMUNITY-WIDE OUTREACH AND AWARENESS

Should the City want to expand their SEP to be inclusive of the entire community the following engagement strategies can be employed. See Appendix C for additional references and resources.

6.5.1 Engage Local Businesses

To begin engaging businesses within the community, the City should first do an assessment to determine the top employers. This will help the City prioritize its outreach approach and target those businesses with the most potential for implementing energy and other sustainability projects with large impacts. Once the top businesses are identified, members of the Leadership Team and/or the hired Energy/Sustainability Coordinator should reach out to these businesses,

inform them of the Strategic Energy Plan, and invite them to engage in the plan creation and implementation process. City can provide resources and information on how businesses can become more sustainable. Some helpful links are provided below:

Bay Area Green Business Program: http://www.greenbiz.ca.gov/

Local Governments for Sustainability (ICLEI) "Green Business Challenge": http://icleiusa.org/programs/city-business/green-biz/

6.5.2 REV "Sustainability Circle" Program

REV is an organization based in San Francisco that specializes in accelerating sustainability within businesses. Several local governments have used REV's Sustainability Circle program to engage local businesses in the strategic energy and sustainability planning process. A REV Sustainability Circle is a 6-month comprehensive peer-learning program that both improves the way business is conducted through embedding sustainably practices across the organization. The outcome is a customized Sustainability Action Plan for local businesses. The City should consider encouraging local businesses to participate as a component of the community-wide SEP.

Two examples of cities utilizing the REV Sustainability Circle program are below:

City of Pleasanton: http://revsustainability.com/wp-content/uploads/2014/02/REV-SuccessStory_PLEASANTON.pdf

City of Chula Vista: http://revsustainability.com/wp-content/uploads/2014/02/REV-SuccessStory_CHULA-VISTA.pdf

REV webpage: http://revsustainability.com/

6.5.3 Engage Residential Sector

Effective engagement of the residential sector will be crucial to the success of a community-wide energy plan. The Community should be informed of the SEP and interested residents should be encouraged to participate throughout plan creation and implementation. The City should consider developing and implementing a Community Outreach Plan consisting of a variety of engagement strategies and opportunities for community involvement. Resources available for multi-and single family residences can be hosted on the City webpage and advertised at appropriate City events (see Appendix C: References and Resources).

6.5.4 Educational Institutions

Universities, colleges, K-12 schools and other educational institutions are large energy users and hold a lot of potential for energy efficiency improvements and renewable energy installations. A variety of incentive programs, grants, and financing programs exist for educational institutions that greatly aid in the feasibility of these projects. The City should reach out to each of its schools, colleges, and/or universities, inform them of the SEP and the City energy vision and goals, and invite them to participate in the creation of a more expansive community-wide energy plan. The

City can also encourage schools and colleges to complete an energy or sustainability plan of their own, which will result in specific, actionable energy reduction programs and projects that will help meet the larger goals of the City's community-wide SEP.

The California Community Colleges Sustainability Template has been effectively used and implemented at many community colleges throughout the State and is a valuable resource for all educational institutions who wish to become more sustainable. A link the Template and its resource documents is provided below:

California Community College Sustainability Template-
http://extranet.cccco.edu/Divisions/FinanceFacilities/Sustainability/CCCSustainabilityPlanTemplateFiles.aspx

STEP 7 – IDENTIFY FUNDING AND FINANCING OPTIONS

In an environment of budget cuts and limited funding, the City will need to carefully evaluate the economics of sustainability in the decision making process. This will mean balancing the different costs and benefits of each project, including those that are difficult to quantify. Often, energy projects that have an initial capital cost will result in annual operating cost savings that translate to reduced General Fund expenditures.

This section will describe approaches for analyzing the economic benefits of sustainability projects and helps identify funding sources.

PROJECT ECONOMICS

There are several economic factors to consider when evaluating which programs or projects to pursue. Several of these factors are listed below.

Consider the costs to develop and implement the Strategic Energy Plan. The City will incur costs to both initially develop the Strategic Energy Plan and to implement its programs and projects. If the planning process is undertaken by means of an Energy Leadership Committee consisting of internal resources, the development costs could be minimal or already accounted for. If a consultant is used for plan development these costs would need to be budgeted. However, the expertise and efficiencies provided by a consultant could result in a more effective plan and additional cost savings that may offset consultant charges.

What is the City investment criteria for sustainability projects? Investment criteria should be developed to help evaluate proposed projects. This could be a simple payback criterion, Return on Investment (ROI), or a life-cycle analysis utilizing a Net Present Value (NPV) calculation. Most cities should have investment criteria and policies in place, and these may need reevaluation to account for the unique benefits of energy measures.

How much is the project capital or up-front cost, how much total capital is available, and when is it available? The availability and access of funding will be a large factor in the City's ability to implement energy projects. It may be possible to enhance the amount of capital available by using a combination of internal and external funding resources (see "Resources for Funding Projects," below.)

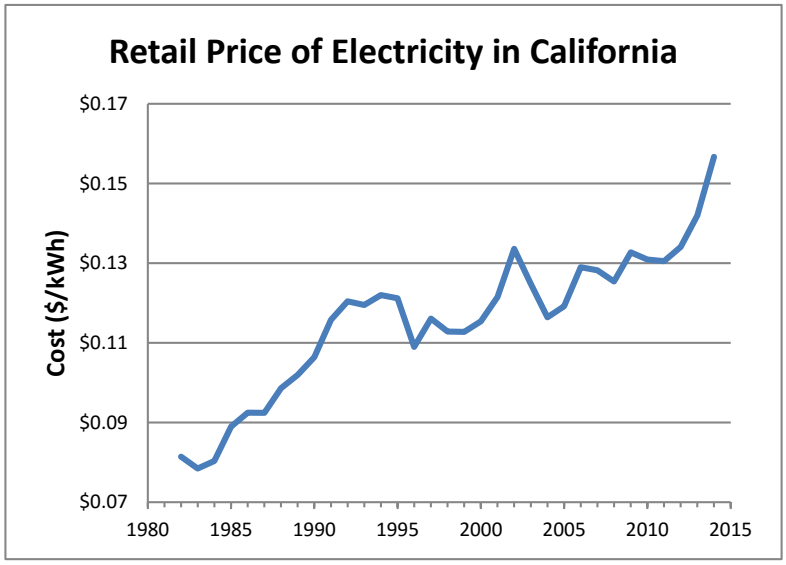
How much savings will the project generate compared to its cost? For energy projects, this can be calculated in annual energy cost savings and evaluated by performing a simple cost-benefits analysis to compare first cost to annual savings over a project's lifetime.

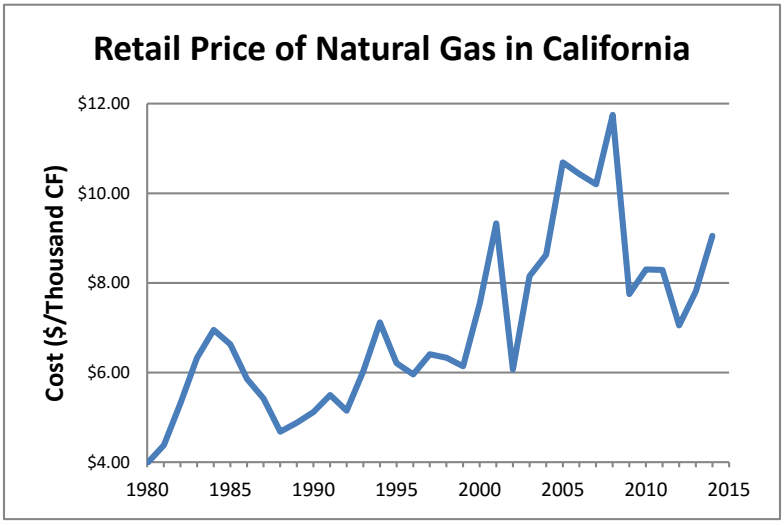
Are there economies of scale with certain project types? Easily scalable projects, such as lighting upgrades, may be more cost-effective than more complex or stand-alone projects that are difficult to scale. The City should also consider the ability to replicate or spread the projects to the larger community.

Can energy project capital expenditures translate to annual operating budget savings? Energy projects that result in annual cost savings can reduce operating budget expenditures and add to the General Fund to finance ongoing costs for other projects or city services. This could be especially attractive if the City has a capital improvement budget and is trying to evaluate the "best bang for its buck."

What are the project's lifecycle costs and benefits? In order to get an accurate picture of the impacts of an energy project, the City should quantify the lifecycle costs and benefits of a project. While performing a lifecycle cost analysis of a project requires more time and effort than a simple payback calculation, calculating lifecycle costs can have the added benefit of capturing maintenance costs and savings, reductions in operational and resource costs, increases in staff productivity, and impacts on the safety, health, and comfort. It can also take into account avoided costs of future capital improvements that may have been otherwise required and potential fluctuations in the price of energy and other necessary resources. Lifecycle analysis should include an NPV analysis to evaluate the ability of the project to meet City financial criteria.

Consider "the cost of doing nothing". Many energy projects will save money for the City over the project's life cycle and can serve as a hedge against increasing utility or other costs. The adjacent graphs indicate the increases in electricity and natural gas prices since 1980, and clearly illustrate "the cost of doing nothing". Most importantly, they reinforce the fact that dollars spent on energy are dollars taken away from the larger community.





When energy or resource efficiency measures result in a reduction in capital cost expenditures it is often referred to as ***tunneling through the cost barrier***[1]. For example, reductions in cooling loads through energy efficiency projects can reduce costs if HVAC equipment is able to be downsized. Such avoided capital costs and opportunities to "tunnel through the cost barrier" should not be overlooked and should be considered in the decision making process.

[1] "Natural Capitalism", by Paul Hawken, Amory B. Lovins, L. Hunter Lovins

ESTIMATING COSTS

All energy projects will incur some cost, either in time, money, or both. Apart from the cost of any equipment purchased, successful execution of energy projects will require a certain amount of staff time to oversee the implementation and the ongoing operation and maintenance (O&M) costs. Some projects will be more time intensive and require more attention of staff than others require. The City should consider its capacity to successfully undertake and continually manage energy projects before pursuing them.

The City can begin its cost estimating process by using industry aggregate data, such as RSMeans, a construction estimation database. While final costs will depend on the specific needs of the project, industry averages can provide a reasonable ballpark estimate for city decision making.

In certain cases, it may be necessary to hire specialists or consultants to assist in parts of or all of an energy project. Cities are recommended to hire specialists for projects that fall outside of the existing expertise of the staff in order to ensure systems are designed to fit City needs and are up to industry standards. In addition, the efficiencies and expertise provided by consultants could result in additional savings that may offset consultant charges.

Cost estimates should be confirmed by issuing Requests for Proposals (RFPs) and receiving vendor or contractor quotes for equipment and services.

THE COST OF "GOING GREEN"

There is a perception that green building practices are too cost prohibitive to pursue. There have been several studies and demonstration projects that have shown these concerns to be unfounded. The seminal work on this subject is *The Costs and Financial Benefits of Green Buildings,* written for the California Green Building Task Force in 2003, found that minimal upfront investments of about two percent of construction costs typically yields life cycle savings of over ten times the initial investment. Since then, green technology costs have steadily decreased and green building practices have become more widespread, making the financial analyses of green projects increasingly attractive.

The Costs and Financial Benefits of Green Buildings report can be found on the US Green Building Council website at http://www.usgbc.org/Docs/News/News477.pdf

LIFE CYCLE COST ANALYSIS TOOLS

Two good resources for estimating and evaluating the costs and benefits of energy activities are included below.

California's Green Building Initiative Life Cycle Cost Assessment spreadsheet tool, available online at:
http://www.green.ca.gov/GreenBuildings/LCCA.aspx

The Building Life-Cycle Cost (BLCC) Program is an economic analysis tool developed by the National Institute of Standards and Technology for the U.S. Department of Energy Federal Energy Management Program (FEMP), which can be downloaded for free at:
http://www.eere.energy.gov/femp/information/download_blcc.html

RESOURCES FOR FUNDING PROJECTS

The following are a list of tools and resources that cities should consider during the evaluation of energy projects. The list is broken into two general categories: funds that can be raised by a city and funds that come from external grants and incentives. Successful financing of a large energy project may require a combination of these different funding mechanisms.

FUNDING THROUGH CITY ACTION

Energy Performance Contracts (EPCs): Energy Performance Contracts (EPCs) are structured so that energy efficiency projects can be installed with little or no up-front costs to the customer. A portion of the revenue from energy savings go directly to an Energy Service Company (ESCO), who finances and constructs the project. ESCOs will finance the costs for the projects as part of the EPC. The structure and details of EPCs vary from project to project but the keys steps involved generally universal. For an overview of these steps, best practices, and case studies, visit the link below.

"Energy Performance Contracts for Local Governments: Industry Standards and Best Practices":
http://newbuildings.org/sites/default/files/EnergyEfficiencyFinancing_ModelsStrategies201110 pdf

Power Purchase Agreements (PPA): A Power Purchase Agreement (PPA) is a contract where an end-use customer to purchases clean energy from a power producer for on-site projects. In the case of solar photovoltaic electricity, customers can opt to purchase solar energy from a system installed on-site through a PPA at a negotiated rate instead of purchasing, installing, and maintaining the operations of solar photovoltaic panels themselves. The length of the PPA contract varies (as does the negotiated electricity rate), but typically ranges from 10 to 20 years. For more information on solar power purchase agreements, visit the Environmental Protection Agency (EPA) link below, which outlines PPA benefits and challenges and provides local-government case studies.
http://www3.epa.gov/greenpower/buygp/solarpower.htm

Additional resources include:

Renewable Energy Laboratory (NREL): Provides a detailed guide to power purchase agreements for state and local governments including financial and contractual considerations.

https://financere.nrel.gov/finance/content/power-purchase-agreement-checklist-state-and-local-governments

Department of Energy (DOE): Provides a general overview of PPAs and lists additional resources, including case studies.
http://energy.gov/eere/slsc/power-purchase-agreements

Renewable Energy Certificates (RECs): Renewable Energy Certificates (RECs), also known as Renewable Energy Credits, Green Tags, or Tradable Renewable Certificates (TRCs), represent the environmental benefits of one megawatt-hour (mWh) of electricity generated from renewable sources. A REC is a tradable commodity and can be sold as a source of revenue to the City. RECs can also be retained so that the owner has claim to the renewable attributes of the electricity. For more information about RECs, how they work, purchased and tracked, visit the Environmental Protection Agency links on the following page.

"Renewable Energy Certificates": http://www3.epa.gov/greenpower/gpmarket/rec.htm
"REC Tracking": http://www3.epa.gov/greenpower/gpmarket/tracking.htm

Carbon Offset Credits: Projects that offset or reduce greenhouse gas emissions can be certified by the Climate Action Reserve and traded as a Climate Reserve Tonne (CRT) credit, which is the equivalent of one metric ton of carbon dioxide equivalent emissions reduced or approximately 2,350 vehicle-miles traveled (VMT) for the average passenger vehicle. In addition to the cap-and-trade market, there are other marketplaces where CRTs can be purchased and sold, though similar to RECs, cities that sell CRTs lose the GHG "offset" attributes and cannot count the reductions towards their goals.

"Green" Revolving Fund (GRF): A "green" revolving fund is an internal fund that would provide financing to energy and sustainability projects that generate cost savings. These savings are tracked and used to replenish the fund for future rounds of "green" investments, thus establishing a sustainable funding cycle. Capital for GRF's may be obtained from a variety of funding sources and the accounting system used to track the funds may also vary. A detailed, and useful guide on the creation and maintenance of a successful GRF can be found by following the link below. Although tailored for the higher educational space, its resources are relevant for a variety of institutions and agencies, including local governments.

"Green Revolving Funds: An Introductory Guide to Implementation & Management":
http://greenbillion.org/wp-content/uploads/2013/01/GRF_Implementation_Guide.pdf

EXTERNAL GRANTS AND INCENTIVES

Energy Utility Programs and Incentives: Local energy utilities offer a variety of programs and financial assistance to their customers for energy efficiency, renewable energy, and Climate Action Planning.

- **East Bay Energy Watch (EBEW),** the local government partnership between PG&E and cities in Alameda and Contra Costa Counties. EBEW, through PG&E, provides cities with a variety of programs and incentives that assist in the financing of energy projects. For example, the **PG&E On-Bill Financing (OBF) program** allows cities to finance energy efficiency projects with no-interest loans that are repaid through the City's utility bill. Additional benefits made available through PG&E and EBEW include access to free, comprehensive energy audits, incentive dollars for LED street lighting upgrades and new construction technical assistance (Savings By Design Program), and a variety of other programs. Cities should work closely with EBEW and PG&E to ensure that all incentives and resources are leveraged to their full potential.

Government Grants: The availability of government grants is constantly changing. The City will stay up-to-date on federal and state grants by referring to the following websites, which consolidate the available grants from all government departments:

Federal Grants: http://grants.gov/
California State Grants: http://www.ca.gov/Grants.html

State Energy Efficiency Loans: Cities can also apply for other state and federal loans, such as the loans available through the California Energy Commission. At the time of the LG-SEP's publication, the California Energy Commission was accepting applications for their 1% interest loan for projects with proven energy and/or demand cost savings. The repayment schedule is up to 20 years and will be based on the annual

projected energy cost savings from the aggregated projects. More information can be found on their website at: http://www.energy.ca.gov/efficiency/financing/index.html

STEP 8 – CREATE AN ACTION PLAN

The next step in the SEP implementation will be to ***Create an Action Plan*** for each of the programs and projects that were selected by the Leadership Team in Step 6.

IMPLEMENTATION PROGRAMS AND PLANS CHECKLIST

The ***Action Plan Checklist*** included in Appendix D is an MS Excel macro-enabled spreadsheet formatted to produce a ***planning and tracking document*** that will be the heart of the Action Plan and help manage implementation. The Checklist will facilitate the creation of the Action Plan, and includes space for the City to identify the specific responsibilities, timelines, criteria for success, and estimated costs for each project and program selected.

Action Plan Checklist

- *Macro-enabled MS Excel Spreadsheet used with the Guidebook to help select and manage different energy projects*
- *Project management tool used to select and track energy projects*
- *Matches the projects described in the LG-SEP Guidebook*

From Section 2: How to Use This Guidebook

Upon opening the live spreadsheet and enabling the "Macros" option, built-in features allow users to navigate from a Summary Tab to the detailed Planning Checklist sheets that correspond to the numbering of the programs and projects in Step 6 of this Guidebook. For example, under Section 1, Management and Organizational Structure, projects listed on the detail sheet include: Adopt a City Energy Policy/ Vision Statement, Appoint an Energy Manager, Appoint a City Energy Leadership Team, etc. ***The user selects a listed program or project by checking the box*** adjacent to the section number, and the selected elements are then listed in the Output tab. Additional space is provided for custom programs not contained in the checklist. The user simply needs to type in the project name in one of the blank lines and check the box, and the new project will be included in both the Summary and Output tabs.

A navigation arrow below the tasks allows users to easily return to the Summary tab. Once a user repeats the process of selecting tasks to implement, the user navigates to the Output tab, and with macros enabled, runs the Summary Report by selecting the button at top right. Each of the tasks the City has selected to implement will appear on the Output tab, along with additional action planning fields for the user to input task details as follows:

Field	Action Required
Action Items/Notes	Enter a brief description of the task(s) to be performed to implement the selected policy or other clarifying notes
Priority	Select High, Medium, or Low priority from the dropdown list
Status	Select Planned, In-Process, Ongoing, or Complete from the dropdown list
Cost ($)	Enter an estimate of the in-house or contracted costs for labor and materials
Associated GOAL(s)	List the associated Goal number that the project is intended to satisfy as defined in Step 5.
Target Completion Date	Enter the date that the policy's implementation is expected to be complete

Field	Action Required
Assigned To	Enter the name of the individual (or position) responsible for implementing the selected policy. This person may assign others to the role. However, the primary responsibility for the policy rests with this person

The Action Plan Checklist will help quantify the robustness of the Strategic Energy Plan, and should be updated regularly to track progress. The Tool will track programs and projects selected, as well as those completed, and compare them against all available projects on the "Summary" tab. This will also assist in the evaluation of project progress for reporting purposes.

STEP 9 – ESTABLISH PERFORMANCE MEASUREMENT PLAN

As with any successful program, the ongoing progress and performance of energy plan activities should be ***monitored and compared to goals and criteria***. This will require continuous participation of the Leadership Team, municipal staff, and other participants in the process. To communicate results and ensure transparency and accountability, the ***results of the LG-SEP activities should be communicated to City staff and to the larger community on a regular basis***. The following describes the process for measuring and reporting progress of plan activities.

MEASURING PERFORMANCE

Measure and Report Performance

- *Energy program progress measured against baselines and compared to goals and criteria*
- *Establish and track appropriate performance metrics*
- *Consider Energy Ranking Systems*
- *Communicate results to municipality community to ensure transparency and accountability*

In order to measure the City's progress toward its energy goals, it is important to regularly collect information on key metrics. This can be done annually for information that is easily collected, such as electricity usage, or bi-annually or less often for information that is more time consuming to collect, such as a greenhouse gas inventory.

Similar to tracking energy use reductions through a regular inventory, ***progress can only be measured if there is a baseline for comparison***. An evaluation of the local government's current operations in areas addressed by the energy plan should be made before implementing energy projects in order to create a baseline for comparison.

PERFORMANCE METRICS

The data collected and performance metrics calculated should reflect the goals and priorities of the municipality and show progress towards the goal in a meaningful way. Metrics should be performance-based and reflect the outcomes of energy projects, such as energy and GHG emission reduction, rather than projects implemented. However, projects like "audits performed," and/or "upgraded to energy efficient lighting, food service and mechanical equipment" should be included as a part of the annual or biannual report to show what actions the local government has taken to meet the goals. Performance metrics should include, at a minimum, monthly electric and gas usage reduction. Depending on the municipality's energy goals, they may also include reporting and tracking of economic and environmental metrics, such as:

- ***Energy reduction:*** Monthly electric and gas usage reduction for all of the municipal facilities and operations and individually metered buildings, if installed.
- ***Operating & Maintenance (O&M) Cost Reduction***
- ***Greenhouse Gas Emission Reduction***
- ***Jobs Created***
- ***Renewable Energy Generation Capacity Added***
- ***Audits performed and energy efficiency installations***

Performance metrics should be tied to the criteria established in Goals of the plan. Since activity can change from year to year, the City may find it useful to normalize metrics to give a more accurate picture of the energy used. Those collecting the information and analyzing the local government's progress may choose to normalize their measurements by considering the following factors that may affect performance:

- Building gross square footage
- Number of employees
- Number of work days
- Annual cooling degree days or heating degree days

The metrics established by the City should be captured in the matrix included in Section 6.1 "Measuring Performance" of the L***G-SEP Document Template.*** The matrix, with examples, is provided below.

Goal No.	Topic	Established Goal	Performance Metric and Frequency of Measurement	Responsibility
1	**Fiscal Criteria**	Develop economic and fiscal criteria to be used to evaluate future energy projects and programs.	Fiscal criteria will be adopted and published by June 30, 2016.	Director of Finance
1	**Energy Efficiency**	Reduce annual energy usage for existing facilities from a 2015 baseline by 15% by the end of 2020 by targeting opportunities from Energy Benchmarking Study and follow-on Energy Efficiency Audits.	Energy usage to be reviewed annually by updating the Energy Benchmarking Study.	Public Works Director
2	**Energy Generation & Procurement**	Explore local opportunities for clean energy generation and procurement, including on-site renewable generation and participating in Community Choice Aggregation (CCA).	Prepare a Feasibility Study by the end of 2016 with recommendations for implementing energy generations strategies.	Public Works Director
3	**Community Outreach and Education**	Engage city staff and the larger community in Energy Plan implementation by developing and implementing education and awareness programs to reduce energy use and promote energy efficiency and renewable energy options.	Beginning in Q4 2016, the City will work to offer outreach and educational programs. Updates to the City sustainability webpage with current resources and information to occur on a quarterly basis.	City Manager

Ultimately, the purpose of measuring progress is to compare the City's progress to the interim and long term goals established. Local governments should analyze how they are doing on their path to energy efficiency and evaluate their performance against their goals, and make adjustments as needed.

ENERGY RATING AND RANKING SYSTEMS

In addition to comparing the municipality's progress with its own goals and expectations, the nationally recognized U.S. Local Government (LGO) Operations Protocol for Accounting and Reporting of Greenhouse Gas Emissions (Community Protocol) can help local governments measure and report the emissions associated with their communities and compare how they are performing with others. The Local LGO Protocol was developed by the California Climate Action Registry, the California Air Resources Board, ICLEI Local Governments for Sustainability, and The Climate Registry through a collaborative consensus-based process. The detailed technical document, that includes cutting-edge methodologies, tools, and best practices, can be found by following this link: http://icleiusa.org/publications/us-community-protocol/

REPORTING

The purpose of measuring and reporting performance and progress is to maintain transparency in energy activities and to assess progress towards goals. The target audience of the reports should be the local government staff and larger community. Progress reporting should be provided in written report format, as well as in workshops and presentations to the local government. It is recommended that an Annual Energy Report be prepared with the following information.

RECAP OF THE ENERGY GOALS

Include a brief summary of the goals and objectives of the plan and why the municipality is pursuing a strategic energy plan. Reference the original Local Government Strategic Energy Plan Document or Action Plan for more information on why the municipality is pursuing energy reduction and more details about long term plans.

HOW IS THE LOCAL GOVERNMENT PERFORMING COMPARED TO THEIR GOALS?

It is important to show the City's actual progress compared to planned progress in a clear and transparent manner. Graphs are a good visual tool for showing the current and past energy use, water use, GHG emissions, and other metrics to compare current progress towards the City's energy and sustainability goals.

If there are anomalies in the results or the results are different from what was expected, such as an increase in energy used, it is worthwhile to take some time to investigate and explain the reason behind the anomaly. Did energy use from another source increase? Were there factors that may have led to this increase in energy use, such as a change in occupancy or use or the addition of new energy-using equipment?

WHAT WAS ACCOMPLISHED?

This should include information about the energy projects that were started, in progress, or completed since the last reporting period. This should also include organizational changes, such as the hiring of an Energy Coordinator or the development of a Leadership Team to spearhead energy planning and implementation.

This section should also include details of funding allotted to these projects and the resulting cost savings experienced from both operational and maintenance sources and any large capital projects that were avoided as a result of energy projects.

The City should describe successes, failures and lessons learned and should be forthcoming with any obstacles to success and describe how the Leadership Team plans on overcoming similar obstacles in the future.

The Action Plan Checklist included in Appendix E is a useful tool for this purpose.

NEXT STEPS AND PLANNED ACTIVITIES

The report should include information on the local government's next steps and upcoming projects. If plans changed from the last report, local governments should note the change and describe why the change was made. If possible, the next steps should also describe the anticipated impact on progress and where the City anticipates progress towards goals after the next reporting period.

ACKNOWLEDGEMENTS AND KEY CONTACT INFORMATION

Contributors to energy efforts on local government should be acknowledged for their work and successes. The report should also include key contact information in case readers have questions about the report and energy plan and should include links to any online website or other media used for communicating the energy plan.

MEDIA AND COMMUNICATION

The Leadership Team is encouraged to actively keep City staff and the larger community engaged and informed about the SEP progress and activities, and not simply rely on formal progress reports.

See the list of Program and Projects in Step 6 for outreach communication strategies.

LOCAL PUBLICATIONS

Municipalities are encouraged to utilize local newspapers or community media to reach a wider audience when major milestones are reached or notable achievements are accomplished. Publishing information in the local newspaper is an effective way to reach a large portion of the community.

Local publications can also be used to publicize upcoming events, provide tips on sustainable habits, and even publish op-ed columns when appropriate.

LOCAL GOVERNMENT WORKSHOPS

The Leadership Team should periodically hold workshops open to all municipal staff and community throughout the planning and implementation phases of the project. This should be a two-way dialogue where information is provided to the community and feedback is solicited and incorporated into the activities.

ENLIST HELP FROM LOCAL GROUPS

Many cities have energy or environmental organizations that should be engaged by the Leadership Team to help spread the word about Energy Plan activities. These groups can be a source of active and enthusiastic “people power” and can often have an effective communication infrastructure in place.

STEP 10 – DEVELOP, ADOPT AND PUBLICIZE THE SEP

The final step in the SEP process is to publish the Strategic Energy Plan document.

STRATEGIC ENERGY PLAN DOCUMENT TEMPLATE

The fully customizable Strategic Energy Plan Document Template provided in Appendix E (and available in Microsoft Word file) includes template language, formatting, instructions, and fill-in-the-blank areas intended to significantly reduce the time spent crafting the City's plan. It is organized and formatted with the recommended content and description of deliverables that should be included in the final plan. The Leadership Team may wish to begin drafting the SEP at the beginning of the plan creation process and capture outcomes as they are completed, or the plan can be compiled all at once after the completion of Step 9.

LG-SEP Document Template

- *MS Word file containing Plan elements, organization, formatting, and instructions to assist in creating the customized LG-SEP*
- *Contains template language and fill-in-the-blanks*
- *Reduces time spent writing and reporting*
- *Fully customizable*

From Section 2: How to Use This Guidebook

When the final Strategic Energy Plan has been completed, cities may wish to have the City Council formally adopt the plan and authorize its implementation by City Staff. This adoption adds gravity to the legitimacy of the plan and can provide the support necessary, both with staff assignments and funding, for program implementation. This would ideally be accomplished during a regular City Council meeting which highlights the importance of the effort and provide publicity of the SEP to the larger community.

If not adopted formally by the City Council, it should be authorized by the City Manager with the appropriate approvals necessary to permit implementation and communicated to the entire organization.

Section 9 of the SEP Template describes many ways that the SEP can be publicized, both within the City organization and the community. Establishing a city website dedicated to energy efficiency and sustainability and positing the SEP on the site is a good first step. Presenting the SEP at internal city staff meetings can help communicate new priorities and project opportunities within the organization. Issuing a press release to local media and newspapers announcing the creation and adoption of the SEP will provide a good communication avenue to the larger community. Participation in regional meetings with other cities, such as Association of Bay Area Governments (ABAG), East Bay Energy Watch, Stopwaste.org, or statewide groups such as the Local Government Commission, the League of California Cities, or the Institute for Local Government can help communicate the SEP and provide an opportunity for sharing of best practices from other cities.

SECTION 5.
APPENDICES

APPENDIX A: GLOSSARY OF TERMS

APPENDIX B: LIST OF CONTACTS

APPENDIX C: REFERENCES AND RESOURCES

APPENDIX D: ACTION PLAN CHECKLIST

APPENDIX E: LG-SEP DOCUMENT TEMPLATE

APPENDIX F: STRATEGIC ENERGY PLAN - CITY OF OAKLEY

APPENDIX G: STRATEGIC ENERGY PLAN - CITY OF EMERYVILLE

APPENDIX A:
GLOSSARY OF TERMS

Air-side Economizer: A device that, on proper variable sensing, initiates control signals or actions to conserve energy in an HVAC system.

ASHRAE Level II Audit: Audit includes an analysis of energy use at a facility and identifies no-cost, low-cost and capital improvement energy-efficiency measures with detailed energy and financial calculations.

Biomass: Organic non-fossil material of biological origin constituting a renewable energy source.

Clean Energy: Energy produced from renewable sources in a process that has minimal impact to the environment

CleanPowerSF: The City and County of San Francisco's Community Choice Aggregation (CCA) program, administered by the San Francisco Public Utilities Commission (SFPUC) and monitored by the San Francisco Local Agency Formation Commission (LAFCo).

Community Choice Aggregation (CCA): CCA permits public agencies to aggregate the electric loads of residents, businesses, and facilities the purchase and sale of electrical energy on their behalf.

Energy Benchmarking: Process of collecting, analyzing and relating energy performance data of a building with the purpose of evaluating and comparing its performance to itself, other buildings within a portfolio, and/or its peers.

Energy Management System (EMS): A computer-aided tool used to monitor, measure, and control electrical building loads. Energy management systems can be used to central control devices like HVAC units and lighting systems across multiple locations. They can also provide metering, sub-metering, and monitory functions that allow facility and building managers to gather data and insight that allows them to make more informed decisions about energy activities across their sites.

ENERGY STAR ®: A U.S. Environmental Protection Agency (EPA) voluntary program that helps people and organizations save money and reduce greenhouse gas emissions by identifying factories, office equipment, home appliances and electronics that have superior energy efficiency.

Energy Use Intensity (EUI): Metric that expresses a building's energy use as a function of its size or other characteristics, generally energy use per square feet of space.

Fuel Cell: A device capable of generating an electrical current by converting the chemical energy of a fuel (e.g., hydrogen) directly into electrical energy. Fuel cells differ from conventional electrical cells in that the active materials such as fuel and oxygen are not contained within the cell but are supplied from outside. It does not contain an intermediate heat cycle, as do most other electrical generation techniques.

Geothermal Energy: Hot water or steam extracted from geothermal reservoirs in the earth's crust that can be used for geothermal heat pumps, water heating, or electricity generation.

Green Building: An environmentally sustainable building, designed, constructed and operated to minimize the total environmental impacts.

Greenhouse Gas Emissions: A gas that contributes to the greenhouse effect by absorbing infrared radiation, e.g., carbon dioxide, chlorofluorocarbons, or methane.

Leadership in Energy and Environmental Design (LEED): A set of rating systems developed by the U.S. Green Building Council for the design, construction, operation, and maintenance of green buildings, homes and neighborhoods.

LED Lighting: Lighting by means of employing light emitting diodes, a more environmentally-friendly alternative to incandescent lighting.

Plug Load: Energy used by products that are powered by means of an ordinary AC plug. It typically includes office and general miscellaneous equipment and computers.

Renewable Energy: Energy from a natural source that is not depleted when used, such as wind or solar power.

Solar Feasibility Assessment: A study that assesses energy production, risks, costs, and size of equipment most appropriate for a building or specified location.

Variable Frequency Drives (VFDs): A type of controller that drives an electric motor by varying the frequency supplied.

Variable Speed Drives (VSDs): See VFD.

Acronyms

AB	Assembly Bill
ABAG	Association of Bay Area Governments
APCD	Air Pollution Control District
AQMD	Air Quality Management District
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BLCC	Building Life Cycle Cost
BMS	Building Management System (also known as Energy Management System)
CAP	Climate Action Plan
CARB	California Air Resources Board
CARROT	Climate Action Registry Reporting Online Tool
CCA	Community Choice Aggregation
C&D	Construction & Demolition
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	Methane (a greenhouse gas)
CO_2	Carbon Dioxide (a greenhouse gas)
CO_2e	Carbon Dioxide equivalent
COP	Certificate of Participation

CRT	Climate Reserve Tonne
CRV	California Redemption Value
EBEW	East Bay Energy Watch
EMS	Energy Management System (also known as Building Management System)
EPA	Environmental Protection Agency (Cal/EPA is the California state EPA, while the US EPA refers to the national agency)
EPC	Energy Performance Contract
ESCO	Energy Service Company
EUI	Energy Use Intensity
EV	Electric Vehicle
DR	Demand Response
FEMP	Federal Energy Management Program
GHG	Greenhouse Gas
GRF	Green Revolving Fund
HFCs	Hydrofluorocarbons (a greenhouse gas)
HVAC	Heating, Ventilation, and Air-Conditioning
ICLEI	International Council for Local Environmental Initiatives
ILG	Institute for Local Government
IOU	Investor Owned Utility
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
kWh	Kilowatt-hour
LCCA	Life Cycle Cost Analysis
LCFS	Low Carbon Fuel Standard
LEED	Leadership in Energy and Environmental Design
LGC	Local Government Commission
MBCx	Monitoring Based Commissioning
MPO	Metropolitan Planning Organization
MTA	Municipal Transit Agency
MWh	Megawatt-hour
N_2O	Nitrous Oxide (a greenhouse gas)
NPV	Net Present Value
O&M	Operations and Maintenance
OBF	On-Bill Financing
OPR	Office of Planning and Research
PFCs	Perfluorocarbons (a greenhouse gas)
PG&E	Pacific Gas & Electric
PPA	Power Purchase Agreement
PV	Photovoltaic (Solar Panel)
RCx	Retrocommissioning
REC	Renewable Energy Credit or Renewable Energy Certificate
REN	Regional Energy Network
RFP	Request for Proposal
ROI	Return on Investment
SB	Senate Bill
SBDP	Sustainable Building Design Process
SCS	Sustainable Community Strategy

SEP	Strategic Energy Plan
SEEC	Statewide Energy Efficiency Collaborative
SF_6	Sulfur Hexafluoride (a greenhouse gas)
SPB or SPP	Simple Payback Period
STARS	Sustainability Tracking Assessment and Reporting System
STEM	Science, Technology, Engineering, and Mathematics
T&D	Transmission and Distribution
TES	Thermal Energy Storage
TRC	Tradable Renewable Certificate
VMT	Vehicle Miles Traveled
WRI	World Resources Institute

APPENDIX B:
LIST OF CONTACTS

For general questions about the LG-SEP Template, the following individuals can be contacted:

Brendan Havenar-Daughton, LEED AP BD+C
Partnership Manager
East Bay Energy Watch
(510) 817 – 4683
BHDaughton@gmail.com

Matt Sullivan, P.E., LEED AP
Principal
Newcomb Anderson McCormick
(415) 896-0300
Matt_Sullivan@newcomb.cc

APPENDIX C:
REFERENCES AND RESOURCES

This section of the LG-SEP Template contains resources and references to assist cities with the development and implement their Strategic Energy Plans. This includes programmatic, informational, and funding or financing resources, many of which are designed specifically for municipalities

POLICY AND REGULATORY AGENCIES

California Energy Commission (CEC)

The California Energy Commission is the state's primary energy policy and planning agency. Established by the Legislature in 1974 and located in Sacramento, seven core responsibilities guide the Energy Commission as it sets California energy policy:

- Forecasting future energy needs;
- Promoting energy efficiency and conservation by setting the state's appliance and building energy efficiency standards;
- Supporting energy research that advances energy science and technology through research, development and demonstration projects;
- Developing renewable energy resources;
- Advancing alternative and renewable transportation fuels and technologies;
- Certifying thermal power plants 50 megawatts and larger;
- Planning for and directing state response to energy emergencies.

More information can be found on the Energy Commission website at http://www.energy.ca.gov/

California Public Utilities Commission (CPUC)

The CPUC regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. The CPUC serves the public interest by protecting consumers and ensuring the provision of safe, reliable utility service and infrastructure at reasonable rates, with a commitment to environmental enhancement and a healthy California economy. We regulate utility services, stimulate innovation, and promote competitive markets, where possible.

More information can be found on the CPUC website at http://www.cpuc.ca.gov/puc/

U.S. Department of Energy (US DOE)

The mission of the Energy Department is to ensure America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions. http://www.energy.gov/

ENERGY EFFICIENCY

American Council on an Energy Efficient Economy (ACEEE)

The American Council for an Energy-Efficient Economy (ACEEE), a nonprofit, 501(c)(3) organization, acts as a catalyst to advance energy efficiency policies, programs, technologies, investments, and behaviors. We believe that the United States can harness the full potential of energy efficiency to achieve greater economic prosperity, energy security, and environmental protection for all its people.
http://aceee.org/

The National Association of Energy Services Companies (NAESCO)

NAESCO serves as the national voice of the ESCO industry through its national and regional advocacy efforts that have such a direct impact on the strategic interests of our members. We are proud that our industry and our members are the vanguard of leading the economy back to life by providing the investment, the jobs, and the infrastructure improvements needed to rebuild America. We work together with our membership to promote the aggressive pursuit of energy efficiency at state, federal, and international facilities; to ensure the key role of ESCOs in delivering energy efficiency resources; and to build new market opportunities while growing existing markets.
http://www.naesco.org/

The California Energy Efficiency Industry Council (CEEIC)

The CEEIC supports appropriate energy efficiency and demand response policies, programs, and technologies to create sustainable jobs, foster long-term economic growth, develop stable and reasonably priced energy infrastructures, and promote environmental improvement.
http://efficiencycouncil.org/

Demand Response

Information on Demand Response and Links to IOU Demand Response Programs
California Public Utilities Commission
http://www.cpuc.ca.gov/PUC/energy/Demand+Response/

SUSTAINABLE BUILDING PRACTICES

US Green Building Council

LEED Rating Systems
http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222

StopWaste.Org

Alameda County Waste Management Authority
Resources for Energy Efficiency and Waste Reduction
http://stopwaste.org/

ON-SITE GENERATION AND RENEWABLE ENERGY

American Council on Renewable Energy (ACORE)

ACORE, a 501(c)(3) non-profit membership organization, is dedicated to building a secure and prosperous America with clean, renewable energy. ACORE provides a common educational platform for a wide range of interests in the renewable energy community, focusing on technology, finance, policy and market development. They convene thought leadership forums and create energy industry partnerships to communicate the economic, security and environmental benefits of renewable energy.
http://www.acore.org/

Solar Energy Industries Association (SEIA)

The Solar Energy Industries Association (SEIA®) is the driving force behind solar energy and is building a strong solar industry to power America through advocacy and education. As the national trade association in the U.S., they represent all organizations that promote, manufacture, install and support the development of solar energy.
http://www.seia.org/

Community Choice Aggregation

Resources and Information about Community Choice Aggregation
California Public Utilities Commission
http://www.cpuc.ca.gov/PUC/energy/Retail+Electric+Markets+and+Finance/070430_ccaggregation.htm

Green Purchasing

Green Purchasing

Resources for Green Purchasing
Alameda County Waste Management Authority
http://stopwaste.org/home/index.asp?page=372

Many Shades of Green

Regional Distribution and Trends in California's Green Economy
Next 10
http://next10.org/many-shades-green-regional-distribution-and-trends-california%E2%80%99s-green-economy

Community Outreach

350.org
Annual day of climate change awareness in the fall
http://www.350.org/

Earth Hour
Hour of energy conservation awareness in the spring
http://www.earthhour.org/

Earth Day
Annual day of environmental awareness on April 22
http://www.earthday.org/

CREATING A CLIMATE ACTION PLAN

California Air Resources Board (CARB)
CARB is the responsible California agency for the implementation of AB-32, the California Global Warming Solutions Act.
http://www.arb.ca.gov/homepage.htm

Climate Change
Information on Climate Change Science
US EPA
http://epa.gov/climatechange/

Greenhouse Gas Protocol
World Resources Institute
http://www.ghgprotocol.org/about-ghgp

Greenhouse Gas Protocol Calculation Tools
World Resources Institute
http://www.ghgprotocol.org/calculation-tools/all-tools

Guide to Climate Action Planning
Pathways to a Low-Carbon Campus
National Wildlife Federation
http://www.nwf.org/campusecology/pdfs/climateactionplanning.pdf

International Council for Local Environmental Initiatives (ICLEI)
Local Governments for Sustainability is an international association of local and metropolitan governments dedicated to sustainable development.
http://www.iclei.org/

International Standards Organization
ISO is an independent, non-governmental international organization with a membership of 162 national standards bodies. Through its members, it brings together experts to share knowledge and develop voluntary, consensus-based, market relevant International Standards that support innovation and provide solutions to global challenges.
http://www.iso.org/

IPCC Fourth Assessment Report of Climate Change
Intergovernmental Panel on Climate Change
http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml

The Climate Registry
A nonprofit collaboration between North American states, provinces, territories, and Native Sovereign Nations to record and track the greenhouse gas emissions of businesses, municipalities and other organizations.
http://www.theclimateregistry.org/

California Cap-and-Trade Program
California Air Resources Board
http://arb.ca.gov/cc/capandtrade/capandtrade.htm

FUNDING AND FINANCING RESOURCES

California State Grants
An Online Database of California State Grants Available
http://www.ca.gov/Grants.html

Climate Reserve Tonnes
Certified Carbon Reduction Credits
Climate Action Reserve
http://www.climateactionreserve.org/

Federal Grants
An Online Database of Federal Grants Available
http://grants.gov/

Energy Efficiency Financing
California State Loans for Energy Efficiency and Renewable Energy Projects
California Energy Commission
http://www.energy.ca.gov/efficiency/financing/index.html

Energy $mart
Financing for Energy Efficiency and Renewable Energy Projects
California Department of General Services
http://www.dgs.ca.gov/pd/Programs/StateFinancialMarketplace/Energy.aspx

Greening the Bottom Line
Green Revolving Funds
Sustainable Endowments Institute
http://www.greeningthebottomline.org/

Life Cycle Cost Assessment Model
California Green Building Initiative
http://www.green.ca.gov/LCCA/default.htm

Renewable Energy Certificates
California Public Utilities Commission
http://www.cpuc.ca.gov/PUC/energy/Renewables/FAQs/05REcertificates.htm

Sustainable Communities Program
Statewide Energy Efficiency Collaborative
http://californiaseec.org/

The Costs and Financial Benefits of Green Buildings
A Report to California's Sustainable Building Task Force
http://www.usgbc.org/Docs/News/News477.pdf

Examples of community plans, compiled by ACEEE
Excel spreadsheet of 30 climate action and sustainability plans from cities around the U.S.
http://aceee.org/sites/default/files/publications/otherpdfs/appendix-local-energy-plansummaries.xlsx

State Energy Efficiency Policy Database
An online database of energy efficiency policies throughout the country.
www.aceee.org/sector/state-policy

Database of State Incentives for Renewables and Efficiency
Online database of state incentives for renewables and energy efficiency.
www.dsireusa.org

ICLEI Outreach and Communications Guide
www.icleiusa.org/action-center/engaging-your-community/outreach-and-communications-guide

The Planning Tool Exchange
Online hub for tools, resources, and organizations in community planning.
www.planningtoolexchange.org/

DOE's Alternative Fuels Data Center
Online database with state-specific information about alternative fuels and advanced vehicles, including laws and incentives, fueling stations, fuel prices, and more.
www.afdc.energy.gov/states/

National League of Cities Sustainable Cities Institute
www.sustainablecitiesinstitute.org/view/page.home/home

National Association of Counties NACo Green Government Initiative
www.naco.org/programs/csd/Pages/GreenGovernmentInitiative.aspx

Urban Sustainability Directors Network
www.usdn.org/home.html?returnUrl=%2findex.html

Partnership for Sustainable Communities
www.sustainablecommunities.gov/aboutUs.html

DOE Building Energy Codes Program
www.energycodes.gov/

DOE Better Buildings Neighborhood Program
www1.eere.energy.gov/buildings/betterbuildings/neighborhoods/

DOE Clean Cities Program
www1.eere.energy.gov/cleancities/

NREL Introduction to Using Community-wide Behavior Change Programs to Increase Energy Efficiency Webinar
www.nrel.gov/applying_technologies/state_local_activities/webinar_20110728.html

Institute for Sustainable Communities Promising Practices in Low-Carbon Transportation: A Resource Guide for Local Leaders
www.iscvt.org/who_we_are/publications/Low_Carbon_Transportation_Resource_Guide.pdf

Coordinate Green Buildings or Green Business Challenge programs
www4.eere.energy.gov/challenge/home.

The National Coalition for Dialogue & Deliberation Resource Guide on Public Engagement
www.ncdd.org/files/NCDD2010_Resource_Guide.pdf

APPENDIX D

ACTION PLAN CHECKLIST

Strategic Energy Plan Summary
Action Plan Checklist

City: *type City name here*
Project: *type Project name here*
Date: *type date here*

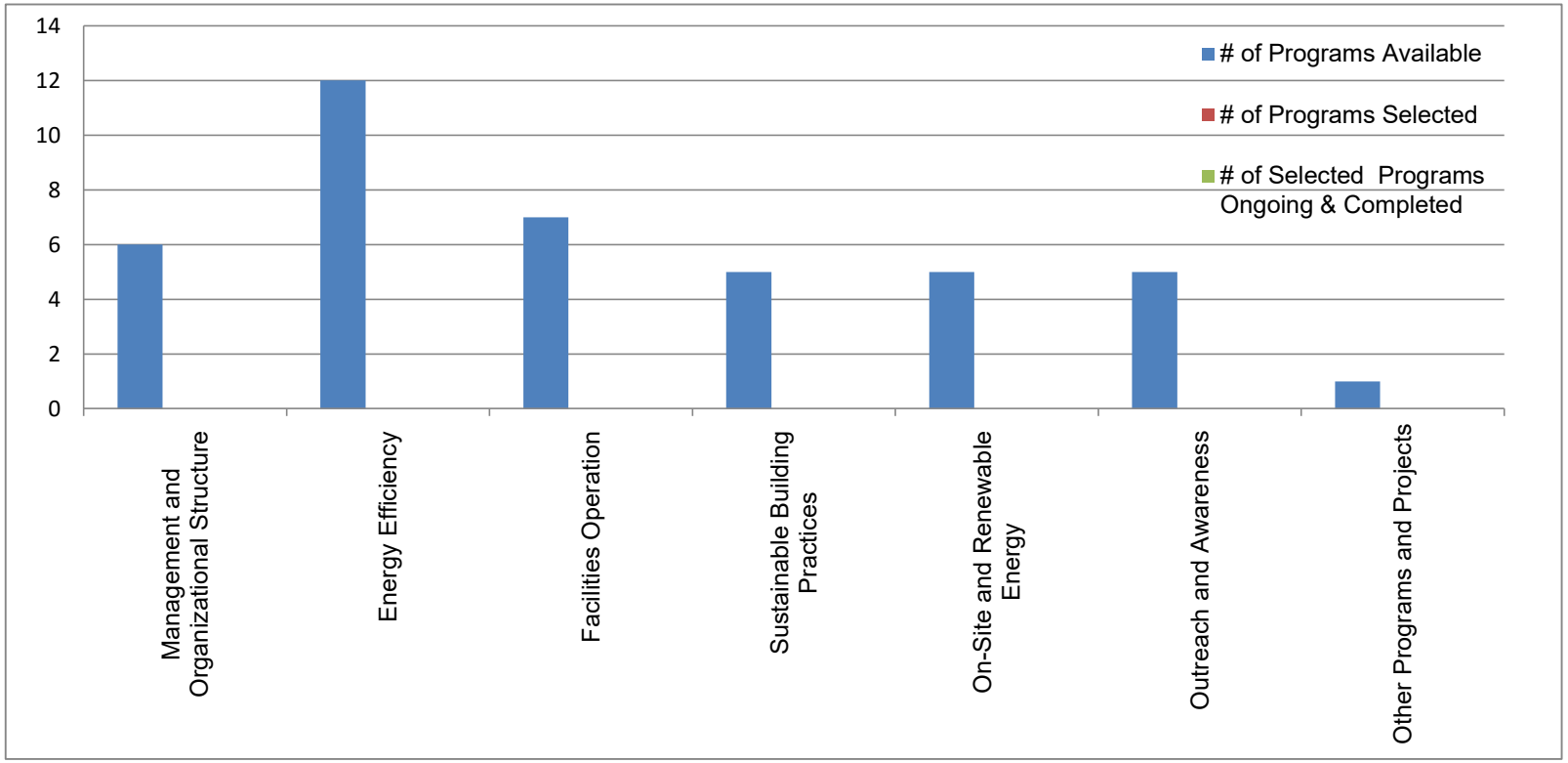
Click Here to go to **Output Tab**

Plan Section	Template Plan Section Description	# of Programs Available	# of Programs Selected	# of Selected Programs Ongoing & Completed
1	Management and Organizational Structure	6	0	0
2	Energy Efficiency	12	0	0
3	Facilities Operation	7	0	0
4	Sustainable Building Practices	5	0	0
5	On-Site and Renewable Energy	5	0	0
6	Outreach and Awareness	5	0	0
7	Other Programs and Projects	1	0	0
	Totals	**40**	**0**	**0**

For questions, comments, or feedback, please contact Matt Sullivan, Newcomb | Anderson | McCormick, 415-896-0300, matt_sullivan@newcomb.cc

Strategic Energy Plan Programs and Projects Chart

City:	enter information on Summary tab
Project:	enter information on Summary tab
Date:	enter information on Summary tab



Sustainability Template Plan
Action Plan Checklist

City:	enter information on Summary tab
Project:	enter information on Summary tab
Date:	enter information on Summary tab

Selected Programs and Plans for Implementation are Summarized Below			
Section 1	**MANAGEMENT AND ORGANIZATIONAL STRUCTURE**		**Comments**
☐	1.1	Adopt a City Energy Policy/ Vision Statement	
☐	1.2	Appoint an Energy Manager	
☐	1.3	Appoint a City Energy Leadership Team	
☐	1.4	Funding and Resources to Support Energy Plan Activities	
☐	1.5	Engage Energy Professionals as Required	
☐	1.6	Integrate Energy Planning into City General Plan or Climate Action Plan	
☐	*1.x*	*Enter Other Program and Project 1, text will change color*	
☐	*1.x*	*Enter Other Program and Project 2, text will change color*	

For questions, comments, or feedback, please contact Matt Sullivan, Newcomb | Anderson | McCormick, 415-896-0300, matt_sullivan@newcomb.cc

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Strategic Energy Plan
Action Plan Checklist

City:	enter information on Summary tab
Project:	enter information on Summary tab
Date:	enter information on Summary tab

Selected Programs and Plans for Implementation are Summarized Below			
Section 2	**ENERGY EFFICIENCY**		**Comments**
☐	2.1	Set Energy Efficiency Goals	
☐	2.2	Evaluate Mechanisms for the Implementation of Energy Conservation and Efficiency Projects	
☐	2.3	Conduct Facility Prioritization Survey	
☐	2.4	Conduct Comprehensive Facility Energy Audits	
☐	2.4.1	Implement New and Existing Audit Recommendations	
☐	2.5	Implement Ongoing Energy Monitoring	
☐	2.6	Participate in Demand Response (DR) Programs	
☐	2.7	Identify and Take Advantage of Grant and Incentive Programs	
☐	2.8	Energy Efficiency Equipment	
☐	2.8.1	Establish an Energy Efficiency Purchasing Policy	
☐	2.8.2	Efficient Lighting and Lighting Controls	
☐	2.8.3	Install Energy Efficient HVAC Systems	
☐	*2.x*	*Enter Other Program and Project 1, text will change color*	
☐	*2.x*	*Enter Other Program and Project 2, text will change color*	

For questions, comments, or feedback, please contact Matt Sullivan, Newcomb | Anderson | McCormick, 415-896-0300, matt_sullivan@newcomb.cc

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Strategic Energy Plan
Action Plan Checklist

City:	enter information on Summary tab
Project:	enter information on Summary tab
Date:	enter information on Summary tab

Selected Programs and Plans for Implementation are Summarized Below			
Section 3	**FACILITIES OPERATION**		**Comments**
☐	3.1	Encourage and Support Energy Efficiency Training of Staff	
☐	3.2	Install Energy Management Systems	
☐	3.3	Adjust Temperature Set Points and Schedule Operating Times	
☐	3.4	Optimize Building Occupancy Scheduling	
☐	3.5	Optimize HVAC Equipment Scheduling	
☐	3.6	Activate Energy-Saving Features for Appliances and Computers	
☐	3.7	Pursue Monitoring-Based(MBCx)/Retro-Commissioning (RCx)	
☐	*3.x*	*Enter Other Program and Project 1, text will change color*	
☐	*3.x*	*Enter Other Program and Project 2, text will change color*	

For questions, comments, or feedback, please contact Matt Sullivan, Newcomb | Anderson | McCormick, 415-896-0300, matt_sullivan@newcomb.cc

Back to Summary tab

Strategic Energy Plan
Action Plan Checklist

City:	enter information on Summary tab
Project:	enter information on Summary tab
Date:	enter information on Summary tab

Selected Programs and Plans for Implementation are Summarized Below			
Section 4	**SUSTAINABLE BUILDING PRACTICES**		**Comments**
☐	4.1	Establish a Green Building Standard	
☐	4.2	Action Plan Checklist	
☐	4.3	Use an Integrated Systems Approach in Building Design	
☐	4.4	Hire Sustainable Design Professionals	
☐	4.5	Commission New Buildings	
☐	*4.x*	*Enter Other Program and Project 1, text will change color*	
☐	*4.x*	*Enter Other Program and Project 2, text will change color*	

For questions, comments, or feedback, please contact Matt Sullivan, Newcomb | Anderson | McCormick, 415-896-0300, matt_sullivan@newcomb.cc

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Strategic Energy Plan
Action Plan Checklist

City:	enter information on Summary tab
Project:	enter information on Summary tab
Date:	enter information on Summary tab

Selected Programs and Plans for Implementation are Summarized Below			
Section 5	**ON-SITE AND RENEWABLE ENERGY**		**Comments**
☐	5.1	Evaluate Clean Cogeneration and Renewable Energy Generation	
☐	5.2	Evaluate Load Shifting Technologies	
☐	5.3	Minimize Greenhouse Gas Intensity of Purchased Electricity	
☐	5.4	Evaluate Participation in Community Choice Aggregation	
☐	5.5	Identify and Take Advantage of Grant and Incentive Programs	
☐	*5.x*	*Enter Other Program and Project 1, text will change color*	
☐	*5.x*	*Enter Other Program and Project 2, text will change color*	

For questions, comments, or feedback, please contact Matt Sullivan, Newcomb | Anderson | McCormick, 415-896-0300, matt_sullivan@newcomb.cc

Back to Summary tab

Strategic Energy Plan
Action Plan Checklist

City:	enter information on Summary tab
Project:	enter information on Summary tab
Date:	enter information on Summary tab

Selected Programs and Plans for Implementation are Summarized Below			
Section 6	**OUTREACH AND AWARENESS**		**Comments**
☐	6.1	Create a Webpage Dedicated to City Sustainability	
☐	6.2	Hold Workshops and Presentations	
☐	6.3	Sustainability Events	
☐	6.4	City Organizational Outreach and Awareness	
☐	6.5	Community-wide Outreach & Awareness	
☐	*6.x*	*Enter Other Program and Project 1, text will change color*	
☐	*6.x*	*Enter Other Program and Project 2, text will change color*	

For questions, comments, or feedback, please contact Matt Sullivan, Newcomb | Anderson | McCormick, 415-896-0300, matt_sullivan@newcomb.cc

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Strategic Energy Plan
Action Plan Checklist

City:	enter information on Summary tab
Project:	enter information on Summary tab
Date:	enter information on Summary tab

Selected Programs and Plans for Implementation are Summarized Below			
Section 7 (	**Other Programs and Projects**		**Comments**
☐	*7.x*	*Enter Other Program and Project 1, text will change color*	
☐	*7.x*	*Enter Other Program and Project 2, text will change color*	
☐	*7.x*	*Enter Other Program and Project 3, text will change color*	
☐	*7.x*	*Enter Other Program and Project 4, text will change color*	

For questions, comments, or feedback, please contact Matt Sullivan, Newcomb | Anderson | McCormick, 415-896-0300, matt_sullivan@newcomb.cc

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Strategic Energy Plan
Action Plan Checklist

City: enter information on Summary tab
Project: enter information on Summary tab
Date: enter information on Summary tab

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Section 1 MANAGEMENT AND ORGANIZATIONAL STRUCTURE									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
1.1	Adopt a City Energy Policy/ Vision Statement								
1.2	Appoint an Energy Manager								
1.3	Appoint a City Energy Leadership Team								
1.4	Funding and Resources to Support Energy Plan Activities								
1.5	Engage Energy Professionals as Required								
1.6	Integrate Energy Planning into City General Plan or Climate Action								
1.x	*Enter Other Program and Project 1, text will change color*								
1.x	*Enter Other Program and Project 2, text will change color*								

Section 2 ENERGY EFFICIENCY									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
2.1	Set Energy Efficiency Goals								
2.2	Evaluate Mechanisms for the Implementation of Energy								
2.3	Conduct Facility Prioritization Survey								
2.4	Conduct Comprehensive Facility Energy Audits								
2.4.1	Implement New and Existing Audit Recommendations								
2.5	Implement Ongoing Energy Monitoring								
2.6	Participate in Demand Response (DR) Programs								
2.7	Identify and Take Advantage of Grant and Incentive Programs								
2.8	Energy Efficiency Equipment								
2.8.1	Establish an Energy Efficiency Purchasing Policy								
2.8.2	Efficient Lighting and Lighting Controls								
2.8.3	Install Energy Efficient HVAC Systems								
2.x	*Enter Other Program and Project 1, text will change color*								
2.x	*Enter Other Program and Project 2, text will change color*								

Strategic Energy Plan
Action Plan Checklist

City: enter information on Summary tab
Project: enter information on Summary tab
Date: enter information on Summary tab

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Section 3 FACILITIES OPERATION									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
3.1	Encourage and Support Energy Efficiency Training of Staff								
3.2	Install Energy Management Systems								
3.3	Adjust Temperature Set Points and Schedule Operating Times								
3.4	Optimize Building Occupancy Scheduling								
3.5	Optimize HVAC Equipment Scheduling								
3.6	Activate Energy-Saving Features for Appliances and Computers								
3.7	Pursue Monitoring-Based(MBCx)/Retro-Commissioning (RCx)								
3.x	*Enter Other Program and Project 1, text will change color*								
3.x	*Enter Other Program and Project 2, text will change color*								

Section 4 SUSTAINABLE BUILDING PRACTICES									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.1	Establish a Green Building Standard								
4.2	Action Plan Checklist								
4.3	Use an Integrated Systems Approach in Building Design								
4.4	Hire Sustainable Design Professionals								
4.5	Commission New Buildings								
4.x	*Enter Other Program and Project 1, text will change color*								
4.x	*Enter Other Program and Project 2, text will change color*								

Section 5 ON-SITE AND RENEWABLE ENERGY									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
5.1	Evaluate Clean Cogeneration and Renewable Energy Generation								
5.2	Evaluate Load Shifting Technologies								
5.3	Minimize Greenhouse Gas Intensity of Purchased Electricity								
5.4	Evaluate Participation in Community Choice Aggregation								
5.5	Identify and Take Advantage of Grant and Incentive Programs								
5.x	*Enter Other Program and Project 1, text will change color*								
5.x	*Enter Other Program and Project 2, text will change color*								

Strategic Energy Plan
Action Plan Checklist

City: enter information on Summary tab
Project: enter information on Summary tab
Date: enter information on Summary tab

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Section 6 OUTREACH AND AWARENESS									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
6.1	Create a Webpage Dedicated to City Sustainability								
6.2	Hold Workshops and Presentations								
6.3	Sustainability Events								
6.4	City Organizational Outreach and Awareness								
6.5	Community-wide Outreach & Awareness								
6.x	*Enter Other Program and Project 1, text will change color*								
6.x	*Enter Other Program and Project 2, text will change color*								

Section 7 OTHER PROGRAMS AND PROJECTS									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
7.x	*Enter Other Program and Project 1, text will change color*								
7.x	*Enter Other Program and Project 2, text will change color*								
7.x	*Enter Other Program and Project 3, text will change color*								
7.x	*Enter Other Program and Project 4, text will change color*								

APPENDIX E

LG-SEP DOCUMENT TEMPLATE

[City Logo]

[City Name]

Strategic Energy Plan

Produced by [City Name] Energy Leadership Team

[DATE]

[Photo of City Facility]

HOW TO USE THIS TEMPLATE

This Document Template has been developed to assist cities in creating their customized Strategic Energy Plan (SEP) and is formatted to streamline the writing while allowing cities to customize it as necessary. This document should be used in conjunction with the LG-SEP Template Plan and the Action Plan Checklist (Appendix D).

This Template contains suggested headings and sections, though the city may add, remove, or elaborate as much as desired. The city should fully customize this template with their own language and replace pictures with photos from the municipality.

Text highlighted in blue, like this, includes instructions and examples that should be deleted before the customized SEP is published. Text highlighted in gray and enclosed with brackets, [this, for example], should be replaced using language specific to the city.

Text that is not highlighted in blue or in brackets can be used verbatim in the creation of the customized Strategic Energy Plan or modified as needed.

ACKNOWLEDGMENTS

[City Name]

- Mayor and City Council members
- [Key Administration Staff – Name and Title]
- [Leadership Team Members – Name and Title]
- [Other Acknowledgements – Name and Title]

[External Agencies and Partners]

- [Electric and/or Gas Utility – Name and Title]
- [Regional or State Government Partners – Name and Title]
- [Regional or State Business Partners– Name and Title]
- [Other Acknowledgements – Name and Title]

Local Community Contributors

- [Other Acknowledgements – Name and Title]

[Other Plan Contributors]

[Other Acknowledgements – Name and Title]

TABLE OF CONTENTS

Before publishing, right click on any part of the Table of Contents below and use the "Update Field" function to automatically update the Table of Contents.

1. EXECUTIVE SUMMARY

As with many public sector agencies, the City of [Name] (City) recognizes the environmental, economic, and social benefits of energy-use reduction, clean energy generation, and the reduction of Greenhouse Gas (GHG) emissions. The passage of the California Global Warming Solutions Act (AB 32) in 2006, the Clean Energy and Pollution Act of 2015 (SB 350), and various other legislation has established the State of California as an international leader in efforts to reduce energy use, become a more energy-efficient economy, and move our state toward a more sustainable future. The City of [Name] understands the unique and vital role that local governments have in helping the State reach the goals set forth in the policies above.

VISION STATEMENT

[Insert City Vision Statement here. See Step 3: Vision Statement of the LG-SEP Template for more details.]

To help meet these challenges, [Name] has developed this Strategic Energy Plan (SEP) following the process outlined in the East Bay Energy Watch (EBEW) Local Government Strategic Energy Planning (LG-SEP) Template. EBEW is the Pacific Gas and Electric (PG&E) Local Government Partnership in Alameda and Contra Costa Counties, serving cities in both counties with energy efficiency programs and technical assistance, as well as incentives and rebates for implementing energy savings projects. The LG-SEP Template was developed by EBEW staff, and consultants Newcomb Anderson McCormick (NAM) and QuEST, in collaboration with the "Pilot Cities" of Emeryville and Oakley. This SEP outlines a comprehensive, organized, and actionable approach for the City to meet its "Energy Vision" and energy-use reduction goals, while reflecting the City's unique culture, values, and constraints.

The following pages describes the policy context for energy planning, the process undertaken by the City to create the SEP, and the resulting Vision, Goals, and specific programs and projects for implementation to achieve the City's Vision for energy efficiency and sustainability.

2. BACKGROUND

2.1 POLICY CONTEXT OF STRATEGIC ENERGY PLANNING

The State of California and local agencies have been on the forefront of establishing aggressive policies and standards for environmental protection and reducing GHG emissions that contribute to global warming. In 1970, the State adopted the California Environmental Quality Act (CEQA) with the goal of informing governments and the public about potential environmental impacts of projects. From 2005 onward, legislation has been passed to directly regulate GHG emissions, encouraging the creation of incentive mechanisms and cap-and-trade programs and the participation in voluntary activities such as purchasing emissions offsets and offering renewable energy certificates (RECs).

In October 2015 the most recent and significant legislation, the **Clean Energy and Pollution Reduction Act of 2015 (SB350),** was signed into law by California Governor Jerry Brown. This bill mandates an increase in California's Renewables Portfolio Standard (RPS) to 50 percent and the doubling of building energy efficiency, both by 2030. Implementation of this bill is likely to result in expanded utility efficiency programs which may benefit local governments. Additionally, AB 802 is another bill that was signed in September and is likely to change how energy efficiency savings are measured and reported. Compliance with state and local policies and regulations regarding these issues are an important factor for consideration by the City of [Name]. The following list outlines some of the numerous past policies and regulatory drivers that contributed to the creation of this Plan.

- **Warren Alquist Act of 1974** – Created the California Energy Commission (CEC) mandate to develop and regularly update Building Energy Efficiency and Equipment Standards, now known as Title 24 and Title 20 codes. These standard are largely credited with holding California's per capita energy consumption essentially flat since the mid-1970s.
- **AB 4420, 1988 (Sher)** – Directed the CEC to inventory and study greenhouse gases (GHGs) and the impacts of climate change on the states' economy and environment.
- **SB 1771, 2000 (Sher)** – Established the State's Climate Action Registry and established GHG baselines and ongoing monitoring.
- **AB 1493, 2002 (Pavley)** – Landmark "Clean Car Legislation" after California received authorization from the US EPA to regulate these emissions. These rules were initially heavily fought by the auto industry but have since become the standard for the nation.
- **SB 1078, 2002 (Sher); SB 107, 2006 (Simitian); SB X1-2 (Simitian)** – Established the State's Renewable Portfolio Standard goals with increasing targets.
- **AB 32, 2006 (Pavley, Nunez)** – Global Warming Solutions Act of 2006; Established goal to reduce California's GHG emissions below 1990 levels by 2020 and 80% below these levels by 2050.
- **California Long-Term Energy Efficiency Strategic Plan (CEESP) drafted by the CPUC in 2008 and updated 2011** – Outlines "big and bold" goals including 40% of residential building to be zero net energy (ZNE) by 2030 and 50% of commercial building to meet this criteria by 2040.
- **AB758, 2009, (Skinner)** – Comprehensive Energy Efficiency Program for Existing Buildings; requires the CEC to create and implement an Existing Building Energy Efficiency Action Plan, in coordination with the California Public Utilities Commission (CPUC) and stakeholders.

2.2 HISTORY OF ENERGY USE REDUCTION EFFORTS TO DATE

The City of [Name] has taken several actions to improve municipal energy performance over the past several years, and has several currently planned projects as part of the City's Capital Improvement Program (CIP). The City is very active in regional energy planning organizations and has taken a leadership role in [Insert Description].

The following list summarizes previously implemented and currently planned energy programs and projects at the City of [Name].

Insert a summary of the work the City has performed to date in the area of sustainability. All past sustainability projects and efforts should be fully recognized.

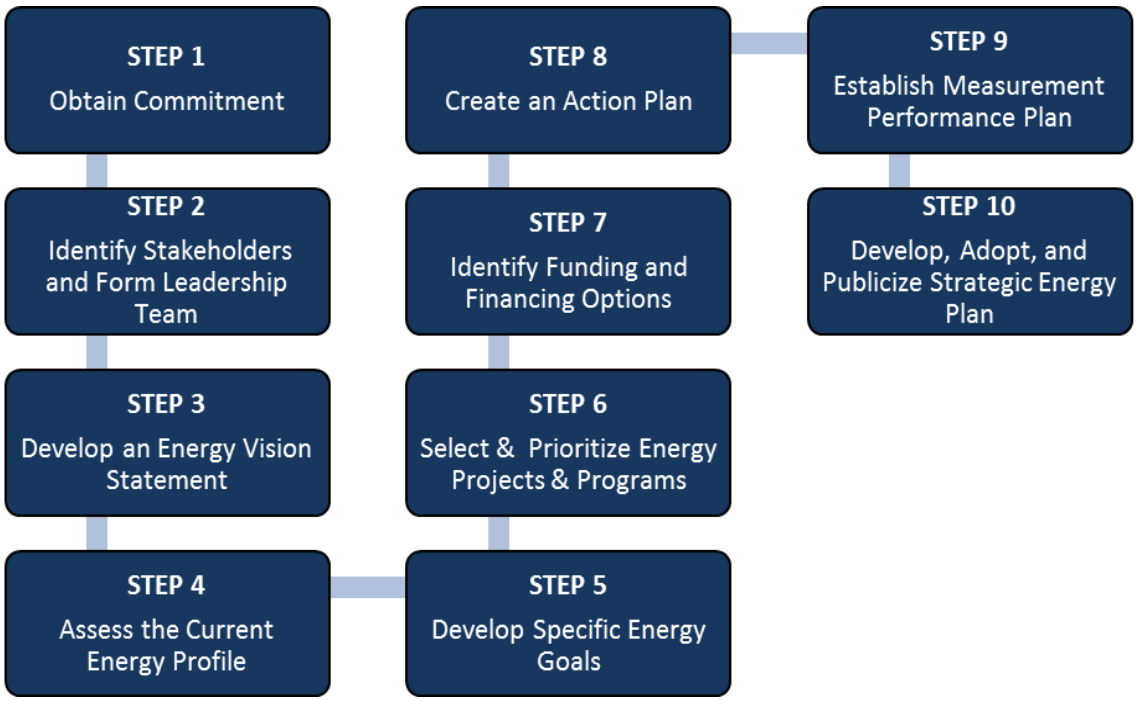
For a complete listing of past, current, and planned energy programs and projects see the Implementation Programs and Plans Checklist in Appendix 2.

2.3 CREATION OF THE STRATEGIC ENERGY PLAN

This section describes the process for the creation of the Strategic Energy Plan. The flow chart below reflects the process flow that is used in the SEP Template.

To create this Strategic Energy Plan, the City of [Name] followed the process and utilized the tools developed for the EBEW Local Government Strategic Energy Plan Template. The energy planning process is illustrated in the flow chart below.

Strategic Energy Plan Creation Process



On [Date], the City made a commitment to create this SEP by means of [City Council Resolution or City Manager Authorization]. An Energy Leadership Team was created that consisted of City staff from a variety of departments, including [Department Names]. The Energy Leadership Team worked to implement this process starting in [Date], culminating in the production of a Final Strategic Energy Plan in [Date].

The Leadership Team chair is [Name], [Title], and can be reached at [email] or [phone number].

The implementation of the energy planning process and the resulting Strategic Energy Plan are described in the following chapters.

3. VISION STATEMENT AND GOALS

The purpose of this section is to describe the city's Energy Vision Statement and to communicate the Goals of the SEP established by the Leadership Team.

The City of [Name] has developed the following Vision Statement as a guide to the creation of a municipal Strategic Energy Plan.

[Insert Vision Statement here. An example Vision Statement is: By adopting this Strategic Energy Plan, the City commits to environmental and fiscal sustainability and reducing its Greenhouse Gas emissions for the benefit of future generations.

3.1 ENERGY USE BENCHMARKING STUDY

To assist in the development of goals, the City has performed an Energy Use Benchmarking Study which is included in Appendix [Number]. The Benchmarking Study compared the energy performance of the City's buildings and facilities against an established baseline. The results of the study indicated [Enter Findings and Recommendations]. Based on these results, a comprehensive energy audit will be performed on [Buildings or Facilities Names] to assist in identifying measures to reduce overall energy use and cost.

3.2 GOALS

To realize this Vision Statement, the City has defined the following energy planning goals and priorities. The goals and priorities for the Strategic Energy Plan reflect city needs, interests, and available resources. The Goals outlined below are not necessarily listed in order of priority. Priorities for all goals and implementation programs are contained in the Action Plan Checklist contained in Appendix 2.

Fill in the following table with the City's goals and add or delete rows as necessary. In addition, the City may want to include graphs of energy use or other relevant information to better illustrate the goals. Criteria assigned to a goal should contain both a target that can be measured and a timeframe by which to achieve the target. These are sometimes called SMART Goals (Specific, Measurable, Achievable, Relevant, Time-bound).

Energy Plan Goals and Criteria

Goal No.	Topic	Established Goal
1	**Fiscal Criteria**	Develop economic and fiscal criteria to be used to evaluate future energy projects and programs. Fiscal criteria will be published by June 30, 2016.
2	**Energy Efficiency**	Reduce annual energy usage for existing facilities from a 2015 baseline by 15% by the end of 2020 by targeting opportunities from Energy Benchmarking Study and follow-on Energy Efficiency Audits.
3	**Energy Generation & Procurement**	Explore local opportunities for clean energy generation and procurement, including on-site renewable generation and participating in Community Choice Aggregation (CCA). Prepare a Feasibility Study by the end of 2016 with recommendations for implementing energy generations strategies.

Goal No.	Topic	Established Goal
4	**Community Outreach & Education**	Engage city staff and the larger community in Energy Plan implementation by developing and implementing education and awareness programs to reduce energy use and promote energy efficiency and renewable energy options.

The goals described above were used by the Leadership Team to develop specific programs and projects for implementation to achieve each goal. This process is described in the next section.

The goals and criteria established for the Strategic Energy Plan will be monitored during plan implementation as described in Section 6, "Measure and Report Performance."

4. PROGRAMS AND PROJECTS FOR IMPLEMENTATION

Based on the goals and priorities described in the previous section, the City has selected programs and projects to actively improve energy use. The programs and projects were selected from a menu of opportunities provided in the LG-SEP Strategic Energy Planning Template. In addition, projects identified by City of [Name] staff are also included.

The programs and projects to be implemented with the Strategic Energy Plan fall into the following broad categories:

1. Management and Organization Structure
2. Energy Efficiency
3. Facilities Operations
4. Sustainable Building Practices
5. Onsite Generation and Renewable Energy
6. Outreach and Awareness

Appendix 1 provides a detailed description of the energy programs and projects selected, including those already completed, currently being implemented, and planned for the future. These programs and projects are also reflected in the Action Plan Checklist, provided in Appendix 2, which outlines the priorities, responsibility for implementation, schedule, and estimated cost of each. The Checklist will be used by the City to manage the implementation process.

5. FUNDING AND FINANCING OPPORTUNITIES

In an environment of budget cuts and limited funding, the City of [Name] understands the importance of leveraging the many funding resources available to local governments to help finance the energy-use reduction and generation projects selected for implementation in this plan. The following are a list of tools and resources that the City will consider as it evaluates energy projects moving forward. The list is broken into two general categories: funds that can be raised by the City and funds that come from external grants and incentives.

FUNDING THROUGH CITY ACTION

Energy Performance Contracts (EPCs): Energy Performance Contracts (EPCs) are structured so that energy efficiency projects can be installed with little or no up-front costs to the customer. A portion of the revenue from energy savings go directly to an Energy Service Company (ESCO), who finances and constructs the project. ESCOs will finance the costs for the projects as part of the EPC. The structure and details of EPCs vary from project to project but the keys steps involved generally universal. For an overview of these steps, best practices, and case studies, visit the link below.

"Energy Performance Contracts for Local Governments: Industry Standards and Best Practices":
http://newbuildings.org/sites/default/files/EnergyEfficiencyFinancing_ModelsStrategies201110 pdf

Power Purchase Agreements (PPA): A Power Purchase Agreement (PPA) is a contract where an end-use customer to purchases clean energy from a power producer for on-site projects. In the case of solar photovoltaic electricity, customers can opt to purchase solar energy from a system installed on-site through a PPA at a negotiated rate instead of purchasing, installing, and maintaining the operations of solar photovoltaic panels themselves. The length of the PPA contract varies (as does the negotiated electricity rate), but typically ranges from 10 to 20 years. For more information on solar power purchase agreements, visit the Environmental Protection Agency (EPA) link below, which outlines PPA benefits and challenges and provides local-government case studies.
http://www3.epa.gov/greenpower/buygp/solarpower.htm

Additional resources include:

Renewable Energy Laboratory (NREL): Provides a detailed guide to power purchase agreements for state and local governments including financial and contractual considerations.

https://financere.nrel.gov/finance/content/power-purchase-agreement-checklist-state-and-local-governments

Department of Energy (DOE): Provides a general overview of PPAs and lists additional resources, including case studies.
http://energy.gov/eere/slsc/power-purchase-agreements

Renewable Energy Certificates (RECs): Renewable Energy Certificates (RECs), also known as Renewable Energy Credits, Green Tags, or Tradable Renewable Certificates (TRCs), represent the environmental benefits of one megawatt-hour (mWh) of electricity generated from renewable sources. A REC is a tradable commodity and can be sold as a source of revenue to the City. RECs can also be retained so that the owner has claim to the renewable attributes of the electricity. For more information about RECs, how they work, purchased and tracked, visit the Environmental Protection Agency links on the following page.
"Renewable Energy Certificates": http://www3.epa.gov/greenpower/gpmarket/rec.htm

"REC Tracking": http://www3.epa.gov/greenpower/gpmarket/tracking.htm

Carbon Offset Credits: Projects that offset or reduce greenhouse gas emissions can be certified by the Climate Action Reserve and traded as a Climate Reserve Tonne (CRT) credit, which is the equivalent of one metric ton of carbon dioxide equivalent emissions reduced or approximately 2,350 vehicle-miles traveled (VMT) for the average passenger vehicle. In addition to the cap-and-trade market, there are other marketplaces where CRTs can be purchased and sold, though similar to RECs, cities that sell CRTs lose the GHG "offset" attributes and cannot count the reductions towards their goals.

"Green" Revolving Fund (GRF): A "green" revolving fund is an internal fund that would provide financing to energy and sustainability projects that generate cost savings. These savings are tracked and used to replenish the fund for future rounds of "green" investments, thus establishing a sustainable funding cycle. Capital for GRF's may be obtained from a variety of funding sources and the accounting system used to track the funds may also vary. A detailed, and useful guide on the creation and maintenance of a successful GRF can be found by following the link below. Although tailored for the higher educational space, its resources are relevant for a variety of institutions and agencies, including local governments.

"Green Revolving Funds: An Introductory Guide to Implementation & Management":
http://greenbillion.org/wp-content/uploads/2013/01/GRF_Implementation_Guide.pdf

EXTERNAL GRANTS AND INCENTIVES

Energy Utility Programs and Incentives: Local energy utilities offer a variety of programs and financial assistance to their customers for energy efficiency, renewable energy, and Climate Action Planning.

- **East Bay Energy Watch (EBEW),** the local government partnership between PG&E and cities in Alameda and Contra Costa Counties. EBEW, through PG&E, provides cities with a variety of programs and incentives that assist in the financing of energy projects. For example, the **PG&E On-Bill Financing (OBF) program** allows cities to finance energy efficiency projects with no-interest loans that are repaid through the City's utility bill. Additional benefits made available through PG&E and EBEW include access to free, comprehensive energy audits, incentive dollars for LED street lighting upgrades and new construction technical assistance (Savings By Design Program), and a variety of other programs. Cities should work closely with EBEW and PG&E to ensure that all incentives and resources are leveraged to their full potential.

Government Grants: The availability of government grants is constantly changing. The City will stay up-to-date on federal and state grants by referring to the following websites, which consolidate the available grants from all government departments:

Federal Grants: http://grants.gov/
California State Grants: http://www.ca.gov/Grants.html

State Energy Efficiency Loans: Cities can also apply for other state and federal loans, such as the loans available through the California Energy Commission. At the time of the LG-SEP's publication, the California Energy Commission was accepting applications for their 1% interest loan for projects with proven energy and/or demand cost savings. The repayment schedule is up to 20 years and will be based on the annual projected energy cost savings from the aggregated projects. More information can be found on their website at: http://www.energy.ca.gov/efficiency/financing/index.html

6. MEASURE AND REPORT PERFORMANCE

The purpose of this section is to describe the City's plan for regular measurement and reporting of its progress towards reaching the SEP goals.

As with any successful program, the ongoing progress and performance of energy reduction activities should be monitored and compared to goals and criteria. This will require continuous participation of the City Energy Leadership Team, City staff, and other participants in the process. To communicate results and ensure transparency and accountability, the results of the Strategic Energy Plan activities should be communicated within City departments and to the larger community on a regular basis.

The following section describes the planned process for measuring and reporting energy use reduction activities and achievements.

6.1 MEASURING PERFORMANCE

In order to monitor the City's progress towards its energy goals, the City Energy Leadership Team plans to collect information on the following key metrics at the regular intervals described below. In addition, the table below indicates responsibility for the accomplishment of each goal to meet the timelines established.

Fill in the following table with the City's customized metrics and add or delete rows as necessary. Cities that choose to normalize metrics by building square footage or other factors should list these metrics separately from measurement of aggregate usage. For more details on developing metrics, see Step 9 of the SEP Template.

Goal No.	Topic	Established Goal	Performance Metric and Frequency of Measurement	Responsibility
1	**Fiscal Criteria**	Develop economic and fiscal criteria to be used to evaluate future energy projects and programs.	Fiscal criteria will be adopted and published by June 30, 2016.	Director of Finance
1	**Energy Efficiency**	Reduce annual energy usage for existing facilities from a 2015 baseline by 15% by the end of 2020 by targeting opportunities from Energy Benchmarking Study and follow-on Energy Efficiency Audits.	Energy usage to be reviewed annually by updating the Energy Benchmarking Study.	Public Works Director
2	**Energy Generation & Procurement**	Explore local opportunities for clean energy generation and procurement, including on-site renewable generation and participating in Community Choice Aggregation (CCA).	Prepare a Feasibility Study by the end of 2016 with recommendations for implementing energy generations strategies.	Public Works Director

Goal No.	Topic	Established Goal	Performance Metric and Frequency of Measurement	Responsibility
3	**Community Outreach and Education**	Engage city staff and the larger community in Energy Plan implementation by developing and implementing education and awareness programs to reduce energy use and promote energy efficiency and renewable energy options.	Beginning in Q4 2016, the City will work to offer outreach and educational programs. Updates to the City sustainability webpage with current resources and information to occur on a quarterly basis.	City Manager

6.2 REPORTING PERFORMANCE

The City should use this section to describe how the Leadership Team will communicate measurement of performance. Step 9 of the LG-SEP Template contains more detail on reporting metrics, measurement, and communications strategies.

As with any successful program, the ongoing progress and performance of energy plan activities should be monitored and compared to goals and criteria. This will require continuous participation for the Leadership Team, City Staff, and other participants in the process. To ensure transparency and accountability, the results of the SEP activities will be communicated to the City Council, City Staff, and to the larger community on a regular basis using the process of measurement and reporting described below.

APPENDICES

APPENDIX 3: GLOSSARY OF TERMS AND ACRONYMS

Air-side Economizer: A device that, on proper variable sensing, initiates control signals or actions to conserve energy in an HVAC system.

ASHRAE Level II Audit: Audit includes an analysis of energy use at a facility and identifies no-cost, low-cost and capital improvement energy-efficiency measures with detailed energy and financial calculations.

Biomass: Organic non-fossil material of biological origin constituting a renewable energy source.

Clean Energy: Energy produced from renewable sources in a process that has minimal impact to the environment

CleanPowerSF: The City and County of San Francisco's Community Choice Aggregation (CCA) program, administered by the San Francisco Public Utilities Commission (SFPUC) and monitored by the San Francisco Local Agency Formation Commission (LAFCo).

Community Choice Aggregation (CCA): CCA permits public agencies to aggregate the electric loads of residents, businesses, and facilities the purchase and sale of electrical energy on their behalf.

Energy Benchmarking: Process of collecting, analyzing and relating energy performance data of a building with the purpose of evaluating and comparing its performance to itself, other buildings within a portfolio, and/or its peers.

Energy Management System (EMS): A computer-aided tool used to monitor, measure, and control electrical building loads. Energy management systems can be used to central control devices like HVAC units and lighting systems across multiple locations. They can also provide metering, sub-metering, and monitory functions that allow facility and building managers to gather data and insight that allows them to make more informed decisions about energy activities across their sites.

ENERGY STAR ®: A U.S. Environmental Protection Agency (EPA) voluntary program that helps people and organizations save money and reduce greenhouse gas emissions by identifying factories, office equipment, home appliances and electronics that have superior energy efficiency.

Energy Use Intensity (EUI): Metric that expresses a building's energy use as a function of its size or other characteristics, generally energy use per square feet of space.

Fuel Cell: A device capable of generating an electrical current by converting the chemical energy of a fuel (e.g., hydrogen) directly into electrical energy. Fuel cells differ from conventional electrical cells in that the active materials such as fuel and oxygen are not contained within the cell but are supplied from outside. It does not contain an intermediate heat cycle, as do most other electrical generation techniques.

Geothermal Energy: Hot water or steam extracted from geothermal reservoirs in the earth's crust that can be used for geothermal heat pumps, water heating, or electricity generation.

Green Building: An environmentally sustainable building, designed, constructed and operated to minimize the total environmental impacts.

Greenhouse Gas Emissions: A gas that contributes to the greenhouse effect by absorbing infrared radiation, e.g., carbon dioxide, chlorofluorocarbons, or methane.

Leadership in Energy and Environmental Design (LEED): A set of rating systems developed by the U.S. Green Building Council for the design, construction, operation, and maintenance of green buildings, homes and neighborhoods.

LED Lighting: Lighting by means of employing light emitting diodes, a more environmentally-friendly alternative to incandescent lighting.

Plug Load: Energy used by products that are powered by means of an ordinary AC plug. It typically includes office and general miscellaneous equipment and computers.

Renewable Energy: Energy from a natural source that is not depleted when used, such as wind or solar power.

Solar Feasibility Assessment: A study that assesses energy production, risks, costs, and size of equipment most appropriate for a building or specified location.

Variable Frequency Drives (VFDs): A type of controller that drives an electric motor by varying the frequency supplied.

Variable Speed Drives (VSDs): See VFD.

Acronyms

AB	Assembly Bill
ABAG	Association of Bay Area Governments
APCD	Air Pollution Control District
AQMD	Air Quality Management District
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BLCC	Building Life Cycle Cost
BMS	Building Management System (also known as Energy Management System)
CAP	Climate Action Plan
CARB	California Air Resources Board
CARROT	Climate Action Registry Reporting Online Tool
CCA	Community Choice Aggregation
C&D	Construction & Demolition
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	Methane (a greenhouse gas)
CO_2	Carbon Dioxide (a greenhouse gas)
CO_2e	Carbon Dioxide equivalent
COP	Certificate of Participation
CRT	Climate Reserve Tonne
CRV	California Redemption Value
EBEW	East Bay Energy Watch
EMS	Energy Management System (also known as Building Management System)
EPA	Environmental Protection Agency (Cal/EPA is the California state EPA, while the US EPA refers to the national agency)

EPC	Energy Performance Contract
ESCO	Energy Service Company
EUI	Energy Use Intensity
EV	Electric Vehicle
DR	Demand Response
FEMP	Federal Energy Management Program
GHG	Greenhouse Gas
GRF	Green Revolving Fund
HFCs	Hydrofluorocarbons (a greenhouse gas)
HVAC	Heating, Ventilation, and Air-Conditioning
ICLEI	International Council for Local Environmental Initiatives
ILG	Institute for Local Government
IOU	Investor Owned Utility
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
kWh	Kilowatt-hour
LCCA	Life Cycle Cost Analysis
LCFS	Low Carbon Fuel Standard
LEED	Leadership in Energy and Environmental Design
LGC	Local Government Commission
MBCx	Monitoring Based Commissioning
MPO	Metropolitan Planning Organization
MTA	Municipal Transit Agency
MWh	Megawatt-hour
N_2O	Nitrous Oxide (a greenhouse gas)
NPV	Net Present Value
O&M	Operations and Maintenance
OBF	On-Bill Financing
OPR	Office of Planning and Research
PFCs	Perfluorocarbons (a greenhouse gas)
PG&E	Pacific Gas & Electric
PPA	Power Purchase Agreement
PV	Photovoltaic (Solar Panel)
RCx	Retrocommissioning
REC	Renewable Energy Credit or Renewable Energy Certificate
REN	Regional Energy Network
RFP	Request for Proposal
ROI	Return on Investment
SB	Senate Bill
SBDP	Sustainable Building Design Process
SCS	Sustainable Community Strategy
SEP	Strategic Energy Plan
SEEC	Statewide Energy Efficiency Collaborative
SF_6	Sulfur Hexafluoride (a greenhouse gas)
SPB or SPP	Simple Payback Period
STARS	Sustainability Tracking Assessment and Reporting System
STEM	Science, Technology, Engineering, and Mathematics
T&D	Transmission and Distribution
TES	Thermal Energy Storage

TRC	Tradable Renewable Certificate
VMT	Vehicle Miles Traveled
WRI	World Resources Institute

APPENDIX F

STRATEGIC ENERGY PLAN - CITY OF OAKLEY

OAKLEY
CALIFORNIA

Strategic Energy Plan

Produced by: City of Oakley Energy Leadership Team

Fall 2015

ACKNOWLEDGEMENTS

Oakley City Council

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Randy Pope, *Council Member*
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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

As with many public sector agencies, the City of Oakley (City) recognizes the environmental, economic, and social benefits of energy-use reduction, clean energy generation, and the reduction of Greenhouse Gas (GHG) emissions. The passage of the California Global Warming Solutions Act (AB 32) in 2006, the Clean Energy and Pollution Act of 2015 (SB 350), and various other legislation has established the State of California as an international leader in efforts to reduce energy use, become a more energy-efficient economy, and move our state toward a more sustainable future. The City of Oakley understands the unique and vital role that local governments have in helping the State reach the goals set forth in these policies.

To help meet these challenges, Oakley agreed to participate as a "Pilot City" in the East Bay Energy Watch (EBEW) Strategic Energy Planning program. EBEW is the Pacific Gas and Electric (PG&E) Local Government Partnership in Alameda and Contra Costa Counties, providing cities in both counties with energy efficiency program and technical assistance services, as well as incentives and rebates for implementing energy savings projects. Several City staff from a variety of departments were engaged throughout the collaborative process, working with EBEW staff, as well as consultants Newcomb Anderson McCormick and QuEST, to develop this Strategic Energy Plan (SEP). This SEP outlines a comprehensive, organized, and actionable approach for the City to meet its "Energy Vision" and energy-use reduction goals while reflecting the City's unique culture, values, and constraints.

City of Oakley
Energy Vision Statement

Oakley will consider energy-efficiency in its operations, striving to provide positive and achievable examples to others in the community, and demonstrating that financially viable and sustainable energy-wise options exist that can both reduce overall costs and lower greenhouse gas emissions, without creating negative environmental impacts or lowering the quality of life of its residents.

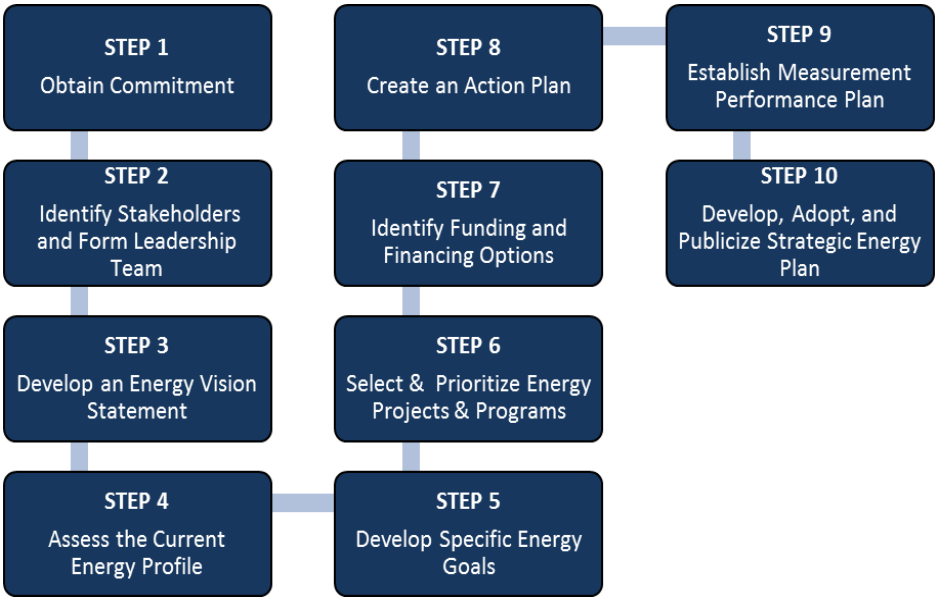
The outcome of this process is not just a Strategic Energy Plan for the City of Oakley, but the results, "best practices," and lessons learned from the planning process that will be incorporated by EBEW and the program consultants into a Strategic Energy Planning "Template", which will provide a process map and tools to allow other cities in Alameda and Contra Costa Counties to develop their own, customized SEPs. The City of Oakley's contribution to both their own SEP and to the development of a Template that will benefit other neighboring cities was valuable and commendable.

The following pages describe the policy context for energy planning, the process undertaken by the City to create the SEP, and the resulting Vision, Goals, and specific programs and projects for implementation to achieve the City's Vision for energy efficiency and sustainability.

2. BACKGROUND

2.1 CREATION OF THE STRATEGIC ENERGY PLAN

To create this Strategic Energy Plan, the City of Oakley followed the process and utilized the tools developed for the EBEW Local Government Strategic Energy Plan Template. The energy planning process is illustrated in the flow chart below.



On June 23, 2015, the City made a commitment to create this Strategic Energy Plan by means of a commitment letter issued by the City Manager, Bryan H. Montgomery. An Energy Leadership Team was created that consisted of City staff from a variety of departments (Planning, Finance, and Public Works), as well as members from EBEW and consultants Newcomb Anderson McCormick and QuEST. The Energy Leadership Team worked to implement this process starting in June of 2015, culminating in the production of a Final Strategic Energy Plan in November 2015.

The implementation of the energy planning process and the resulting Strategic Energy Plan are described in the following chapters.

2.2 HISTORY OF ENERGY USE REDUCTION EFFORTS TO DATE

The City of Oakley has taken actions to improve municipal energy performance over the past several years, and, as outlined in this Strategic Energy Plan, expects to explore the viability of additional energy projects and programs to help meet the goals outlined above. The City is active in regional energy planning efforts and has taken a leadership role in the PG&E-funded EBEW as a member of its Strategic Advisory Committee. This organization consists of City representation from Alameda and Contra Costa counties, and collaborates on best practices in energy efficiency and sustainability efforts to assist all East Bay cities in becoming more sustainable. The following list summarizes previously implemented energy programs and projects at the City of Oakley.

Energy Programs and Policies Implemented

- **PACE Program**
  - The City adopted the Property Assessed Clean Energy (PACE) Program in November 2014, an affordable financing model where solar panels, heating and cooling (HVAC) systems, and a variety of other energy efficiency measures can be financed through an owner's property tax bill. By passing the resolution for the Program, the City of Oakley has enabled its community to work toward the SEP Vision Statement and have easier access to the many economic benefits of energy-savings measures.

- **City-wide and Local Government Operations Greenhouse Gas (GHG) Inventory**
  - The City conducted a community-wide and local government operations GHG inventory process in 2011 based on a 2005 baseline. This was accomplished through the PG&E sponsored Green Communities Program. In 2013, the inventories were updated with a 2010 GHG baseline through energy consultant QuEST. The GHG inventory will be used as a starting point for a future Climate Action Plan.

- **Environmental Purchasing Policy**
  - An Environmentally Preferable Purchasing Policy was adopted in 2011 and became effective on February 9, 2011. A detailed description of the Policy is provided in Appendix 7.

- **Solar Photovoltaic (PV) Feasibility Study**

  The City performed a solar photovoltaic feasibility study in 2009 and 2011 that evaluated the economic viability of PV systems on various City buildings and facilities. The study determined that installing systems would not meet the economic criteria established for these projects and therefore no further action was taken. However, the cost of solar panels has dropped significantly since 2011 and many of the projects may have improved significantly enough to warrant further analysis. This has been established as a project for future implementation.

- **EBEW Energy Audit of City Hall**
  - In September of 2015, EBEW funded an energy audit of City Hall to identify energy efficiency project opportunities (Appendix 6). Energy consultant QuEST performed the audit and the findings were released in October of 2015.

Completed Projects

- **LED Streetlight Replacement (Project #125)**
  - Oakley finished replacing 296 City–owned cobra head street lights with energy efficient LEDs in 2012, resulting in energy cost savings of over $9,000 per year, energy savings of 76,000 kWh per year, and CO2 emissions reduction of over 40,000 pounds per year. The project was completely funded using a $168,000 grant applied for and approved through the American Recovery and Reinvestment Act of 2009 (ARRA) and through a $24,000 incentive awarded by PG&E's incentive rebate program for energy efficiency projects.

- **Traffic Signal Modernization (Project #142)**
  - The City recently finished installing new LED street name signs on signal mast arms and also installed LED pedestrian countdown clocks at several intersections throughout the City.

Planned and Funded Projects – 2015 Capital Improvement Program (CIP)

For a complete listing of past, current, and planned energy programs and projects see the Implementation Programs and Plans Checklist in Appendix 2.

Future Projects

- **LED Streetlight Replacement**
  - The City is currently working with PG&E to evaluate the feasibility of retrofitting the remaining City-owned cobra head street lights with LED fixtures. The project will be financed through a PG&E loan program, with payback through energy cost savings over a period of 5 years.

3. VISION STATEMENT AND GOALS.

The City of Oakley has developed the following Energy Vision Statement as a guide to the creation of the Strategic Energy Plan:

> ***Oakley will consider energy-efficiency in its operations, striving to provide positive and achievable examples to others in the community, and demonstrating that financially viable and sustainable energy-wise options exist that can both reduce overall costs and lower greenhouse gas emissions, without creating negative environmental impacts or lowering the quality of life of its residents.***

The Vision Statement and an overview of the SEP planning process were presented to the Oakley City Council on August 11, 2015. The Council was very supportive of both the vision and the process to develop the SEP for the City of Oakley.

3.1 ENERGY USE BENCHMARKING STUDY

To assist in the development of goals, EBEW performed an Energy Use Benchmarking Study for the City of Oakley. The Benchmarking Study compared the energy performance of the City's buildings and facilities against an established baseline. The results of the study indicated that City Hall operated at a higher energy use intensity (energy use per square feet of space) than the baseline for typical, similar buildings. While there was some question about the accuracy of data collected for the study, it clearly identified a need to perform an energy audit of City Hall to both confirm the usage data and identify if measures could be employed to improve energy performance. The energy audit was performed by EBEW's consultant QuEST in September 2015 and the results are included in Appendix 3.

3.2 GOALS

To realize this Vision Statement, the City has defined the following energy planning goals and priorities. The goals and priorities for the SEP reflect City needs, interests, and available resources. The Goals outlined below are not necessarily listed in order of priority. Priorities for all goals and implementation programs are contained in the Implementation Programs and Plans Checklist contained in Appendix 2.

Energy Plan Goals and Criteria

Goal No.	Topic	Established Goal
1	**Energy Use Reduction**	Seek ways to reduce annual energy usage for existing facilities. Explore opportunities for energy efficiency, demand reduction, and/or clean self-generation measures. Evaluate and begin implementing viable measures that meet economic criteria (see below) by December 2017. Low-cost and no-cost measures should be prioritized for immediate implementation.

2	**Green Building**	Improve energy performance to exceed Title 24 requirements for new construction and major renovations of City facilities where/when supported by cost-benefit analyses; consider ways to update existing City policies to support this goal.
3	**Economics**	Evaluate existing economic and fiscal criteria commonly used for the evaluation and implementation of energy use reduction and energy generation strategies. Adopt economic and fiscal criteria from these common examples, or develop and adopt new criteria determined most appropriate for the City of Oakley by December 2016.
4	**Greenhouse Gas Reduction**	Leverage the GHG inventory conducted in 2013 (or any more recent study), the adopted SEP, and the EBEW Civic Spark intern program to plan and develop a Climate Action Plan (CAP) for the City. Planning for the CAP should occur in early 2016.
5	**Community Awareness & Engagement**	Engage City staff and the larger community in SEP implementation by developing and offering Education and Awareness Programs to reduce energy use beginning in 2016.

The goals described above were used by the Leadership Team to develop specific programs and projects for implementation to achieve each goal. This process is described in the next section.

The goals and criteria established for the SEP will be monitored during plan implementation as described in Section 6, “Measure and Report Performance”.

4. PROGRAMS AND PROJECTS FOR IMPLEMENTATION

Based on the goals and priorities described in Section 2 above, the City has selected programs and projects to actively reduce energy use. The programs and projects were selected from a menu of opportunities provided in the Local Government-Strategic Energy Planning Template. In addition, projects identified from City of Oakley staff are also included.

The programs and projects to be implemented with the SEP fall into the following broad categories:

1. Management and Organization Structure
2. Energy Efficiency
3. Facilities Operations
4. Sustainable Building Practices
5. Onsite Generation and Renewable Energy
6. Outreach and Awareness

Appendix 1 provides a detailed description of the energy programs and projects selected, including those already completed, currently being implemented, and planned for the future. These programs and projects are also reflected in the Implementation Programs and Projects Checklist, located in Appendix 2, which outlines the priorities, responsibility for implementation, schedule, and estimated cost of each. The Checklist will be used by the City to manage the implementation process.

5. FUNDING AND FINANCING OPPORTUNITIES

In an environment of budget cuts and limited funding, the City of Oakley understands the importance of leveraging the many funding resources available to local governments to help finance the energy-use reduction and generation projects selected for implementation in this plan. The following are a list of tools and resources that the City will consider as it evaluates energy projects moving forward. The list is broken into two general categories: funds that can be raised by the City and funds that come from external grants and incentives.

Funding Through City Action

- **Energy Performance Contracts (EPCs)*:*** Energy Performance Contracts (EPCs) are structured so that energy efficiency projects can be installed with little or no up-front costs to the customer. A portion of the revenue from energy savings go directly to an Energy Service Company (ESCO), who finances and constructs the project. ESCOs will finance the costs for the projects as part of the EPC. The structure and details of EPCs vary from project to project but the keys steps involved are generally universal. For an overview of these steps, best practices, and case studies, visit the link below.

  New York State Department of Environmental Conservation – Energy Performance Contracts for Local Governments: Industry Standards and Best Practices:
  www.dec.ny.gov/docs/administration_pdf/epcguide.pdf

  New York State Department of Environmental Conservation Homepage: www.dec.ny.gov/

  Additional resource: National Association of Energy Service Companies (NAESCO): www.naesco.org/

- **Power Purchase Agreements (PPA)*:*** A Power Purchase Agreement (PPA) is a contract where an end-use customer purchases clean energy from a power producer for on-site projects. In the case of solar photovoltaic electricity, customers can opt to purchase solar energy from a system installed on-site through a PPA at a negotiated rate instead of purchasing, installing, and maintaining the operations of solar photovoltaic panels themselves. The length of the PPA contract varies (as does the negotiated electricity rate), but typically ranges from 10 to 20 years. For more information on solar power purchase agreements, visit the Environmental Protection Agency (EPA) link below, which outlines PPA benefits and challenges and provides local-government case studies.

  EPA – Solar Power Purchase Agreements: www3.epa.gov/greenpower/buygp/solarpower.htm
  EPA Homepage: www3.epa.gov

  Additional resources:

  Renewable Energy Laboratory (NREL) Homepage: www.nrel.gov/
  NREL – Power Purchase Agreement Checklist for State and Local Governments:
  https://financere.nrel.gov/finance/content/power-purchase-agreement-checklist-state-and-local-governments

  - Provides a detailed guide to power purchase agreements for state and local governments including financial and contractual considerations.

  Department of Energy (DOE) Homepage: www.energy.gov

DOE – Power Purchase Agreements: energy.gov/eere/slsc/power-purchase-agreements

- Provides a general overview of PPAs and lists additional resources, including case studies.

- **National Renewable Energy Certificates (RECs)*:*** Renewable Energy Certificates (RECs), also known as Renewable Energy Credits, Green Tags, or Tradable Renewable Certificates (TRCs), represent the environmental benefits of one megawatt-hour (mWh) of electricity generated from renewable sources. A REC is a tradable commodity and can be sold as a source of revenue to the City. RECs can also be retained so that the owner has claim to the renewable attributes of the electricity. For more information about RECs, how they work, and how they are purchased and tracked, visit the Environmental Protection Agency links below.

  EPA - Renewable Energy Certificates: www3.epa.gov/greenpower/gpmarket/rec.htm
  EPA - REC Tracking: www3.epa.gov/greenpower/gpmarket/tracking.htm

- **Carbon Offset Credits:** Projects that offset or reduce greenhouse gas emissions can be certified by the Climate Action Reserve and traded as a Climate Reserve Tonne (CRT) credit, which is the equivalent of one metric ton of carbon dioxide equivalent emissions reduced or approximately 2,350 vehicle-miles traveled (VMT) for the average passenger vehicle. In addition to the cap-and-trade market, there are other marketplaces where CRTs can be purchased and sold, though similar to RECs, cities that sell CRTs lose the GHG "offset" attributes and cannot count the reductions towards their goals.

- **"Green" Revolving Fund (GRF):** A "green" revolving fund is an internal fund that would provide financing to energy and sustainability projects that generate cost savings. These savings are tracked and used to replenish the fund for future rounds of "green" investments, thus establishing a sustainable funding cycle. Capital for GRF's may be obtained from a variety of funding sources and the accounting system used to track the funds may also vary. A detailed, and useful guide on the creation and maintenance of a successful GRF can be found by following the link below. Although tailored for the higher educational space, its resources are relevant for a variety of institutions and agencies, including local governments.

  Billion Dollar Green Challenge - Green Revolving Funds: An Introductory Guide to Implementation & Management: http://greenbillion.org/wp-content/uploads/2013/01/GRF_Implementation_Guide.pdf

6. MEASURE AND REPORT PERFORMANCE

As with any successful program, the ongoing progress and performance of energy reduction activities should be monitored and compared to goals and criteria. This will require continuous participation of the City Energy Leadership Team, City staff, and other participants in the process. To communicate results and ensure transparency and accountability, the results of the SEP activities should be communicated to the City Council and to the larger community on a regular basis.

The following section describes the planned process for measuring and reporting energy use reduction activities and achievements.

6.1 MEASURING PERFORMANCE

In order to monitor the City's progress towards its energy goals, the City Energy Leadership Team plans to collect information on the following key metrics at the regular intervals described below. In addition, the table below indicates responsibility for the accomplishment of each goal to meet the timelines established.

Topic	Established Goal	Performance Metric and Frequency of Measurement	Responsibility
Energy Use Reduction	Seek ways to reduce annual energy usage for existing facilities. Explore opportunities for energy efficiency, demand reduction, and/or clean self-generation measures. Evaluate and begin implementing viable measures that meet economic criteria by December 2017. Low-cost and no-cost measures should be prioritized for immediate implementation.	Utilize 2015 benchmarking study and comprehensive EBEW (QuEST) energy audit conducted in September 2015 to establish annual energy use and demand reduction goals (target 10% reduction). Plan appropriate efficiency, demand reduction, and/or clean generation measures by mid-2016 to meet reduction goals.	Senior Planner
Green Building	Improve energy performance to exceed Title 24 requirements for new construction and major renovations of City facilities where/when supported by cost-benefit analyses; consider ways to update existing City policies to support this goal.	Develop and adopt sustainable design criteria by 2017. Revisit and update criteria bi-annually.	Senior Planner
Economics	Explore existing economic and fiscal criteria commonly used for the evaluation and implementation of energy use reduction and energy generation strategies. Adopt economic and fiscal criteria from these common examples, or develop and adopt new criteria determined most appropriate for the City of	Utilize developed economic and fiscal criteria to evaluate and select energy projects by March 2017. Revisit criteria bi-annually to ensure it is still aligned and relevant to City goals and priorities.	Senior Planner, Finance Director

	Oakley by December 2016.		
Greenhouse Gas Reduction	Leverage the GHG inventory conducted in 2013 (or any more recent study), the adopted SEP, and the EBEW Civic Spark intern program to plan and implement a CAP for the City. Planning for the CAP should occur in early 2016.	Use the 2013 GHG inventory (or any more recent study) to inform GHG reduction goals and strategies outlined in the future CAP. Conduct a comprehensive GHG inventory every 5 years simultaneously with CAP to ensure goals are being met.	Senior Planner
Community Awareness & Engagement	Engage City staff and the larger community in Energy Plan implementation by developing and offering Education and Awareness Programs to reduce energy use beginning in 2016.	Beginning in 2017, the City will incorporate educational opportunities and information sharing centered on energy and sustainability at community events. Updates to the City sustainability webpage with up-to-date resources and information will occur on a quarterly basis.	Senior Planner

6.2 REPORTING PERFORMANCE

The Energy Leadership Team will report progress on established goals in consistency with performance metrics and frequency of measurements identified above. Progress will be reported to the City Council on a regular basis as plan activities are accomplished. In addition, the City will create a Sustainability web page on the City web site that will contain information about energy plan activities and provide periodic progress reports for the community at large.

APPENDICES

CITY OF OAKLEY

APPENDIX 1: PROGRAMS & PROJECTS

1. MANAGEMENT AND ORGANIZATIONAL STRUCTURE
2. ENERGY EFFICIENCY
3. FACILITIES OPERATION
4. SUSTAINABILE BUILDING PRACTICES
5. ON-SITE GENERATION AND RENEWABLE ENERGY
6. OUTREACH & AWARENESS

PROGRAMS AND PROJECTS

Based on the goals and priorities adopted by the City, the following programs and projects have been chosen to actively reduce energy use. The programs and projects were selected from a menu of opportunities provided in the LG-SEP Template. In addition, projects identified by City of Oakley staff are also included.

The following provides a detailed description of the selected programs and projects, including those already completed, currently being implemented, and planned for the future. These programs and projects are also reflected in the Implementation Programs and Projects Checklist, located in Appendix 2, which outlines the priorities, responsibility for implementation, schedule, and estimated cost of each. The Checklist will be used by the City to manage the implementation process.

1. MANAGEMENT AND ORGANIZATIONAL STRUCTURE

In order to implement an effective SEP, it is important for a city to have a policy mandate for energy and/or sustainability, the organizational structure required to manage the process, and the financial and technical resources to accomplish the plan goals.

The following implementation programs will be implemented to meet this goal:

1.1. ADOPT A CITY ENERGY POLICY

The City has demonstrated its commitment to environmental, fiscal, and social sustainability by drafting the Energy Vision statement outlined in the SEP. Upon adoption of the SEP by the Oakley City Council, the Energy Vision statement will act as a formal City policy, informing and guiding the City to a more environmentally sustainable future.

1.2. ESTABLISH A CITY ENERGY COMMITTEE

The City has authorized the establishment of an "Energy Leadership Team" that is responsible for the drafting of an SEP. The Team consists of staff from a variety of City departments and currently meets on a bi-monthly basis. Upon adoption of the SEP by the Oakley City Council, the Team will meet, as necessary, to assist in the implementation of the Plan. Annual meetings will be held to monitor Plan implementation and to make revisions and/or updates to the Plan as needed.

1.3. APPOINT AN ENERGY PLAN COORDINATOR

An existing City staff member will be responsible for the implementation of the SEP as well as tracking and reporting its results to the City Manager, City Council, and community-at-large.

In addition, the City of Oakley will explore taking advantage of the EBEW "Civic Spark" Initiative, which will provide an intern to work full time at the City to assist with coordination and management of all Energy Plan activities.

1.4. FUNDING AND RESOURCES TO SUPPORT ENERGY PLAN ACTIVITIES

The City will develop a plan to identify and obtain funding for the implementation of energy plan activities. This funding plan will be consistent with the objectives of the City's Two-Year Strategic Plan. Sources of funding may be from internal City budgets, grants, local or state agencies and energy utilities. Where possible, support from PG&E, including energy project incentives and the EBEW local government partnership resources, will be employed.

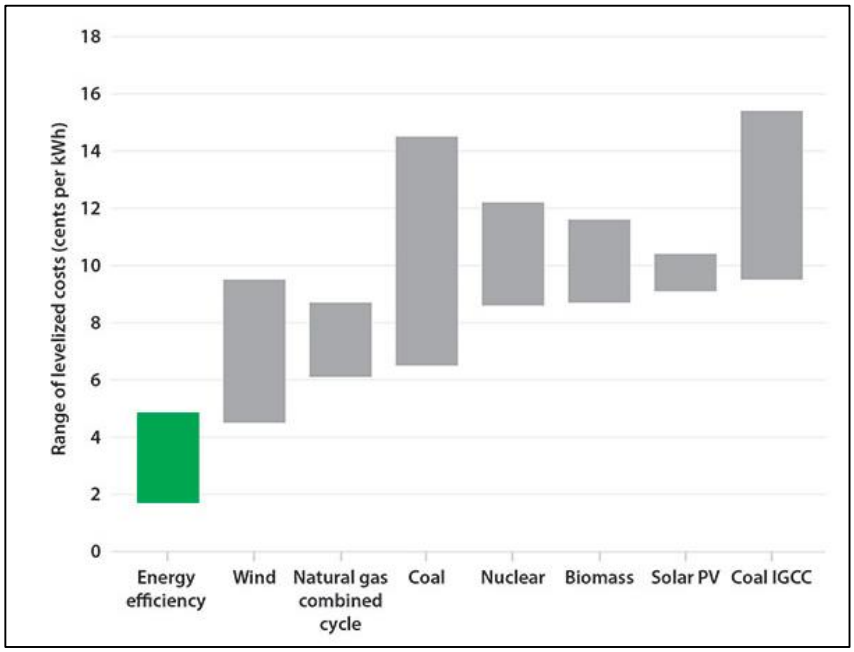
1.5. ENGAGE ENERGY PROFESSIONALS AS REQUIRED

Many of the projects identified in the plan may require a level of technical or programmatic expertise not available among City personnel. Based on need and expertise required, the City will engage experts or consultants to assist with the evaluation and implementation of energy efficiency or other sustainability projects to ensure project success.

2. ENERGY EFFICIENCY

Energy efficiency is one of the most cost effective ways to reduce the City's energy use and carbon footprint. When implemented properly, efficiency measures can decrease energy use without compromising comfort, can improve indoor air quality and enhance employee and staff performance. Energy efficiency will be a higher priority than renewable energy due to more favorable economics and to avoid over-sizing renewable energy systems.

The chart below illustrates a comparison of the cost effectiveness of energy efficiency to power generation. These costs do not account for externalities, such as health costs, pollution costs, and costs incurred from environmental damage and cleanup.



Costs of electricity resource options, March 2014. ***Source:*** *American Council for an Energy-Efficient Economy*

The following Energy Efficiency Implementation Programs and Projects will be implemented by the City.

2.1. SET ENERGY EFFICIENCY GOALS

The City will establish energy use reduction goals based on a benchmarking analysis of City facilities. The energy projects and measures to be implemented to achieve these goals will be evaluated and selected based on City economic and fiscal criteria. Performance of energy projects will be monitored annually by the Energy Leadership Team to ensure progress towards established goals.

2.2. EVALUATE MECHANISMS FOR THE IMPLEMENTATION OF ENERGY EFFICIENCY PROJECTS

The City will evaluate appropriate project delivery models for the implementation of energy efficiency projects and programs based on factors that include the specialized expertise and capabilities necessary for each project.

2.3. CONDUCT COMPREHENSIVE FACILITY ENERGY AUDITS

"No-cost" audits will be utilized by the City to evaluate its facilities to the extent practicable. Where possible, the level of detail and energy savings calculations will be that of an American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Level II audit. An ASHRAE Level II audit includes an analysis of energy use at a facility and identifies no-cost, low-cost and capital improvement energy efficiency measures with detailed energy and financial calculations.

2.3.1. EVALUATE AND IMPLEMENT NEW AND EXISTING AUDIT RECOMMENDATIONS

Audit recommendations will be implemented where appropriate and consistent with the City's policies. Audits will be promptly reviewed by the City upon completion to ensure that the City capitalizes on the cost-savings that would result in swift project implementation. In making decisions about investments in energy efficiency and renewable energy projects, the City will use life-cycle cost analyses, targeting projects with low and no additional life-cycle costs first. Where appropriate, the City will consider the life-cycle costs of combinations of projects, particularly to encourage the bundling of energy efficiency projects with renewable energy projects to improve project economics.

2.4. IMPLEMENT ONGOING ENERGY MONITORING

The City has smart meters installed at the building level to monitor City energy use. The installation of an energy management system (EMS) will be considered to further aid in energy monitoring and analysis.

2.5. PARTICIPATE IN DEMAND RESPONSE (DR) PROGRAMS

Several City sites are currently enrolled in the PG&E Peak Pricing program to reduce energy demand. By using less electricity on Peak Day Pricing Event Days when the power gird is under the most strain, the City is helping keep California's energy supply reliable for everyone and reduces the City's energy cost. City Hall is not among the sites currently enrolled in the program but plans are in place for all City facilities to participate by 2016.

2.6. IDENTIFY AND TAKE ADVANTAGE OF GRANT AND INCENTIVE PROGRAMS

The City has taken advantage of available incentives for energy efficiency projects offered through PG&E, such as the nearly $24,000 rebate that was granted for the LED Street-Light installation project described in Section 3. The City will continue to identify and take advantage of grant and incentive programs available, including any additional energy utility incentive programs and the CEC low-interest energy project loan programs. See Section 5 for more details on funding opportunities.

2.7. ENERGY EFFICIENT EQUIPMENT

When purchasing new equipment, the City will seek to purchase and utilize energy efficient equipment, consistent with the City of Oakley Environmentally Preferable Purchasing Policy, described in more detail below.

2.7.1 ESTABLISH AN ENERGY EFFICIENCY PURCHASING POLICY

The City adopted an "Environmentally Preferable Purchasing Policy" in February 2011, which guides the City in its purchasing activities when environmentally preferable options are both practical and cost effective. It includes a section on energy efficiency that states that, where applicable and practical, the City will seek to purchase energy-efficiency equipment, including:

- High efficiency space heating systems and high efficiency space cooling equipment.
- Replace inefficient interior lighting with energy-efficient equipment.
- Replace inefficient exterior lighting, street lighting and traffic signal lights with energy-efficient equipment. Minimize exterior lighting where possible to avoid unnecessary lighting of architectural and landscape features while providing adequate illumination for safety and accessibility.
- Purchase EPA Energy Star certified products when available and cost effective. When Energy Star labels are not available, choose energy-efficiency products that are in the upper 25% of energy efficiency as designated by the Federal Energy Management Program.

The policy also addresses purchasing in a variety of other areas including water saving products, green building, and landscaping. The full City of Oakley Environmentally Preferable Purchasing Policy can be found on the City of Oakley webpage at www.ci.oakley.ca.us.

2.7.2 EFFICIENT LIGHTING AND LIGHTING CONTROLS

Consistent with the Environmentally Preferable Purchasing Policy, when installing new interior and exterior applications, the City will seek to install current generation of energy efficient lighting and lighting controls. Energy efficient lighting technologies include low-wattage linear fluorescent lights, compact fluorescent lights, LEDs, and induction lighting. Examples of lighting controls include occupancy sensors, photocell installations for turning off lights when there is enough daylight, and time clocks for scheduling lights on and off automatically.

2.7.3 INSTALL ENERGY EFFICIENT HVAC SYSTEMS

In addition to buying energy efficient air conditioners, chillers, and boilers, the City will consider the feasibility of further increasing the energy efficiency of their HVAC systems using the following strategies:

- Install Economizers
- Enhance Control of Equipment
- Appropriately Size Equipment
- Reduce Unnecessary Heat Gain and Loss
- Perform Regular Maintenance on Equipment

2.7.4 MANAGE PLUG LOADS

"Plug Loads" are energy consuming equipment that draws electricity from a wall socket. Examples of plug loads include computers, printers, refrigerators, and space heaters. The City manages plug loads by activating any energy saving features on equipment, where appropriate, and will explore whether substantial benefits might be obtained by installing occupancy sensed power strips.

3. FACILITIES OPERATION

In addition to installing energy efficient equipment, the City will strive to operate high-performing facilities, buildings, and energy infrastructure systems that are optimized for inhabitant comfort, productivity, and energy and resource efficiency. The following programs will be implemented by the City to meet this goal:

3.1. ENCOURAGE AND SUPPORT ENERGY EFFICIENCY TRAINING OF STAFF

The City will provide informal training and reminders to encourage staff to practice energy reduction best practices in the operations and maintenance of City facilities.

3.2. INSTALL ENERGY MANAGEMENT SYSTEMS

The City will explore the installation of a computerized energy management system (EMS) to provide centralized reporting and control of City energy-related activities. City staff will strive to achieve optimum efficiency in the use of natural gas, electricity, or other energy resources to meet the heating, cooling, and lighting needs of City facilities. This will be a future project and will be considered if appropriate and consistent with the City's energy and fiscal goals.

3.3. ADJUST TEMPERATURE SET POINTS AND SCHEDULE OPERATING TIMES

The City building thermostats have been programmed such that heating will only occur at certain temperature set points, helping the City avoid the energy costs associated with overcooling and overheating of its buildings. The City will prioritize improving the control of heating and cooling within the City Hall building through the implementation of measures identified as part of a thorough energy audit. The City is also in the process of identifying funding for new, remotely controlled thermostats for the Recreational Building – a measure that is estimated to significantly increase energy efficiency and reduce energy costs.

3.4. OPTIMIZE BUILDING OCCUPANCY SCHEDULING

The Oakley City Hall building is currently closed two Fridays out of each month to help reduce operational costs and save energy. During these closure periods, minimal lighting and HVAC equipment is used in the building. Computers, copy-machines and printers are placed on "stand-by" mode to reduce plug load energy usage as well.

3.5. OPTIMIZE HVAC EQUIPEMENT SCHEDULING

The City currently optimizes HVAC equipment scheduling, and avoids cooling and heating spaces when unnecessary. All air conditioning equipment, including supply and return air fans, are shut off on weekends, holidays, and for varying periods each night.

3.6. ACTIVATE ENERGY-SAVING FEATURES FOR APPLIANCES AND COMPUTERS

Where appropriate, the City activates energy-saving features on appliances and computer equipment within City facilities, for example, power-saving modes on PCs, copiers, printers, and other office equipment.

4. SUSTAINABLE BUILDING PRACTICES

Construction and renovation of new and existing facilities provides a significant opportunity to reduce the environmental impacts of the built environment through sustainable building practices. The City will incorporate energy and resource efficient "green building" practices in the design and construction of all new and renovated facilities. The following are planned to meet this goal:

4.1. IMPLEMENT SUSTAINABLE DESIGN PRACTICES

The City will incorporate sustainability into the design criteria for new construction, renovation, maintenance, and repair projects compatible with the City's economic and fiscal criteria. Energy efficient and sustainable design will be addressed early in the project planning and design phases to identify those design elements that deliver both energy savings and maximize cost effectiveness. Sustainable design criteria for consideration include:

- Solar energy opportunities
- Durable systems and finishes with long life cycles that minimize maintenance and replacement
- Systems designed for optimization of energy, water, and other natural resources
- Maximization natural daylighting and ventilation
- Optimization of indoor environmental quality for occupants by limiting the use of building materials and furnishing with high levels of Volatile Organic Compounds (VOCs) and utilizing energy- efficient HVAC systems
- Utilization of environmentally preferable products and processes, such as recycled content materials and recyclable materials
- Optimization of layout and design of spaces to accommodate reconfiguration, with the expectation that the facility will be renovated and re-used (versus demolished)
- Procedures that monitor, trend, and report operational performance
- Design outdoor spaces to incorporate sustainable landscaping practices, minimize impervious surfaces, and plant trees to shade parking lots to prevent the heat island effect
- Any energy-using equipment acquired for the furnishing of new and renovated buildings will be ENERGY STAR® rated or equivalent in accordance with the purchasing policy adopted by the City

The design criteria listed above will include taking advantage of utility-provided design programs that help incorporate and evaluate the benefits of these practices, including the PG&E "Savings by Design" program.

4.2. COMMISSION NEW BUILDINGS

All new buildings will be commissioned after construction to ensure that systems were installed and operating as designed. Individual systems will also be commissioned to ensure that they run as efficiently as possible.

5. ON-SITE GENERATION AND RENEWABLE ENERGY

As described below, the City has evaluated the potential for renewable energy and clean on-site generation on City Hall. The City adheres to the philosophy that renewable generation implementation should occur only after significant efficiency and conservation plans have been implemented to ensure that any self-generation or demand response programs or projects are sized appropriately.

The following implementation programs will be implemented by the City to meet this goal:

5.1. RE-EVALUATE RENEWABLE ENERGY GENERATION

The City had solar photovoltaic (PV) feasibility studies conducted for City Hall by a vendor in January 2009 and September 2011. Solar panel installation was not recommended at those times due to unfavorable economics. Since the cost of solar has been reduced dramatically since 2011, the City will consult an independent consultant to provide an updated feasibility study and will continue to consider opportunities for renewable generation where appropriate and consistent with the City's economic policy.

5.2. IDENTIFY AND TAKE ADVANTAGE OF GRANT AND INCENTIVE PROGRAMS

The City will explore and take advantage of grant and incentive programs available for self-generation or renewable energy through the local utilities. See Section 5 of the SEP for utility incentive program information.

6. OUTREACH & AWARENESS

The effectiveness of a Local Government SEP is highly dependent on the actions of individual City staff and employees. While energy efficient equipment and the installation of solar panels will make a city more energy responsible, cultural and behavioral changes can have a large impact on the effectiveness of these projects. These factors also strongly influence the likelihood of the continued prioritization of sustainability within City operations and in the community itself. Additionally, it is important to maintain transparency and keep employees and the community informed of the City's progress with energy planning and action. Ideally, the city of Oakley SEP will act as a springboard toward more robust activities with the larger community.

The City will implement the following to help achieve this goal and will evaluate future programs and projects on an annual basis.

6.1. CREATE A WEBPAGE DEDICATED TO CITY SUSTAINABILITY

The City will establish a webpage on the City website dedicated to energy and sustainability efforts. The intent of the webpage is to act as an education and awareness tool for the larger community and highlight the City's commitment to energy use reduction and sustainability as whole. It will host the latest version of the City's completed SEP and provide a summary of the vision, goals, and past, and planned projects. The Energy Plan Coordinator provided through the Civic Spark Program, or a member of the Energy Leadership Team, will manage the webpage and ensure that it is kept up-to-date with the latest City developments and the results of the City's efforts.

APPENDIX 2: ENERGY PROGRAMS AND PROJECTS CHECKLIST

Strategic Energy Plan Summary
Implementation Programs and Checklist

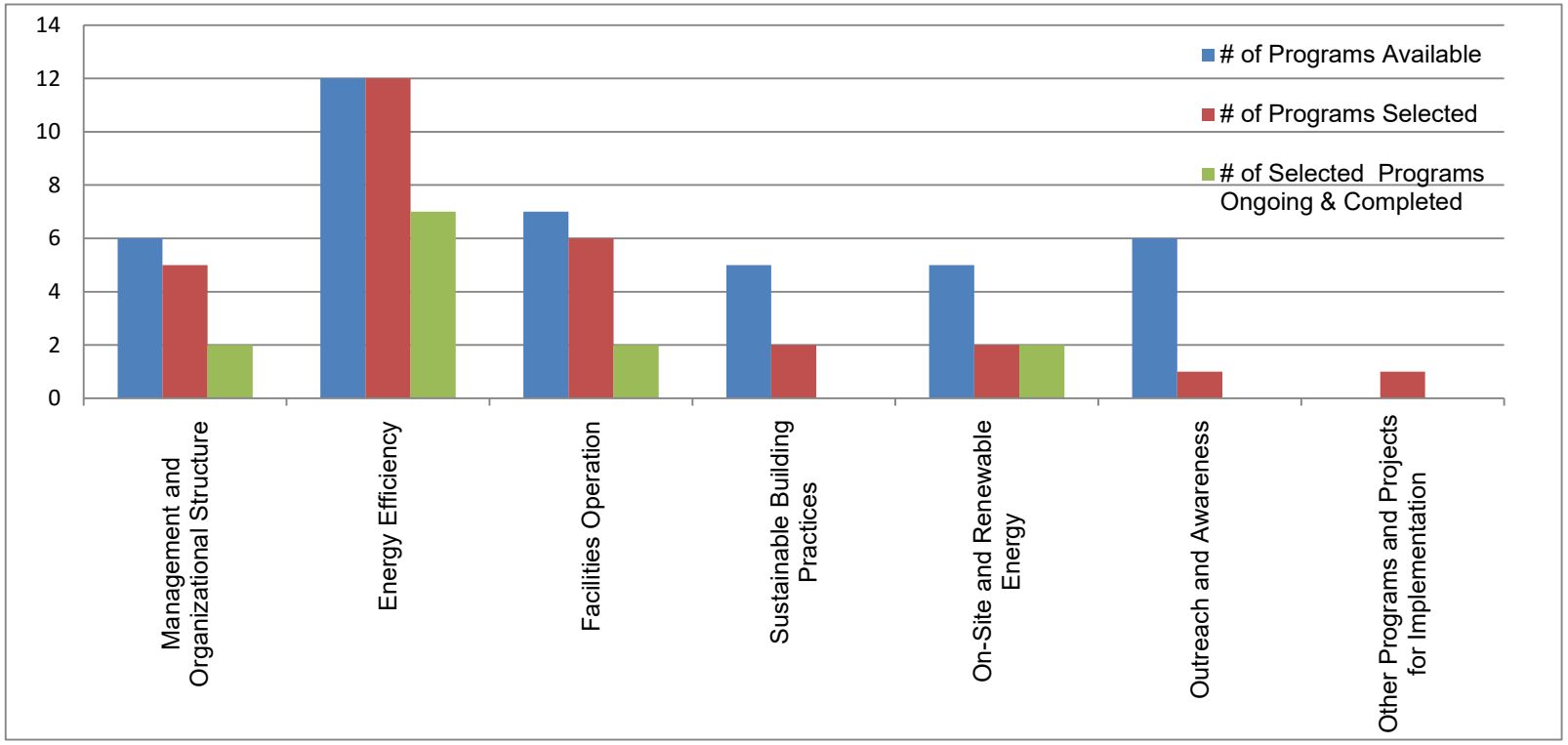
City: Oakley
Project: Strategic Energy Plan
Date: 10/26/2015

Plan Section	Template Plan Section Description	# of Programs Available	# of Programs Selected	# of Selected Programs Ongoing & Completed
1	Management and Organizational Structure	6	5	2
2	Energy Efficiency	12	12	7
3	Facilities Operation	7	6	2
4	Sustainable Building Practices	5	2	0
5	On-Site and Renewable Energy	5	2	2
6	Outreach and Awareness	6	1	0
7	Other Programs and Projects for Implementation	6	1	0
	Totals	**41**	**29**	**13**

For questions, comments, or feedback, please contact Matt Sullivan, Newcomb | Anderson | McCormick, 415-896-0300, matt_sullivan@newcomb.cc

Strategic Energy Plan Programs and Projects Chart

City: Oakley
Project: Strategic Energy Plan
Date: 10/26/2015



Sustainability Template Plan
Implementation Programs and Plans Checklist

City: Oakley
Project: Strategic Energy Plan
Date: 10/26/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 1	**MANAGEMENT AND ORGANIZATIONAL STRUCTURE**		**Comments**
☐	1.x	Establish a City Council Energy Committee	
☑	1.1	Adopt a City Energy Policy	
☑	1.2	Establish a City Energy Committee	
☑	1.3	Appoint an Energy Plan Coordinator	
☑	1.4	Funding and Resources to Support Energy Plan Activities	
☑	1.5	Engage Energy Professionals as Required	
☐	1.6	Integrate Energy Planning into City General Plan or Climate Action Plan	
☐	*1.x*	*Enter Other Program and Project 1, text will change color*	
☐	*1.x*	*Enter Other Program and Project 2, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan
Implementation Programs and Checklist

City: Oakley
Project: Strategic Energy Plan
Date: 10/26/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 2	**ENERGY EFFICIENCY**		**Comments**
☑	2.1	Set Energy Efficiency Goals	
☑	2.2	Evaluate Mechanisms for the Implementation of Energy Efficiency Projects	
☐	2.2.1	Conduct Facility Prioritization Survey	
☑	2.3	Conduct Comprehensive Facility Energy Audits	
☑	2.3.1	Evaluate & Implement New and Existing Audit Recommendations	
☑	2.4	Implement Ongoing Energy Monitoring	
☑	2.5	Participate in Demand Response (DR) Programs	
☑	2.6	Identify and Take Advantage of Grant and Incentive Programs	
☑	2.7	Energy Efficient Equipment	
☑	2.7.1	Establish an Energy Efficiency Purchasing Policy	
☑	2.7.2	Efficient Lighting and Lighting Controls	
☑	2.7.3	Install Energy Efficient HVAC Systems	
☑	2.7.4	Manage Plug Loads	
☐	*2.x*	*Enter Other Program and Project 2, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan
Implementation Programs and Checklist

City: Oakley
Project: Strategic Energy Plan
Date: 10/26/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 3	**FACILITIES OPERATION**		**Comments**
☑	3.1	Encourage and Support Energy Efficiency Training of Staff	
☑	3.2	Install Energy Management Systems	
☑	3.3	Adjust Temperature Set Points and Schedule Operating Times	
☑	3.4	Optimize Building Occupancy Scheduling	
☑	3.5	Optimize HVAC Equipment Scheduling	
☑	3.6	Activate Energy-Saving Features for Appliances and Computers	
☐	3.7	Pursue Monitoring-Based(MBCx)/Retro-Commissioning (RCx)	
☐	*3.x*	*Enter Other Program and Project 1, text will change color*	
☐	*3.x*	*Enter Other Program and Project 2, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan
Implementation Programs and Checklist

City: Oakley
Project: Strategic Energy Plan
Date: 10/26/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 4	**SUSTAINABLE BUILDING PRACTICES**		**Comments**
☐	4.x	Establish a Green Building Standard	
☑	4.1	Implement Sustainable Design Practices	
☐	4.x	Use an Integrated Systems Approach in Building Design	
☐	4.x	Hire Sustainable Design Professionals	
☑	4.2	Commission New Buildings	
☐	*4.x*	*Enter Other Program and Project 1, text will change color*	
☐	*4.x*	*Enter Other Program and Project 2, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan
Implementation Programs and Checklist

City: Oakley
Project: Strategic Energy Plan
Date: 10/26/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 5	**ON-SITE AND RENEWABLE ENERGY**		**Comments**
☑	5.1	Re-evaluate Renewable Energy Generation	
☐	5.x	Evaluate Load Shifting Technologies	
☐	5.x	Minimize Greenhouse Gas Intensity of Purchased Electricity	
☐	5.x	Participation in Community Choice Aggregation	
☑	5.2	Identify and Take Advantage of Grant and Incentive Programs	
☐	*5.x*	*Enter Other Program and Project 1, text will change color*	
☐	*5.x*	*Enter Other Program and Project 2, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan
Implementation Programs and Checklist

City: Oakley
Project: Strategic Energy Plan
Date: 10/26/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 6	**OUTREACH AND AWARENESS**		**Comments**
☑	6.1	Create a Webpage Dedicated to City Sustainability	
☐	6.2	Hold Workshops and Presentations	
☐	6.3	Coordinate Sustainability Events	
☐	6.4	Hold Sustainability Challeneges and Competitions	
☐	6.5	City Organization Outreach and Awareness	
☐	6.6	Community-wide Outreach & Awareness	
☐	*6.6*	*Enter Other Program and Project 1, text will change color*	
☐	*6.7*	*Enter Other Program and Project 2, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan
Implementation Programs and Checklist

City: Oakley
Project: Strategic Energy Plan
Date: 10/26/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 7	**OTHER PROGRAMS AND PROJECTS FOR IMPLEMENTATION**		**Comments**
☐	*7.1*	*Enter Other Program and Project 1, text will change color*	
☐	*7.2*	*Enter Other Program and Project 2, text will change color*	
☐	*7.3*	*Enter Other Program and Project 3, text will change color*	
☐	*7.4*	*Enter Other Program and Project 4, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan Summary
Implementation Programs and Plans Checklist

City: Oakley
Project: Strategic Energy Plan
Date: 10/26/2015

Priority Implementation Plans Indicated Below

Section 1 MANAGEMENT AND ORGANIZATIONAL STRUCTURE									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
1.1	Adopt a City Energy Policy	11/15/2015	High	In-process		1,2,3,4,5		Senior Planner	
1.2	Establish a City Energy Committee		High	Complete		1,2,3,4,5		Senior Planner	
1.3	Appoint an Energy Plan Coordinator		Low	Planned		1,2,3,4,5		Senior Planner	
1.4	Funding and Resources to Support Energy Plan Activities		High	Planned		1,2,3,4,5		Senior Planner	
1.5	Engage Energy Professionals as		Med	Ongoing		1,2,3,4,5		Senior Planner	

Section 2 ENERGY EFFICIENCY									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
2.1	Set Energy Efficiency Goals		High	Planned		1,4		Senior Planner	
2.2	Evaluate Mechanisms for the Implementation of Energy Efficiency		High	Ongoing		1		Senior Planner	
2.3	Conduct Comprehensive Facility Energy Audits	Audited City Hall 9/15	High	In-process		1,3		Senior Planner	
2.3.1	Evaluate & Implement New and Existing Audit Recommendations	Audited City Hall 9/15	High	Planned		1,3		Senior Planner	
2.4	Implement Ongoing Energy Monitoring		High	Planned		1		Senior Planner	

Strategic Energy Plan Summary
Implementation Programs and Plans Checklist

City: Oakley
Project: Strategic Energy Plan
Date: 10/26/2015

Priority Implementation Plans Indicated Below

TRUE									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
2.5	Participate in Demand Response (DR) Programs	City enrolled in PG&E Peak Day Pricing Program at the following sites (City Hall not currently enrolled): 10 RED BARN CT (IRRIGATION CONTROLLER); 4015 EMPIRE AVE; 4200 LIVE OAK AVE; 608 SCABBARD WY (IRRIGATION CONTROLLER); 1882 LAKEWOOD DR; 1799 PARK PL A (IRRIGATION CONTROLLER); 2300 OAKLEY RD; N/S CAROENTER RD W/O; NS/LAUREL RD AND 204 2ND ST; 1250 OHARA AVE	High	Complete		1,4		Senior Planner	
2.6	Identify and Take Advantage of Grant and Incentive Programs		High	Ongoing		1,3		Senior Planner	
2.7	Energy Efficient Equipment		Med	Ongoing		1		Senior Planner	
2.7.1	Establish an Energy Efficiency Purchasing Policy		High	Complete		1,3		Senior Planner	
2.7.2	Efficient Lighting and Lighting Controls		High	Ongoing		1		Senior Planner	
2.7.3	Install Energy Efficient HVAC Systems		Med	Planned		1		Senior Planner	
2.7.4	Manage Plug Loads		High	Ongoing		1		Senior Planner	

Strategic Energy Plan Summary
Implementation Programs and Plans Checklist

City: Oakley
Project: Strategic Energy Plan
Date: 10/26/2015

Priority Implementation Plans Indicated Below

Section 3 FACILITIES OPERATION									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
3.1	Encourage and Support Energy Efficiency Training of Staff		Med	Planned		2,5		Senior Planner	
3.2	Install Energy Management Systems		Med	Planned		1,2		Senior Planner	
3.3	Adjust Temperature Set Points and Schedule Operating Times		Med	Planned		1,2		Senior Planner	
3.4	Optimize Building Occupancy		High	Complete		1,2		Senior Planner	
3.5	Optimize HVAC Equipment Scheduling		Med	Complete		1,2		Senior Planner	
3.6	Activate Energy-Saving Features for Appliances and Computers	Copy & Fax machines have been programmed; Computers still need programming	High	Planned		1,2		Senior Planner	

Section 4 SUSTAINABLE BUILDING PRACTICES									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.1	Implement Sustainable Design Practices		Low	Planned		2		Senior Planner	
4.2	Commission New Buildings		Low	Planned		2		Senior Planner	

Section 5 ON-SITE AND RENEWABLE ENERGY									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
5.1	Re-evaluate Renewable Energy Generation	As needed; Last feasibility study completed in 2011	Med	Ongoing		1,4		Senior Planner	
5.2	Identify and Take Advantage of Grant and Incentive Programs		High	Ongoing		1,3		Senior Planner	

Strategic Energy Plan Summary
Implementation Programs and Plans Checklist

City: Oakley
Project: Strategic Energy Plan
Date: 10/26/2015

Priority Implementation Plans Indicated Below

Section 6 OUTREACH AND AWARENESS									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
6.1	Create a Webpage Dedicated to City Sustainability		High	Planned		5		Senior Planner	

Section 7 OTHER PROGRAMS AND PROJECTS FOR IMPLEMENTATION									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address

APPENDIX 3: ENERGY USE BENCHMARKING STUDY

The East Bay Energy Watch (EBEW)[1] benchmarked the energy performance of the buildings and facilities operated by the City of Oakley. The purpose of energy benchmarking is to measure changes in energy performance of a building, or portfolio of buildings, against an established baseline. Buildings can be benchmarked against their own historic baseline, or using the energy performance of other, similar buildings. It should be noted that Energy Star Portfolio Manager, the industry-standard benchmarking tool, does not standardize energy use by building operations for the many types of buildings local governments manage. Therefore, benchmarking should not be the only tool in a facility manager's toolbox. It provides a platform on which an agency can collect and organize its energy data, draw comparisons on building energy performance using very limited information, and form questions that require deeper investigation.

The data presented below provides a snapshot of benchmarking results. Benchmarking utilizes 12-month periods of energy use data; the end of each building's baseline and current energy period is indicated in Table 1[2]. All energy sources (e.g. electricity and natural gas) used in a building are converted to kBtu and standardized by floor area. Figure 1 compares baseline to current energy performance for each building. Energy performance of the Community Annex Building improved over time, but City Hall, which also hosts the Police Department, increased in energy use intensity more than twofold. Changes in operation that led to this increase in intensity occurred during a period of time less than two years (refer to End Dates, Table 1). Buildings housing both central administrative and law enforcement functions are usually the most energy intense and expensive buildings for local governments. Oakley spent over $50,000 on energy used in City Hall during the current energy period (Figure 2).

Table 1. City buildings, space type as designated by Energy Star, and 12-month baseline and current energy period ending dates.

Oakley Buildings	Baseline Period End Date	Current Period End Date	Space Type
City Hall & Police Dept.	10/31/2013	6/30/2015	Office
Comm. Annex Building	6/30/2010	6/30/2015	Social/Meeting Hall
Recreation Portables	6/30/2011	6/30/2015	Social/Meeting Hall

Still, City Hall was relatively less energy intense when compared to the energy performance of other, similar buildings in the region (Figure 3). The low energy intensity of Oakley's other buildings, illustrated in Figure 3, may represent their relative efficiency compared to similar buildings in the region, but more than likely it reflects the extreme differences in their patterns of use. It is recommended that the City of

[1] The East Bay Energy Watch (EBEW) is a partnership between Pacific Gas and Electric Company (PG&E) and local governments, non-profit and for-profit energy service providers in the East Bay dedicated to providing innovative energy efficiency solutions for residents and businesses in communities throughout Alameda and Contra Costa Counties.

[2] Energy period ending dates necessarily differ based on availability of energy data.

Oakley examine the patterns of energy use in all of their facilities[3] using simple tools like PG&E's MyEnergy database (www.pge.com/myenergy), and explore opportunities for energy efficiency retrofits or other efforts to reduce the energy intensity of the buildings they operate, particularly that of City Hall. Most energy efficiency projects are eligible for rebates from PG&E, and some projects may qualify for 0% interest On-Bill Financing.

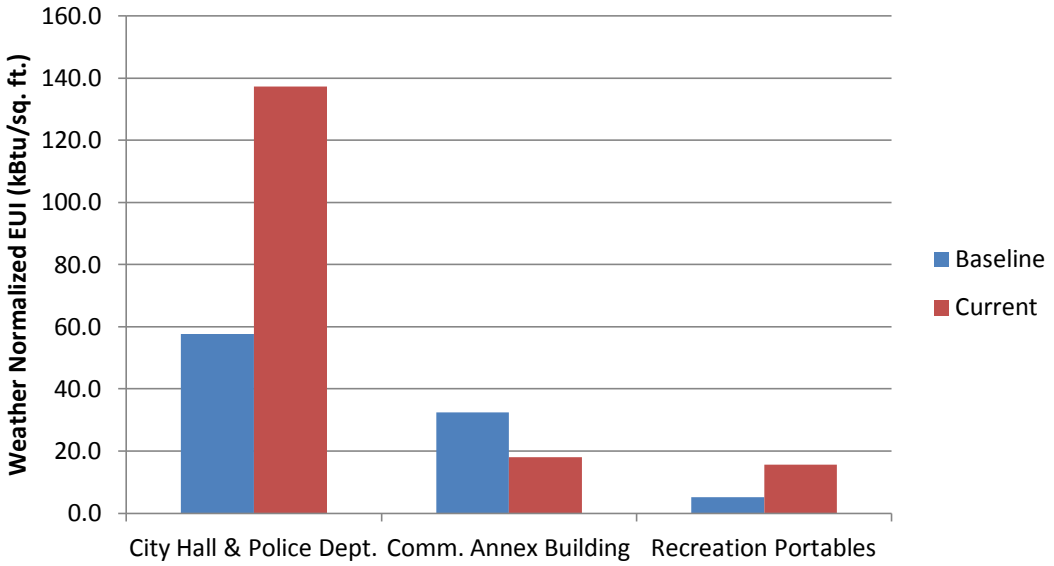


Figure 1. Comparison of baseline period EUI (energy use intensity; kBtu/ft^2) to current period EUI, by building operated by City of Oakley.

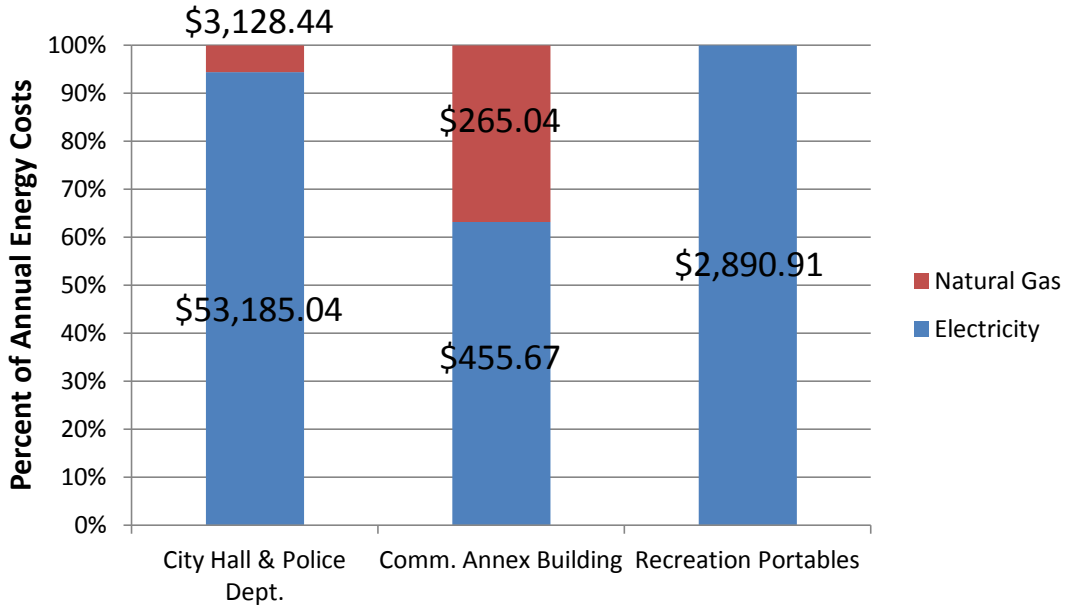


Figure 2. Comparison of current period energy costs and their percent distribution by energy source.

[3] Local governments use energy to operate numerous irrigation controllers, traffic and street lights, and park facilities. Benchmarking is not an appropriate exercise for these non-building end uses, but the usage and costs of all energy should be organized and monitored using a variety of available tools.

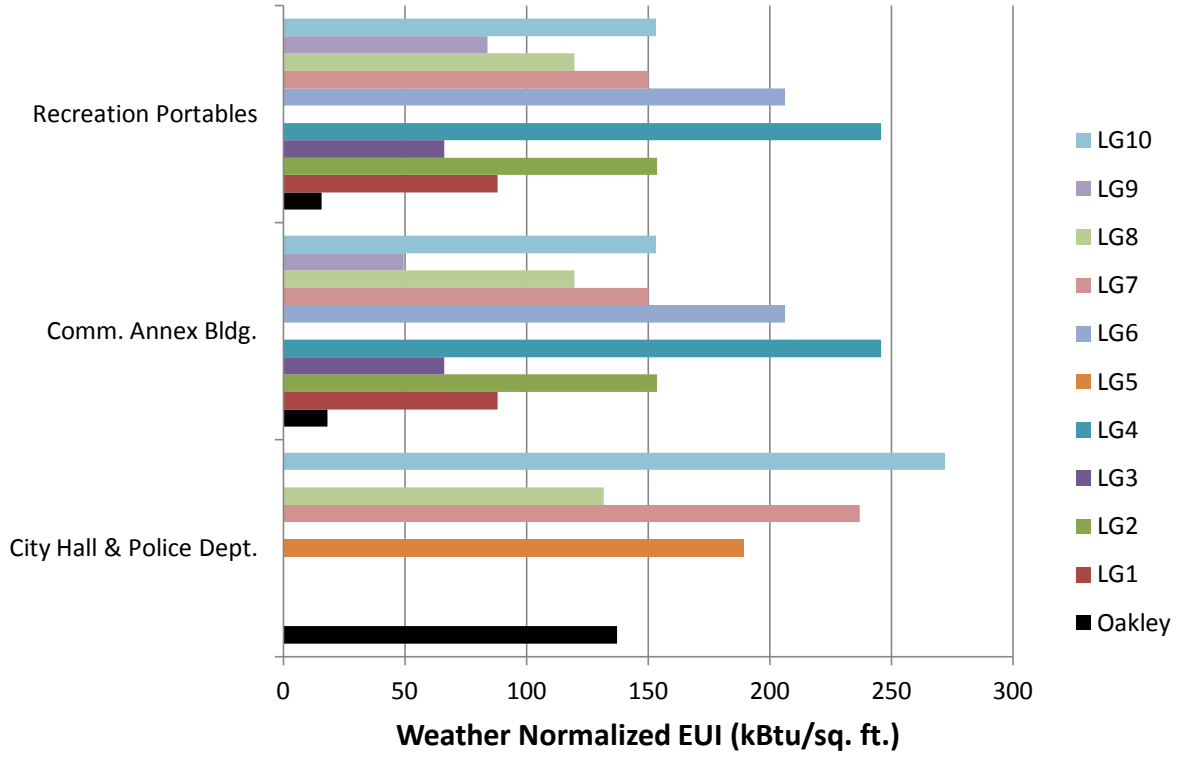


Figure 3. Comparison of current period EUI across similar buildings operated by other East Bay local governments (LG1-13). Community centers, recreation buildings, and senior centers in the region were all included in comparisons of the Oakley Community Annex and Recreation buildings because their patterns of use are not consistent or typical. Buildings that house both administrative and police functions were selected for comparisons with Oakley's City Hall.

APPENDIX 4: THE POLICY CONTEXT OF STRATEGIC ENERGY PLANNING

The State of California and local agencies have been on the forefront of establishing aggressive policies and standards for environmental protection and reducing greenhouse gas (GHG) emissions that contribute to global warming. In 1970, the State adopted the California Environmental Quality Act (CEQA) with the goal to inform governments and the public about potential environmental impacts of projects. From 2005 onward, legislation has been passed to directly regulate GHG emissions, encouraging the creation of incentive mechanisms and cap-and-trade programs and the participation in voluntary activities such as purchasing emissions offsets and offering renewable energy certificates (RECs).

In September of 2015 the most recent and significant legislation, the **Clean Energy and Pollution Reduction Act of 2015 (SB-350),** was passed by the California State Legislature. This bill outlines California Governor Brown's "50/50/50" energy plan for the State, which aims to increase electricity from renewable sources by 50 percent, reduce petroleum consumption by 50 percent, and increase building efficiency by 50 percent by 2030. Compliance with state and local policies and regulations regarding these issues is an important factor for consideration by the City of Oakley. The following list outlines some of the numerous policies and regulatory drivers that contributed to the creation of this Plan.

- **Warren Alquist Act 1974** – Created the California Energy Commission (CEC) mandate to develop and regularly update Building Energy Efficiency and Equipment Standards, now known as Title 24 and Title 20 codes. These standard are largely credited with holding California's per capita energy consumption essentially flat since the mid-1970s.
- **AB 4420, 1988 (Sher)** – Directed the CEC to inventory and study greenhouse gases (GHGs) and the impacts of climate change on the states' economy and environment.
- **SB 1771, 2000 (Sher)** – Established the State's Climate Action Registry and established GHG baselines and ongoing monitoring.
- **AB 1493, 2002 (Pavley)** – Landmark "Clean Car Legislation" after California received authorization form the US EPA to regulate these emissions. These rules were initially heavily fought by the auto industry but have since become the standard for the nation.
- **SB 1078, 2002 (Sher); SB 107, 2006 (Simitian); SB X1-2 (Simitian)** – Establishing the State's Renewable Portfolio Standard (RPS) goals with increasing targets, currently requiring all retail sales of electricity to include 33% renewable power by the end of 2020.
- **AB 32, 2006 (Nunez)** – Global Warming Solutions Act of 2006; Established goal to reduce California's GHG emissions below 1990 levels by 2020 and 80% below these levels by 2050.
- **California Long-Term Energy Efficiency Strategic Plan (CEESP) drafted by the CPUC in 2008 and updated 2011** – Outlines "big and bold" goals including 40% of residential building to be zero net energy (ZNE) by 2030 and 50% of commercial building to meet this criteria by 2040
- **AB758, 2009, (Skinner)** – Comprehensive Energy Efficiency Program for Existing Buildings; requires the CEC to create and implement an Existing Building Energy Efficiency Action Plan, in coordination with the CPUC and stakeholders.

APPENDIX 5: GLOSSARY OF TERMS AND ACRONYMS

Air-side Economizer: a device that conserves energy by allowing outside airflow to enter the building instead of air-conditioned air if the outdoor temperature is within a set temperature set range.

ASHRAE Level II Audit: audit includes an analysis of energy use at a facility and identifies no-cost, low-cost and capital improvement energy efficiency measures with detailed energy and financial calculations.

Biomass: Organic non-fossil material of biological origin constituting a renewable energy source.

Clean Energy: energy produced from renewable sources in a process that has minimal impact to the environment.

CleanPowerSF: The City and County of San Francisco's Community Choice Aggregation (CCA) program, administered by the San Francisco Public Utilities Commission (SFPUC) and monitored by the San Francisco Local Agency Formation Commission (LAFCo).

Community Choice Aggregation (CCA): efforts as developed by Alameda County or other local agencies, as appropriate. CCA permits public agencies to aggregate the electric loads of residents, businesses, and facilities to facilitate the purchase and sale of electrical energy.

Energy Benchmarking: process of collecting, analyzing and relating energy performance data of a building with the purpose of evaluating and comparing its performance to itself, other buildings within a portfolio, and/or its peers.

Energy Management System (EMS): a computer-aided tool used to monitor, measure, and control electrical building loads. Energy management systems can be used to control devices like HVAC units and lighting systems across multiple locations. They can also provide metering, sub-metering, and monitory functions that allow facility and building managers to gather data and insight that allows them to make more informed decisions about energy activities across their sites.

ENERGY STAR®: a government-backed labeling program that helps people and organizations save money and reduce greenhouse gas emissions by identifying factories, office equipment, home appliances and electronics that have superior energy efficiency.

Energy Use Intensity (EUI): metric that expresses a building's energy use as a function of its size or other characteristics.

Fuel Cell: A device capable of generating an electrical current by converting the chemical energy of a fuel (e.g., hydrogen) directly into electrical energy. Fuel cells differ from conventional electrical cells in that the active materials such as fuel and oxygen are not contained within the cell but are supplied from outside. It does not contain an intermediate heat cycle, as do most other electrical generation techniques.

Geothermal Energy: Hot water or steam extracted from geothermal reservoirs in the earth's crust that can be used for geothermal heat pumps, water heating, or electricity generation.

Green Building: an environmentally sustainable building, designed, constructed and operated to minimize the total environmental impacts.

Greenhouse Gas Emissions: a gas contributes to the greenhouse effect by absorbing infrared radiation, e.g., carbon dioxide and chlorofluorocarbons.

Leadership in Energy and Environmental Design (LEED): a set of rating systems developed by the U.S. Green Building Council for the design, construction, operation, and maintenance of green buildings, homes and neighborhoods.

LED Lighting: a more environmentally-friendly alternative to incandescent lighting.

Plug Load: energy used by products that are powered by means of an ordinary AC plug. It typically includes office and general miscellaneous equipment, computers, elevators and escalators.

Renewable Energy: energy from a source that is not depleted when used, such as wind or solar power.

Solar Feasibility Assessment: a study that assesses energy available, risks, costs, and size of equipment most appropriate for a building or specified location.

Variable Frequency Drives (VFDs): a type of motor controller that drives an electric motor by varying the frequency and voltage supplied to the electric motor.

Variable Speed Drives (VSDs): a piece of equipment that regulates the speed and rotational force, or torque output, of an electric motor.

Acronyms

ABAG: Association of Bay Area Governments

ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers

CAP: Climate Action Plan

EBEW: East Bay Energy Watch

HVAC: Heating, Ventilation, and Air-Conditioning

REN: Regional Energy Network

SEP: Strategic Energy Plan

APPENDIX 6: OAKLEY CITY HALL AUDIT REPORT

Oakley City Hall
MIT Audit Report
QuEST, Inc.

I. DESCRIPTION OF BUILDING

Oakley City Hall is a 24,795 square foot, 1-story building located at 3231 Main Street in Oakley, California. The building is divided into three wings: the north, east, and west. Building wings were not constructed at the same time. The east and west wings were constructed first and the north wing was added on in 2007. The City's administration services occupy the north wing, the building and public works department occupies the east wing, and the finance, recreation, and police departments occupy the west wing. The building is primarily used as office space, but additional space types include several conference rooms, kitchens, bathrooms, and a lobby. The building is occupied from 7:30 AM to 6:00 PM Monday through Thursday and 7:30 AM to 5:00 PM on Friday, except for the 1st and 3rd Fridays of each month.

The building has a total of fifteen packaged units that utilize both natural gas heating and electric cooling. The north wing has seven units and the east and west wings have four units each. The east and west wing units are all the same 5-ton model. The seven packaged units serving the

north wing include two units at 10 tons each, two units at 4 tons each, and three units at 3 tons each. All units are located on the roof. Some of the units have programmed schedules, the most common being 6:00 AM to 10:00 PM M-F and 6:00 PM to 10:00 PM Sa-Su. There are five exhaust fans; each is smaller than 1 HP (horsepower). The building has two hot water heaters that supply domestic hot water to the entire building. The water heaters have capacities of 50 and 19 gallons, respectively. These units are relatively new and have high efficiencies.

The number of thermostats is the same as the number of packaged units, indicating that there are fifteen thermal zones in the building. There are two main types of thermostats, Honeywell and Carrier, and both are programmable. There are two additional thermostats that were found during the audit that do not appear to have programming capability; they have only on/off control. These thermostats are made by Automated Logic Corp. The programmable thermostats shared the same schedule, but the room temperature set point varied by space because it was adjusted by the occupants.

When asked about the temperature in the space, occupants expressed that they were comfortable. During the audit the spaces felt cool and well ventilated. There were no personal heating devices or fans observed in offices during the audit.

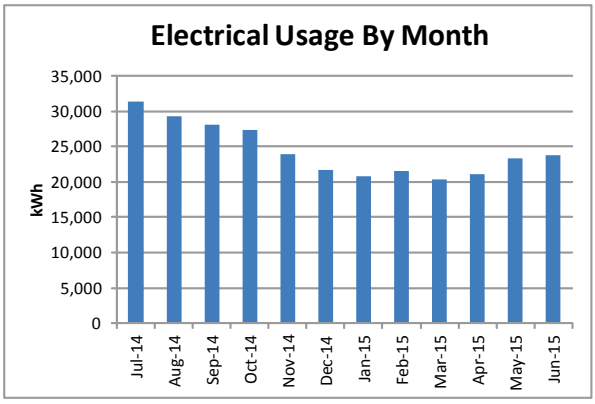
The interior lighting includes several fluorescent fixtures with 4’ and 2’ T8s, a few 4’ T12s, and 2’ U-tube lamps. The exterior lighting includes parking lot lights and security lights. The parking lot pole lights are 150 W high pressure sodium fixtures. Other fixtures identified in the plans include 130 and 95 W HID fountain stem and in-ground stem fixtures, 27 W CFL and 95 W HPS wall fixtures, 50 W Halogen poster illuminating wall fixtures, and 59 W T5 strip soffit cove fixtures.

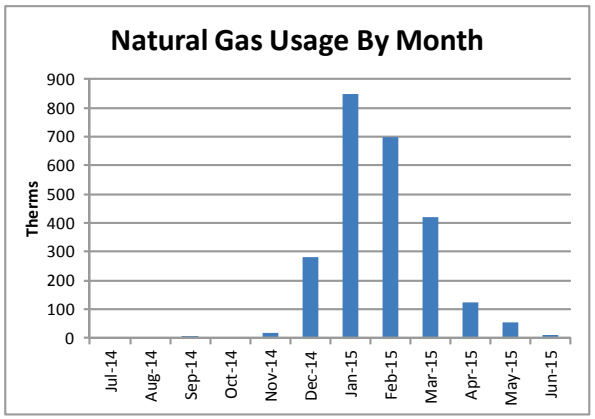
II. UTILITY USE SUMMARY

Building Oakley City Hall
Address 3231 Main St.

Conditioned Building Area	24,795 ft^2

Period	Electricity (kWh)	Gas (therms)	Energy Cost				Energy Use Index	
			Annual Electricity Cost ($)	Annual Gas Cost ($)	Average Electricity Rate ($/kWh)	Average Gas Rate ($/Therms)	Electricity (kWh/sf-yr)	Natural Gas (Therms/sf-yr)
Jul-14 To Jun-15	292,819	2,465	$52,757	$3,127	$0.18	$1.27	11.8096	0.0994





Month	kWh	Electricity Cost
Jul-14	31,324	$6,398
Aug-14	29,366	$6,008
Sep-14	28,142	$5,706
Oct-14	27,365	$5,669
Nov-14	23,865	$5,047
Dec-14	21,766	$3,118
Jan-15	20,762	$2,913
Feb-15	21,502	$3,036
Mar-15	20,356	$2,892
Apr-15	21,124	$3,101
May-15	23,391	$3,737
Jun-15	23,855	$5,133

Month	Therms	Gas Cost
Jul-14	2	$49
Aug-14	3	$46
Sep-14	5	$51
Oct-14	2	$48
Nov-14	17	$59
Dec-14	280	$325
Jan-15	847	$948
Feb-15	698	$808
Mar-15	420	$488
Apr-15	125	$165
May-15	55	$89
Jun-15	11	$53

The site EUI (energy use intensity) of Oakley City Hall is 47.05 kBTU/ft^2, which is lower than a typical building of this type (67.3 kBTU/ft^2) [1].

The monthly consumption of electricity is consistent with slight seasonal peaks, which suggests that there is a high base load. Significant energy savings can come from reducing the base load. For example, the base load can be reduced by increasing equipment efficiencies and/or schedules can be adjusted on the energy consuming equipment so that they can be turned off when they are not being used.

III. EQUIPMENT

- Fifteen (15) packaged units of varying size and capacity.
- Two (2) hot water heaters.
- Five (5) small exhaust fans.

IV. MEASURE SUMMARY

Because the building is relatively new, and its equipment and fixtures are of relatively high efficiency and in good condition, retrofits would not be recommended for this building. However, there are opportunities to save energy by reducing the operating schedules of HVAC and lighting equipment (Table 1). HVAC packaged units could run on weekdays until 6:00 PM on Monday through Thursday and until 5:00 PM on Fridays. They should also be turned off on the weekends and on the 1st and 3rd Friday of each month when staff do not occupy the building.

Additional savings could be achieved by adding occupancy, day lighting, or schedule controls to all of the light fixtures. Some, but not all, lights are equipped with occupancy sensors. The parking lot pole lights are on schedules, but they could be upgraded with day-lighting sensors that turn on the light relative to the demand and adjust to seasonal light shifts.

Table 1. Proposed energy efficiency measures

EEM	Measure Description	Measure Code	Peak Demand Savings (kW)	Electrical Energy Savings (kWh/yr)	Natural Gas Energy Savings (therms/yr)	Energy Cost Savings ($/yr)	Measure Cost ($)	Simple Payback Period (years)	Incentive Rebate ($)	Adjusted Payback Period (years)
M1	Add Occupancy Sensors	CLA82	-	-	-	-	-	-	-	-
M2	Add Lighting Schedule Controls	CLA80	-	-	-	-	-	-	-	-
M3	Add Daylighting Controls to Parking Lot Lights	CLA81	-	-	-	-	-	-	-	-
M4	Reprogram Thermostats	CCA11	-	-	-	-	-	-	-	-
				29,282	345.1	$ 5,714	$ 31,500	5.5	$2,687.66	5.0

[1]Energy Star. (2014, September). *Technical Reference: U.S. Energy Use Intensity by Property Type.* Retrieved August 31, 2015, from Portfolio Manager: https://portfoliomanager.energystar.gov/pdf/reference/US%20National%20Median%20Table.pdf

The estimated total savings of 29,282 kWh/yr and 345 therms/yr are based on the assumption that the implementation of the proposed measures will reduce the annual electrical and thermal energy consumption by 10% and 14% respectively. The total energy cost savings is estimated to be $5,714 and the incentive is estimated to be $2,688. The total project cost is estimated to be $31,500 with a payback period of 5.5 years without the incentive and 5.0 years with the incentive.

The expected contribution of savings from each measure will be estimated during detailed lighting and HVAC control investigations. The measure savings and all relevant information outlined in Table 1, will be provided with the Investigation Report(s). It is recommended that lighting experts from the SmartLights Program be deployed to the site to assess the energy savings potential of implementing interior and exterior lighting controls. MIT staff will continue investigation of HVAC control opportunities with City staff.

APPENDIX 7: CITY OF OAKLEY ENVIRONMENTALLY PREFERABLE PURCHASING POLICY

CITY of OAKLEY

A PLACE *for* FAMILIES *in the* HEART *of the* DELTA

Agenda Date: 02/08/11
Agenda Item: 3.6

MEMORANDUM

Approved and forwarded to City Council

Bryan Montgomery,
City Manager

Date: February 8, 2011

To: Bryan Montgomery, City Manager

From: Rebecca Willis, Community Development Director

Project: Adopt a Resolution to approve an Environmentally Preferable Purchasing Policy

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Summary

This item is a follow up to the AB 939 Planning Documents that were approved on May 25, 2010. One of the planned Solid Waste Diversion Program requirements is to implement an Environmentally Preferable Purchasing Policy (EPP). The EPP is intended to supplement Title 3, Chapter 6 of the Oakley Municipal Code, which deals with Purchasing and Contracting. As stated within the AB 939 Planning Documents, the City already purchases environmentally preferable products and City Staff has been encouraged to reuse and reduce in the workplace; the EPP will be used to further guide this practice. The adoption of an EPP policy may also assist the City in obtaining future grants through CalRecycle.

Recommendation

Staff recommends the City Council adopt the Resolution approving the Environmentally Preferable Purchasing Policy.

Attachments

1. Proposed Resolution
2. Draft Environmentally Preferable purchasing Policy

RESOLUTION NO. _____

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF OAKLEY APPROVING THE ENVIRONMENTALLY PREFERABLE PURCHASING POLICY

WHEREAS, the City of Oakley adopted AB 939 Planning Documents, in which a requirement is to adopt an Environmentally Preferable Purchasing Policy, and

WHEREAS, the City desires to institute practices that reduce waste by increasing product efficiency and effectiveness, purchase products where cost effective, that minimize environmental impacts, such as toxics, pollution and hazards to worker and community safety; purchase cost effective products that reduce greenhouse gas emissions in their production, shipping, use and discard; and purchase products that include recycled content, are durable and long-lasting, and conserve energy and water, and

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Oakley adopt the Environmentally Preferable Purchasing Policy.

PASSED AND ADOPTED by the City Council of the City of Oakley, California, this 8th day of February 2011 by the following vote:

AYES:

NOES:

ABSTENTIONS:

ABSENT:

APPROVED:

_____
James L. Frazier, Jr., Mayor

ATTEST:

_____
Nancy Ortenblad, City Clerk Date

CITY of OAKLEY
A PLACE for FAMILIES in the HEART of the DELTA

ENVIRONMENTALLY PREFERABLE PURCHASING POLICY (EPP)

1.0 STATEMENT OF POLICY

It is the policy of the City of Oakley (City) to:

- Institute practices that reduce waste by increasing product efficiency and effectiveness;
- Purchase products where cost effective, that minimize environmental impacts, such as toxics, pollution and hazards to worker and community safety;
- Purchase cost effective products that reduce greenhouse gas emissions in their production, shipping, use and discard; and
- Purchase products that include recycled content, are durable and long-lasting, and conserve energy and water.

2.0 PURPOSE

This Policy is adopted in order to:

- Conserve natural resources;
- Minimize environmental impacts such as pollution and use of water and energy;
- Eliminate or reduce toxics that create hazards to workers and our community;
- Support strong recycling markets;
- Reduce materials that are landfilled;
- Increase the use and availability of environmentally preferable products that protect the environment;
- Identify environmentally preferable products and distribution systems;

- Reward manufacturers and vendors that reduce environmental impacts in their production and distribution systems or services; and
- Create a model for purchasing environmentally preferable products that supports environmentally friendly practices during production, and that encourages other purchasers in our community to adopt similar goals.

3.0 STRATEGIES FOR IMPLEMENTATION

3.1 Source Reduction

3.1.1 Institute practices that reduce waste, and encourage reuse.

3.1.2 Whenever feasible, purchase remanufactured products such as toner cartridges, tires, furniture, equipment and automotive parts.

3.1.3 Consider short-term and long-term costs in comparing product alternatives. This includes evaluation of total costs expected during the time a product is owned, including, but not limited to, acquisition, extended warranties, operation, supplies, maintenance and replacement parts, disposal costs and expected lifetime compared to other alternatives.

3.1.4 Purchase products that are durable, long lasting, reusable or refillable trying to avoid purchasing one-time use or disposable products.

3.1.5 Encourage vendors to eliminate packaging or use the minimum amount necessary for product protection. Also, vendors will be encouraged to take back packaging for reuse. A vendor's willingness to take back packaging may be used as part of the consideration in the bid process.

3.1.6 Indicate to vendors a preference for packaging that is reusable, recyclable or compostable, when suitable uses and programs exist.

3.1.7 Encourage vendors to take back and reuse pallets and other shipping materials.

3.1.8 Encourage suppliers of electronic equipment, including but not limited to computers, monitors, printers, and copiers, to take back equipment for reuse or environmentally sound recycling when the City discards or replaces such equipment, whenever possible. If the City requests a supplier to also dispose of equipment being replaced, and selection of the

vendor is determined using a bidding process, bidders will be required to state their take back, reuse or recycling programs during the bidding process.

3.1.9 Consider provisions in contracts with suppliers of non-electronic equipment that require suppliers to take back equipment for reuse or environmentally sound recycling when the City discards or replaces such equipment, whenever possible. If the City requests a supplier to also dispose of non-electronic equipment being replaced, and selection of the vendor is determined using a bidding process, bidders will be required to state their take back, reuse or recycling programs during the bidding process.

3.1.10 Encourage printing and copying of all documents on both sides to reduce the use and purchase of paper. Encourage the practice of setting printers and copiers to duplex as the default.

3.1.11 Encourage the use of scanning documents as a primary means for distribution to reduce the number of faxes transmitted.

3.2 Recycled Content Products

3.2.1 Purchase products, to the extent that it is cost effective for the City, with the highest post-consumer content available. The City will refer to the United States Environmental Protection Agency (U.S. EPA) Comprehensive Procurement Guidelines for product recycle content standards.

3.2.2 Purchase copiers and printers compatible with the use of recycled content and remanufactured products.

3.2.3 To the extent possible and cost effective, when specifying asphalt, concrete, aggregate base or portland cement concrete for road construction projects, use recycled, reusable or reground materials in accordance with adopted standards and specifications.

3.2.4 To the extent possible and cost effective, specify and purchase recycled content traffic control products, including signs, cones, parking stops,

delineators, channelizers and barricades in accordance with adopted standards and specifications.

3.2.5 When feasible and cost effective, pre-printed recycled content papers intended for distribution by the City, that are either purchased or produced should contain a statement that the paper is recycled content and also indicates the percentage of post-consumer recycled content.

3.3 Energy Efficient and Water Saving Products

3.3.1 Where applicable, purchase energy-efficient equipment. This includes, but is not limited to, high efficiency space heating systems and high efficiency space cooling equipment.

3.3.2 Whenever practicable, replace inefficient interior lighting with energy-efficient equipment.

3.3.3 Replace inefficient exterior lighting, street lighting and traffic signal lights with energy-efficient equipment, whenever practical. Minimize exterior lighting where possible to avoid unnecessary lighting of architectural and landscape features while providing adequate illumination for safety and accessibility.

3.3.4 Purchase U. S. EPA Energy Star certified products when available and cost effective. When Energy Star labels are not available, choose energy-efficient products that are in the upper 25% of energy efficiency as designated by the Federal Energy Management Program.

3.3.5 Whenever practical, purchase water-saving products. This includes, but is not limited to, high-performance fixtures like toilets, low-flow faucets and aerators, and upgraded irrigation systems.

3.4 Green Building Products and Practices

3.4.1 Consider Green Building practices for design, construction, and operation as described in the LEED™ Rating System for building and renovations undertaken by the City.

3.5 Landscaping Products and Practices

3.5.1 Refer to and employ where practical, sustainable landscape management techniques for landscape renovations, construction and maintenance performed by the City. The City will request that workers and contractors providing landscaping services for the City refer to and use these techniques wherever practical, including, but not limited to, integrated pest management, grasscycling, drip irrigation, composting, and procurement and use of mulch and compost. 3.5.2 Select plants to minimize waste by choosing species for purchase that are appropriate to the microclimate, species that can grow to their natural size in the space allotted them, and consider perennials rather than annuals for color. Additionally, native and drought-tolerant plants that require no or minimal watering once established are preferred.

3.5.3 Hardscape and landscape structures constructed of recycled content materials are encouraged. Limit the amount of impervious surfaces in the landscape. Permeable substitutes, such as permeable asphalt or pavers, are encouraged for walkways, patios and driveways.

3.5.4 Consider creating swales in landscape renovations and construction performed by the City to assist in water run-off management. If applicable, develop outreach programs to instruct the public in the proper maintenance of swales.

4.0 RESPONSIBILITIES

4.1 The health and safety of our workers and citizens is of utmost importance and takes precedence over all other practices. Nevertheless, the City recognizes its duty to act in a fiscally responsible as well as in a timely manner.

4.2 Nothing contained in this policy shall be construed as requiring a department, purchaser or contractor to procure products that do not perform adequately for their intended use, exclude adequate competition, risk the health or safety of workers and citizens, or are not available at a reasonable, competitive and cost effective price in a reasonable period of time.

4.3 Nothing contained in this policy shall be construed as requiring the City, department, purchaser, or contractor to take any action that conflicts with local, state or federal requirements.

4.4 The City has made significant investments in developing a successful recycling system and recognizes that recycled content products are essential to the continuing viability of that recycling system and as the foundation of an environmentally sound production system. Therefore, to the greatest extent practicable, recycled content shall be included in products that also meet other specifications, such as chlorine free or bio-based.

4.5 Utilize grant funds to support and implement the Environmentally Preferable Practices Policy to the extent allowable and eligible, where such funds are available and their use for this purpose desirable.

5.0 IMPLEMENTATION

5.1 The City Manager or his/her designee shall implement this policy in coordination with other appropriate City personnel.

5.2 Require successful bidders to certify in writing that the environmental attributes claimed in competitive bids are accurate. When required by State law, vendors shall be required to specify the minimum or actual percentage of recovered and post-consumer material in their products, even when such percentages are zero.

5.3 Upon request, buyers making the selection from competitive bids shall be able to provide justification for product choices that do not meet the environmentally preferable purchasing criteria in this policy.

5.4 Encourage vendors, contractors and grantees to comply with applicable sections of this policy for products and services provided to the City.

6.0 PROGRAM EVALUATION

6.1 The City Manager or his/her designee shall provide information about the program, including changes to the program, in the City's annual reporting to CalRecycle..

7.0 DEFINITIONS

7.1 "Bay Area Green Business Program" is a partnership of governments and businesses that certifies the environmental performance of government agencies and businesses.

7.2 "Buyer" means anyone authorized to purchase or contract for purchases on behalf of this jurisdiction or its subdivisions.

7.3 "Contractor" means any person, group of persons, business, consultant, designing architect, association, partnership, corporation, supplier, vendor or other entity that has a contract with the City of Oakley or serves in a subcontracting capacity with an entity having a contract with the City of Oakley for the provision of goods or services.

7.4 "Energy Star" means the U.S. EPA's energy efficiency product labeling program.

7.5 "Energy-Efficient Product" means a product that is in the upper 25% of energy efficiency for all similar products, or that is at least 10% more efficient than the minimum level that meets Federal standards.

7.6 "LEED™ Rating System" means the most recent version of the Leadership in Energy and Environmental Design (LEEDTM) Commercial Green Building Rating System, or other related LEEDTM Rating System, approved by the U.S. Green Building Council and designed for rating new and existing commercial, institutional, and residential buildings.

7.7 "Post-consumer Material" means a finished material which would normally be disposed of as a solid waste, having reached its intended end-use and completed its life cycle as a consumer item, and does not include manufacturing or converting wastes.

7.8 "Pre-consumer Material" means material or by-products generated after manufacture of a product is completed but before the product reaches the end-use consumer. Pre-consumer material does not include mill and manufacturing trim, scrap, or broke which is generated at a manufacturing site and commonly reused on-site in the same or another manufacturing process.

7.9 "Recovered Material" means fragments of products or finished products of a manufacturing process, which has converted a resource into a commodity of real economic value, and includes pre-consumer and post-consumer material.

7.10 "Recycled Content" means the percentage of recovered material, including pre-consumer and post-consumer materials, in a product.

7.11 "Recycled Product" means a product that meets the City's recycled content policy objectives for post-consumer and recovered material.

7.12 "Remanufactured Product" means any product diverted from the supply of discarded materials by refurbishing and marketing said product without substantial change to its original form.

7.13 "Reused Product" means any product designed to be used many times for the same or other purposes without additional processing except for specific requirements such as cleaning, painting or minor repairs.

7.14 "U.S. EPA Guidelines" means the Comprehensive Procurement Guidelines established by the U.S. Environmental Protection Agency for federal agency purchases as of May 2002 and any subsequent versions adopted.

7.15 "Water-Saving Products" are those that are in the upper 25% of water conservation for all similar products, or at least 10% more water-conserving than the minimum level that meets the Federal standards.

8.0 EFFECTIVE DATES

8.1 This policy shall take effect on February 9, 2011.

RESOLUTION NO. 16-11

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF OAKLEY APPROVING THE ENVIRONMENTALLY PREFERABLE PURCHASING POLICY

WHEREAS, the City of Oakley adopted AB 939 Planning Documents, in which a requirement is to adopt an Environmentally Preferable Purchasing Policy, and

WHEREAS, the City desires to institute practices that reduce waste by increasing product efficiency and effectiveness, purchase products where cost effective, that minimize environmental impacts, such as toxics, pollution and hazards to worker and community safety; purchase cost effective products that reduce greenhouse gas emissions in their production, shipping, use and discard; and purchase products that include recycled content, are durable and long-lasting, and conserve energy and water, and

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Oakley adopt the Environmentally Preferable Purchasing Policy.

PASSED AND ADOPTED by the City Council of the City of Oakley, California, this 8th day of February 2011 by the following vote:

AYES: Anderson, Frazier, Pope, Rios, Romick

NOES: None

ABSTENTIONS: None

ABSENT: None

APPROVED:

James L. Frazier, Jr., Mayor

ATTEST:

Nancy Ortenblad, City Clerk

2/14/11
Date

APPENDIX G

STRATEGIC ENERGY PLAN - CITY OF EMERYVILLE

City of Emeryville

Strategic Energy Plan

Produced by: City of Emeryville Energy Leadership Team

Fall 2015

ACKNOWLEDGEMENTS

Emeryville City Council

Ruth Atkin, *Mayor*
Nora Davis, *Vice Mayor*
Jac Asher, *Council Member*
Dianne Martinez, *Council Member*
Scott Donahue, *Council Member*

Sustainability Committee

Nancy Humphrey, *Environmental Programs Supervisor*
Maurice Kaufman, *Public Works Director*
Daniel Stevenson, *Public Works Operations and Facilities Manager*
Sara Billing, *Assistant Planner*

Other Contributors

Brendan Havenar-Daughton, *Partnership Manager – East Bay Energy Watch*
Matt Sullivan, P.E., *Consultant – Newcomb Anderson McCormick*
Danielle Moultak, *Project Manager – Newcomb Anderson McCormick*
Ryan Sit, *Energy Engineer – Newcomb Anderson McCormick*
Tim Bankroff, *Program Manager – QuEST*
Andrea Schumer, *Account Representative – PG&E*

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

As with many public sector agencies, the City of Emeryville (City) recognizes the environmental, economic, and social benefits of energy-use reduction, clean energy generation, and the reduction of Greenhouse Gas (GHG) emissions. The passage of the California Global Warming Solutions Act (AB 32) in 2006, the Clean Energy and Pollution Act of 2015 (SB 350), and various other legislation has established the State of California as an international leader in efforts to reduce energy use, become a more energy-efficient economy, and move our state toward a more sustainable future. The City of Emeryville understands the unique and vital role that local governments have in helping the State reach the goals set forth in the policies above.

VISION STATEMENT

The city of Emeryville will be a model and leader in energy planning through the development and implementation of innovative municipal policies and programs that enhance the environment, boost economic vitality, and inspire and empower our community.

To help meet these challenges, Emeryville agreed to participate as a "Pilot City" in the East Bay Energy Watch (EBEW) Strategic Energy Planning program. EBEW is the Pacific Gas and Electric (PG&E) Local Government Partnership in Alameda and Contra Costa Counties, serving cities in both counties with energy efficiency programs and technical assistance, as well as incentives and rebates for implementing energy savings projects. Several City staff from a variety of departments were engaged throughout a collaborative process, working with EBEW staff, and consultants Newcomb Anderson McCormick (NAM) and QuEST, in the development of this Strategic Energy Plan (SEP). This SEP outlines a comprehensive, organized, and actionable approach for the City to meet its "Energy Vision" and energy-use reduction goals, while reflecting the City's unique culture, values, and constraints.

The outcome of this process is not just a Strategic Energy Plan for the City of Emeryville, but the results, "best practices," and lessons learned from this planning process will be incorporated by EBEW and the program consultants into a Strategic Energy Planning "Template", which will provide a process map and tools to allow other cities in Alameda and Contra Costa Counties to develop their own, customized SEPs. The City of Emeryville's contribution to both their own SEP and to the development of the Template that will benefit other neighboring cities was valuable and commendable.

The following pages describes the policy context for energy planning, the process undertaken by the City to create the SEP, and the resulting Vision, Goals, and specific programs and projects for implementation to achieve the City's Vision for energy efficiency and sustainability.

2. BACKGROUND

2.1 POLICY CONTEXT OF STRATEGIC ENERGY PLANNING

The State of California and local agencies have been on the forefront of establishing aggressive policies and standards for environmental protection and reducing GHG emissions that contribute to global warming. In 1970, the State adopted the California Environmental Quality Act (CEQA) with the goal to inform governments and the public about potential environmental impacts of projects. From 2005 onward, legislation has been passed to directly regulate GHG emissions, encouraging the creation of incentive mechanisms and cap-and-trade programs and the participation in voluntary activities such as purchasing emissions offsets and offering renewable energy certificates (RECs).

In October 2015 the most recent and significant legislation, the **Clean Energy and Pollution Reduction Act of 2015 (SB350),** was signed into law by California Governor Jerry Brown. This bill mandates an increase in California's Renewables Portfolio Standard (RPS) to 50 percent and the doubling of building energy efficiency, both by 2030. Implementation of this bill is likely to result in expanded utility efficiency programs which may benefit local governments. Additionally, AB 802 is another bill that was signed in September and is likely to change how energy efficiency savings is measured and reported. Compliance with state and local policies and regulations regarding these issues is an important factor for consideration by the City of Emeryville. The following list outlines the some of the numerous past policies and regulatory drivers that contributed to the creation of this Plan.

- **Warren Alquist Act of 1974** – Created the California Energy Commission (CEC) mandate to develop and regularly update Building Energy Efficiency and Equipment Standards, now known as Title 24 and Title 20 codes. These standard are largely credited with holding California's per capita energy consumption essentially flat since the mid-1970s.
- **AB 4420, 1988 (Sher)** – Directed the CEC to inventory and study greenhouse gases (GHGs) and the impacts of climate change on the states' economy and environment.
- **SB 1771, 2000 (Sher)** – Established the State's Climate Action Registry and established GHG baselines and ongoing monitoring.
- **AB 1493, 2002 (Pavley)** – Landmark "Clean Car Legislation" after California received authorization from the US EPA to regulate these emissions. These rules were initially heavily fought by the auto industry but have since become the standard for the nation.
- **SB 1078, 2002 (Sher); SB 107, 2006 (Simitian); SB X1-2 (Simitian)** – Establishing the State's Renewable Portfolio Standard (RPS) goals with increasing targets, currently requiring all retail sales of electricity to include 33% renewable power by the end of 2020.
- **AB 32, 2006 (Pavley, Nunez)** – Global Warming Solutions Act of 2006; Established goal to reduce California's GHG emissions below 1990 levels by 2020 and 80% below these levels by 2050.
- **California Long-Term Energy Efficiency Strategic Plan (CEESP) drafted by the CPUC in 2008 and updated 2011** – Outlines "big and bold" goals including 40% of residential building to be zero net energy (ZNE) by 2030 and 50% of commercial building to meet this criteria by 2040
- **AB758, 2009, (Skinner)** – Comprehensive Energy Efficiency Program for Existing Buildings; requires the CEC to create and implement an Existing Building Energy Efficiency Action Plan, in coordination with the California Public Utilities Commission (CPUC) and stakeholders.

2.2 HISTORY OF ENERGY USE REDUCTION EFFORTS TO DATE

The City of Emeryville has taken several actions to improve municipal energy performance over the past several years, and has several currently planned projects as part of the 2015 Five-Year Capital Improvement Program (CIP). The City is very active in regional energy planning organizations and has taken a leadership role in the PG&E-funded East Bay Energy Watch (EBEW) as a member of its Strategic Advisory Committee, and serves on the Technical Advisory Committee of the Stopwaste.org Energy Council. These organizations consist of city representation from Alameda and Contra Costa Counties and collaborate on best practices in energy efficiency and sustainability efforts to assist all East Bay cities in becoming more sustainable. The City took a significant step forward in its efforts to reduce energy use and implement broader sustainability programs and GHG reduction with the adoption of a Climate Action Plan (CAP) in November of 2008. This SEP takes many of the goals from the CAP and will flesh out the details for implementation of the necessary steps for their achievement.

The following list summarizes previously implemented and currently planned energy programs and projects at the City of Emeryville.

Completed Projects (as of SEP publication date):

- Participated in the School and Municipal Advanced Retro-commissioning and Tune-up (S.M.A.R.T) Program building analysis for the Civic Center Building in summer 2015. Energy savings projects identified in those reports, located in Appendices 4 (Phase I) & 5 (Phase II), have been implemented and result in over 100,000 kWh in annual energy savings.
- A Civic Center energy audit was conducted by QuEST in April 2015. Two out of three energy efficiency measures identified in the audit (Appendix 6) have been completed and the third (boiler retrofit) is planned for completion in 2016.
- Adopted a policy for new municipal buildings to be LEED-Silver rating “equivalent” and Stopwaste.org Bay Friendly Landscape Guidelines verified
- Eliminated design review requirements and reduced building permit fees for single family home solar PV installation
- Solar PV roof system installation: Civic Center, Police Station roof, Fire Station 34
- Traffic signal lights converted to more efficient LED lamps
- Peninsula Fire Station Improvements– Lighting & HVAC
- Worked with the California Youth Energy Services organization to provide summer jobs to high school students in the energy efficiency retrofit of local small businesses
- Required new residential and commercial development to rate energy efficiency and other green building elements of their construction using the Stopwate.org “Green Points” system and the LEED rating system developed by the U.S. Green Building council

Planned and Funded Projects – 2015 CIP

Many of the building rehabilitation and improvement projects listed contain energy efficiency or renewable energy elements as part of a broader building rehabilitation effort.

- Child Development Center Rehabilitation – efficient lighting and HVAC improvements
- Civic Center HVAC upgrades (currently underway)
- Corporation Yard Improvements – lighting, HVAC, solar PV
- Senior Center Rehabilitation – lighting, HVAC, solar PV
- Transit Center Parking Lot LED lights
- Hollis Street Fire Station Rehabilitation - lighting, HVAC, Solar PV
- Marina Park Improvements – exterior lighting
- Lumec Street Lighting LED retrofit
- City Hall Lighting Upgrade

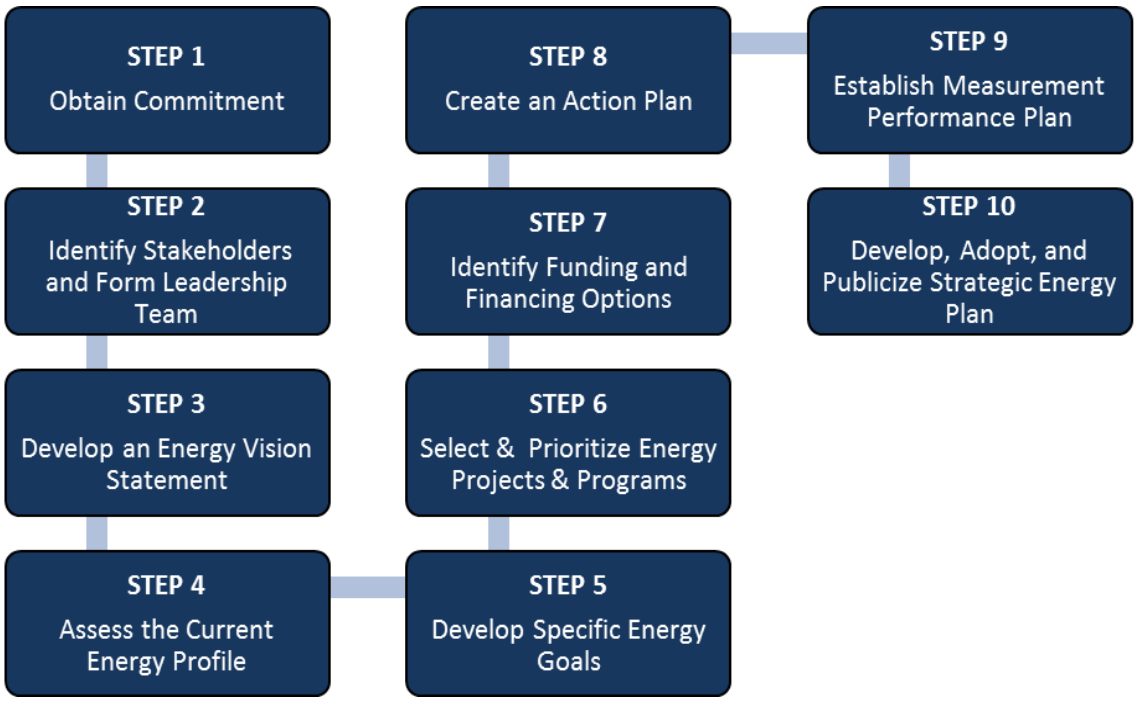
Many of the building rehabilitation projects listed above are candidates for PG&E's Savings by Design energy efficiency design assistance services. The City will pursue this as appropriate.

For a complete listing of past, current, and planned energy programs and projects see the Implementation Programs and Plans Checklist in Appendix 2.

2.3 CREATION OF THE STRATEGIC ENERGY PLAN

To create this Strategic Energy Plan, the City of Emeryville followed the process and utilized the tools developed for the EBEW Local Government Strategic Energy Plan Template. The energy planning process is illustrated in the flow chart below.

Strategic Energy Plan Creation Process



On June 12, 2015, the City made a commitment to create this SEP by means of a commitment letter issued by the City Public Works Director, Maurice Kaufman. An Energy Leadership Team was created that consisted of City staff from a variety of departments, as well as members from EBEW and consultants Newcomb Anderson McCormick and QuEST. The Energy Leadership Team worked to implement this process starting in June of 2015, culminating in the production of a Final Strategic Energy Plan in November 2015.

The implementation of the energy planning process and the resulting Strategic Energy Plan are described in the following chapters.

3. VISION STATEMENT AND GOALS

The City of Emeryville has developed the following Vision Statement as a guide to the creation of a municipal Strategic Energy Plan, a major component of implementing a broader Climate Action Plan.

> ***The City of Emeryville will be a model and leader in energy planning through the development and implementation of innovative municipal policies and programs that enhance the environment, boost economic vitality, and inspire and empower our community.***

3.1 ENERGY USE BENCHMARKING STUDY

To assist in the development of goals, EBEW performed an Energy Use Benchmarking Study for the City of Emeryville, included in Appendix 7. The Benchmarking Study compared the energy performance of the City's buildings and facilities against an established baseline. The results of the study indicated that City Hall, the City building with the highest energy cost, operated at a higher energy use intensity (energy use per square feet of space) than the baseline for typical, similar buildings. The Child Development Center, Corp Yard, Police Department, Fire Station 1 and 2, and the Senior Center were also included within the analysis and revealed that these buildings operate efficiently, relative to similar buildings. A thorough energy audit is recommended of all City buildings to assist in identifying measures to reduce overall energy use and cost.

3.2 GOALS

To realize this Vision Statement, the City has defined the following energy planning goals and priorities. The goals and priorities for the Strategic Energy Plan reflect city needs, interests, and available resources. The Goals outlined below are not necessarily listed in order of priority. Priorities for all goals and implementation programs are contained in the Implementation Programs and Plans Checklist contained in Appendix 2.

Energy Plan Goals and Criteria

Goal No.	Topic	Established Goal
1	**Energy Efficiency**	Reduce annual energy usage for existing facilities from a 2010 baseline by 10% by the end of 2020 (as identified in the City CAP) by targeting opportunities from the Civic Center energy audit provided by QuEST in 2015 and additional energy audits to be performed on the remaining City facilities.
2	**Energy Generation & Procurement**	Explore local opportunities for clean energy generation and procurement. Evaluate and begin implementing viable measures that meet established economic and fiscal criteria by 2017.
3	**Community Outreach & Education**	Engage city staff and the larger community in Energy Plan implementation by developing and implementing education and awareness programs to reduce energy use and promote energy efficiency and renewable energy options.

The goals described above were used by the Leadership Team to develop specific programs and projects for implementation to achieve each goal. This process is described in the next section.

The goals and criteria established for the Strategic Energy Plan will be monitored during plan implementation as described in Section 6, “Measure and Report Performance.”

4. PROGRAMS AND PROJECTS FOR IMPLEMENTATION

Based on the goals and priorities described above, the City has selected programs and projects to actively improve energy use. The programs and projects were selected from a menu of opportunities provided in the LG-SEP Strategic Energy Planning Template. In addition, projects identified from City of Emeryville staff are also included.

The programs and projects to be implemented with the Strategic Energy Plan fall into the following broad categories:

1. Management and Organization Structure
2. Energy Efficiency
3. Facilities Operations
4. Sustainable Building Practices
5. Onsite Generation and Renewable Energy
6. Outreach and Awareness
7. Economics

Appendix 1 provides a detailed description of the energy programs and projects selected, including those already completed, currently being implemented, and planned for the future. These programs and projects are also reflected in the Implementation Programs and Projects Checklist, provided in Appendix 2, which outlines the priorities, responsibility for implementation, schedule, and estimated cost of each. The Checklist will be used by the City to manage the implementation process.

5. FUNDING AND FINANCING OPPORTUNITIES

In an environment of budget cuts and limited funding, the City of Emeryville understands the importance of leveraging the many funding resources available to local governments to help finance the energy-use reduction and generation projects selected for implementation in this plan. The following are a list of tools and resources that the City will consider as it evaluates energy projects moving forward. The list is broken into two general categories: funds that can be raised by the City and funds that come from external grants and incentives.

Funding Through City Action

- **Energy Performance Contracts (EPCs)*:*** Energy Performance Contracts (EPCs) are structured so that energy efficiency projects can be installed with little or no up-front costs to the customer. A portion of the revenue from energy savings go directly to an Energy Service Company (ESCO), who finances and constructs the project. ESCOs will finance the costs for the projects as part of the EPC. The structure and details of EPCs vary from project to project but the keys steps involved are generally universal. For an overview of these steps, best practices, and case studies, visit the link below.

  New York State Department of Environmental Conservation – Energy Performance Contracts for Local Governments: Industry Standards and Best Practices:
  www.dec.ny.gov/docs/administration_pdf/epcguide.pdf

  New York State Department of Environmental Conservation Homepage: www.dec.ny.gov/

  Additional resource: National Association of Energy Service Companies (NAESCO): www.naesco.org/

- **Power Purchase Agreements (PPA)*:*** A Power Purchase Agreement (PPA) is a contract where an end-use customer purchases clean energy from a power producer for on-site projects. In the case of solar photovoltaic electricity, customers can opt to purchase solar energy from a system installed on-site through a PPA at a negotiated rate instead of purchasing, installing, and maintaining the operations of solar photovoltaic panels themselves. The length of the PPA contract varies (as does the negotiated electricity rate), but typically ranges from 10 to 20 years. For more information on solar power purchase agreements, visit the Environmental Protection Agency (EPA) link below, which outlines PPA benefits and challenges and provides local-government case studies.

  EPA – Solar Power Purchase Agreements: www3.epa.gov/greenpower/buygp/solarpower.htm
  EPA Homepage: www3.epa.gov

  Additional resources:

  Renewable Energy Laboratory (NREL) Homepage: www.nrel.gov/
  NREL – Power Purchase Agreement Checklist for State and Local Governments, which provides a detailed guide to power purchase agreements for state and local governments including financial and contractual considerations:

  https://financere.nrel.gov/finance/content/power-purchase-agreement-checklist-state-and-local-governments

  Department of Energy (DOE) Homepage: www.energy.gov

DOE – Power Purchase Agreements, which provides a general overview of PPAs and lists additional resources, including case studies: energy.gov/eere/slsc/power-purchase-agreements

- **National Renewable Energy Certificates (RECs)*:*** Renewable Energy Certificates (RECs), also known as Renewable Energy Credits, Green Tags, or Tradable Renewable Certificates (TRCs), represent the environmental benefits of one megawatt-hour (mWh) of electricity generated from renewable sources. A REC is a tradable commodity and can be sold as a source of revenue to the City. RECs can also be retained so that the owner has claim to the renewable attributes of the electricity. For more information about RECs, how they work, and how they are purchased and tracked, visit the Environmental Protection Agency links below.

  EPA - Renewable Energy Certificates: www3.epa.gov/greenpower/gpmarket/rec.htm
  EPA - REC Tracking: www3.epa.gov/greenpower/gpmarket/tracking.htm

- **Carbon Offset Credits:** Projects that offset or reduce greenhouse gas emissions can be certified by the Climate Action Reserve and traded as a Climate Reserve Tonne (CRT) credit, which is the equivalent of one metric ton of carbon dioxide equivalent emissions reduced or approximately 2,350 vehicle-miles traveled (VMT) for the average passenger vehicle. In addition to the cap-and-trade market, there are other marketplaces where CRTs can be purchased and sold, though similar to RECs, cities that sell CRTs lose the GHG "offset" attributes and cannot count the reductions towards their goals.
- **"Green" Revolving Fund (GRF):** A "green" revolving fund is an internal fund that would provide financing to energy and sustainability projects that generate cost savings. These savings are tracked and used to replenish the fund for future rounds of "green" investments, thus establishing a sustainable funding cycle. Capital for GRF's may be obtained from a variety of funding sources and the accounting system used to track the funds may also vary. A detailed, and useful guide on the creation and maintenance of a successful GRF can be found by following the link below. Although tailored for the higher educational space, its resources are relevant for a variety of institutions and agencies, including local governments.

  Billion Dollar Green Challenge - Green Revolving Funds: An Introductory Guide to Implementation & Management: http://greenbillion.org/wp-content/uploads/2013/01/GRF_Implementation_Guide.pdf

External Grants and Incentives

- **Ener**gy **Utility Programs and Incentives:** Local energy utilities offer a variety of programs and financial assistance to their customers for energy efficiency, renewable energy, and Climate Action Planning.
  - **East Bay Energy Watch (EBEW),** the local government partnership between PG&E and cities in Alameda and Contra Costa Counties. EBEW, through PG&E, provides cites with a variety of programs and incentives that assist in the financing of energy projects. For example, the **PG&E On-Bill Financing (OBF) Program** allows cities to finance energy efficiency projects with no-interest loans that are repaid through the city's utility bill. Additional benefits made available through PG&E and EBEW include access to free, comprehensive energy audits, incentive dollars for LED street lighting upgrades and new construction technical assistance (**Savings By Design Program**), and a variety of other programs. Emeryville has and will continue to work closely with EBEW and PG&E to ensure that all incentives and resources are leveraged to their full potential.

- **Government Grants:** The availability of government grants is constantly changing. The City will stay up-to-date on federal and state grants by referring to the following websites, which consolidate the available grants from all government departments:

Federal Grants: http://grants.gov/
California State Grants: http://www.ca.gov/Grants.html

- **State Energy Efficiency Loans:** Cities can also apply for other state and federal loans, such as the loans available through the California Energy Commission. At the time of the LG-SEP's publication, the California Energy Commission was accepting applications for their 1% interest loan for projects with proven energy and/or demand cost savings. The repayment schedule is up to 20 years and will be based on the annual projected energy cost savings from the aggregated projects. More information can be found on their website at:

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

6. MEASURE AND REPORT PERFORMANCE

As with any successful program, the ongoing progress and performance of energy reduction activities should be monitored and compared to goals and criteria. This will require continuous participation of the City Energy Leadership Team, City staff, and other participants in the process. To communicate results and ensure transparency and accountability, the results of the Strategic Energy Plan activities should be communicated within City departments and to the larger community on a regular basis.

The following section describes the planned process for measuring and reporting energy use reduction activities and achievements.

6.1 MEASURING PERFORMANCE

In order to monitor the City's progress towards its energy goals, the City Energy Leadership Team plans to collect information on the following key metrics at the regular intervals described below. In addition, the table below indicates responsibility for the accomplishment of each goal to meet the timelines established.

Goal No.	Topic	Established Goal	Performance Metric and Frequency of Measurement	Responsibility
1	**Energy Efficiency**	Reduce annual energy usage for existing facilities from a 2010 baseline by 10%, as identified in the City CAP, by the end of 2020 by targeting opportunities from a benchmarking analysis provided by EBEW in 2015.	Energy usage to be reviewed annually using EBEW benchmarking analysis.	Environmental Programs Supervisor
2	**Energy Generation & Procurement**	Explore local opportunities for clean energy generation and procurement. Evaluate and begin implementing viable measures that meet established economic and fiscal criteria by 2017.	City-wide solar feasibility assessment to be conducted by the end of 2016.	Environmental Programs Supervisor
3	**Community Outreach and Education**	Engage City staff and the larger community in Energy Plan implementation by developing and implementing education and awareness programs to reduce energy use and promote energy efficiency and renewable energy options.	Beginning in Q4 2016, the City will work to offer outreach and educational programs. Updates to the City sustainability webpage with current resources and information to occur on a quarterly basis.	Environmental Programs Supervisor

6.2 REPORTING PERFORMANCE

The Energy leadership will report progress on established goals in consistency with performance metrics and frequency of measurements identified above.

APPENDICES

CITY OF EMERYVILLE

APPENDIX 1: ENERGY PROGRAMS AND PROJECTS DESCRIPTIONS

1. MANAGEMENT AND ORGANIZATIONAL STRUCTURE
2. ENERGY EFFICIENCY
3. FACILITIES OPERATION
4. SUSTAINABILE BUILDING PRACTICES
5. ON-SITE GENERATION AND RENEWABLE ENERGY
6. OUTREACH & AWARENESS
7. ECONOMICS

PROGRAMS AND PROJECTS APPENDIX

Based on the goals and priorities adopted by the City, the following programs and projects have been chosen to actively reduce energy use. The programs and projects were selected from a menu of opportunities provided in the LG-SEP Template. In addition, projects identified from City of Emeryville staff are also included.

The following provides a detailed description of the selected programs and projects, including those already completed, currently being implemented, and planned for the future. These programs and projects are also reflected in the Implementation Programs and Projects Checklist, located in Appendix 2 which outlines the priorities, responsibility for implementation, schedule, and current status of each. The Checklist will be used by the City to manage the implementation process.

1. MANAGEMENT AND ORGANIZATIONAL STRUCTURE

In order to implement an effective Strategic Energy Plan, it is important for a city to have a policy mandate for energy and/or sustainability, the organizational structure required to manage the process, and the financial and technical resources to accomplish the plan goals.

The following implementation programs are part of the SEP. The current status of each (either "planned," "in-process," "complete" or "ongoing") can be found in Appendix 2.

1.1 ESTABLISH A CITY COUNCIL SUSTAINABILITYCOMMITTEE

The City Council will authorize the establishment of a Council-led committee that will provide leadership, provide policy recommendations, and oversee proposed activities for the City of Emeryville to become more energy efficient and sustainable. The committee will consist of two City Councilmembers and selected City staff. The implementation of this SEP will be a high priority, but its charter will be broader than the plan itself and will serve as a liaison to the full City Council and the community at large.

1.2 ADOPT A CITY ENERGY POLICY/VISION STATEMENT

The City will demonstrate its commitment to environmental, fiscal, and social sustainability by adopting a policy that provides a mandate to develop and implement an SEP. This policy will articulate the mission, vision, and goals of the City and authorize City staff to develop the necessary plans, programs, and actions necessary to achieve them. The vison and goals of the Strategic Energy Plan will serve as a model for the City Council to formally adopt this policy.

1.3 APPOINT A CITY ENERGY LEADERSHIP TEAM

A City Energy Leadership Team will be established consisting of staff members from a variety of departments such as public works, planning, budget/finance office, transportation, etc., as well as industry experts, and representatives from energy utilities. The Leadership Team will follow the direction of the Council and provide the day-to-day support and resources necessary to implement Energy Plan activities. Should the City like to expand their SEP beyond municipal buildings to include the broader community, interested community members and groups will also be included within the Leadership Team. In general, the Team will be designed to provide a broad perspective on sustainability programs and activities within the City. The Team may or may not have authority over plan implementation, but at a minimum will provide input and recommendations regarding performance of plan activities and play an advisory or management role in the process.

1.4 APPOINT AN ENERGY PLAN COORDINATOR

Implementation of an SEP will require time, effort, continuity, and leadership. It is important to establish the management and support infrastructure to meet these needs. To fulfill this purpose, the City of Emeryville will take advantage of the EBEW "Civic Spark" Initiative, which will provide an intern to work full time at the City to assist with coordination and management of Energy Plan activities. The Energy Plan Coordinator will work under the direction of the staff Leadership Team and their duties will include the following:

1.4.1 MANAGE THE PROCESS

Implementing a comprehensive SEP will require coordination of activities and action plans, meeting schedules and deliverables, delegating responsibility, and managing internal and external resources to accomplish the goals of the program. Appointing an individual with the responsibility, authority, and accountability to manage this process will be critical for its success.

1.4.2 CHAMPION FOR ENERGY AND SUSTAINABILITY PROJECTS

Large projects, particularly those that span a long period of time, require an enthusiastic individual to follow through with efforts. The Energy Plan Coordinator will be passionate about sustainability and be excited about working towards City goals despite potential financial, political, and logistical difficulties.

1.4.3 POINT OF CONTACT

Sustainability often begins at the grassroots level, and sustainability efforts can often be sporadic and lack coordination without designated leadership. The Energy Plan Coordinator will serve as a main point of contact for sustainability efforts at the City and help grassroots projects gain the critical mass required for long term success.

1.5 FUNDING AND RESOURCES TO SUPPORT ENERGY PLAN ACTIVITIES

The City will define the economic and fiscal criteria used to evaluate, prioritize, and implement the activities identified in the SEP. Sources of funding may come from internal City budgets or grants, endowments, or other fundraising activities or revenue streams. Additional funding and technical or programmatic resources may come from local or state agencies and energy utilities.

The City will also leverage available programs and funding support from PG&E, including energy project incentives and the EBEW local government partnership. The City will continue to participate in other programs providing energy program support such as Stopwaste.org and the East Bay Regional Energy Network (REN) offered through the Association of Bay Area Governments (ABAG).

1.6 ENGAGE ENERGY PROFESSIONALS AS REQUIRED

Many of the projects identified in the plan may require a level of technical or programmatic expertise not available among City personnel. Where appropriate, specialists will be hired to assist in the design and implementation of energy projects to ensure project success.

The City will ensure that the individual or company being hired has past experience that is relevant to the project for which they are being hired. Experience working with other cities is also a plus.

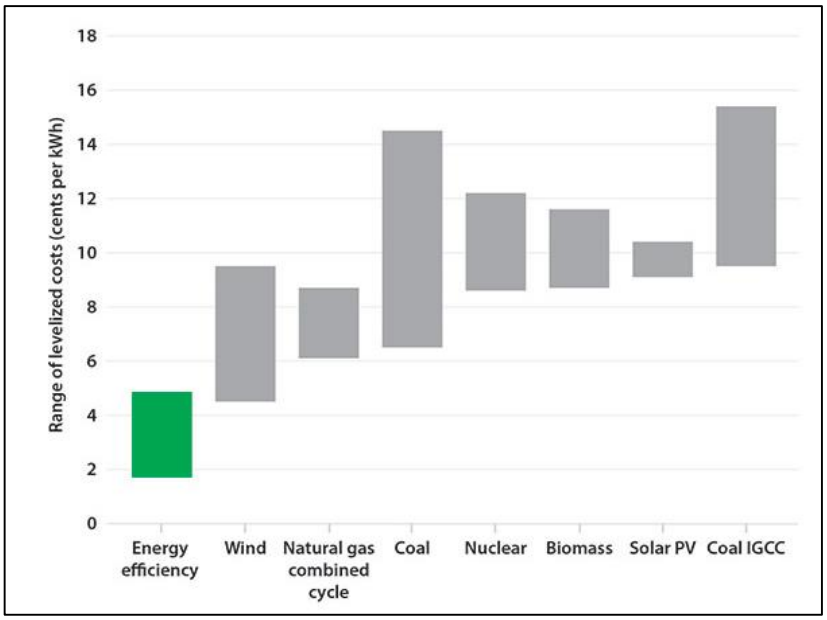
1.7 INTEGRATE ENERGY PLANNING INTO CITY GENERAL PLAN OR CLIMATE ACTION PLAN

City General Plans and energy planning will go hand in hand. The SEP will be designed to be consistent with the policies and programs outlined in the General Plan, however, the SEP may also be used to drive

General Plan changes and the adoption of new energy efficiency or sustainability City policies. In addition, the SEP will be used to implement the broader goals identified in the City of Emeryville CAP.

2. ENERGY EFFICIENCY

Energy efficiency is one of the most cost effective ways to reduce city energy use and its carbon footprint. When implemented properly, efficiency measures can decrease energy use without compromising comfort and can improve indoor air quality and enhance employee and staff performance. Energy efficiency will be a higher priority than renewable energy due to more favorable economics and to avoid over-sizing renewable energy systems. The chart below illustrates a comparison of the cost effectiveness of energy efficiency to power generation. These costs do not account for externalities, such as health costs, pollution costs, and costs incurred from environmental damage and cleanup.



Costs of electricity resource options, March 2014. ***Source:*** *American Council for an Energy-Efficient Economy*

The following Energy Efficiency Implementation Programs and Projects will be implemented by the City. The current status of each (either "planned," "in-process," "complete" or "ongoing") can be found in Appendix 2.

2.1 SET ENERGY EFFICIENCY GOALS

The City has established an annual energy usage reduction goal for existing facilities of 10% below a 2010 baseline by the end of 2020. This reduction will be achieved by targeting opportunities from a benchmarking analysis provided by EBEW in 2015. Performance will be monitored annually to determine if goals are met, and will be re-evaluated every five years to establish new goals.

2.2 EVALUATE MECHANISMS FOR THE IMPLEMENTATION OF ENERGY CONSERVATION AND EFFICIENCY PROJECTS

The City will use various mechanisms for the identification and implementation of energy efficiency projects and programs, including the use of in-house staff, engineering consultants, contractors, and

performance contracting vehicles through Energy Service Companies (ESCOs). The following specific tasks will be implemented.

2.3 CONDUCT A FACILITY PRIORITIZATION SURVEY

The City will conduct a prioritization survey of all City facilities. The surveys will be used to establish priorities for conducting comprehensive facility energy audits. Buildings will be prioritized based on energy use intensity (EUI) (i.e. electricity and natural gas use per gross square foot per year), with buildings with the highest energy use intensity given highest priority. The Energy Benchmarking Report developed by EBEW/QuEST as a part of this SEP will be used for this purpose. The surveys will include leased facilities to the extent practicable and to the extent that the recommendations of such surveys and audits can be implemented under the terms of the lease.

2.4 CONDUCT COMPREHENSIVE FACILITY ENERGY AUDITS

The City will establish an Energy Efficiency auditing plan which will consist of the following elements:

1. A long term plan to conduct or obtain comprehensive facility energy audits, which can be based on prioritization surveys.
2. A commitment to conduct energy audits for approximately 20% of their facilities each year, beginning within 6 months of the establishment of the City's Energy Plan. This can be carried out either independently using public agency resources, through Energy Savings Performance Contracts, state programs such as the California Energy Commission Technical Assistance program, utility energy-efficiency technical assistances, or energy engineering consultants hired by the City.
3. Comprehensive audits of facilities performed within the last 3 years may be considered current for the purposes of implementation.
4. "No-cost" audits will be utilized to the extent practicable.
5. The level of details and energy savings calculations will be that of an ASHRAE Level II audit. An ASHRAE Level II audit includes an analysis of energy use at a facility and identifies no-cost, low-cost and capital improvement energy efficiency measures with detailed energy and financial calculations.

2.4.1 IMPLEMENT NEW AND EXISTING AUDIT RECOMMENDATIONS

Within 90 days of the completion of the comprehensive facility audit of each facility, the City will begin implementing cost-effective recommendations for installation of energy efficiency and renewable energy technologies. The City will also do the same for energy audits of facilities performed within the past 3 years. In making decisions about investments in energy efficiency and renewable energy projects, the City will use life-cycle cost analyses, targeting projects with low and no additional life cycle costs first. Savings from low and no-cost measures can be used to support projects requiring more capital investment. Where appropriate, the City will consider the life-cycle costs of combinations of projects, particularly to encourage the bundling of energy efficiency projects with renewable energy projects to improve project economics.

2.5 IMPLEMENT ONGOING ENERGY MONITORING

For City facilities believed to be major energy users, which are likely to be larger buildings or those with technical areas, the City will install permanent meters on all energy inputs (e.g. electricity, natural gas, chilled water, hot water) to allow for continuous energy monitoring and evaluation of the impact of efficiency projects. If a central plant system is installed at a City facility, the City will include metering and monitoring of hot and chilled water circulation from the plant as appropriate. When possible, metering will be connected to energy management systems (EMS) to aid in the monitoring and analysis of energy use.

2.6 PARTICIPATE IN DEMAND RESPONSE (DR) PROGRAMS

The City will participate in the PG&E Peak Pricing Program to reduce energy demand. By using less electricity on Peak Day Pricing Event Days when the power gird is under the most strain, the City will help keep California's energy supply reliable for everyone and reduces the City's energy cost. More information about PG&E's Demand Response programs can be found by following the link below: http://www.pge.com/en/mybusiness/save/energymanagement/index.page

2.7 IDENTIFY AND TAKE ADVANTAGE OF GRANT AND INCENTIVE PROGRAMS

The City will identify and take advantage of all grant and incentive programs available for energy efficiency and conservation projects, including energy utility incentive programs and the CEC low-interest energy project loan programs. See Section 5 of the SEP for more details on funding opportunities.

2.8 ENERGY EFFICIENT EQUIPMENT

The City will purchase and utilize energy efficient equipment whenever possible and will employ the following strategies to accomplish this goal.

2.8.1 ESTABLISH AN ENERGY EFFICIENCY PURCHASING POLICY

The City will establish a city-wide policy for all purchases of energy-using equipment, stipulating where life-cycle cost-effective, energy efficient products will be selected. Products with an ENERGY STAR® label are certified to not only be energy efficient but to also have a reasonable payback period, and ENERGY STAR® labeled equipment will be purchased whenever available. For product groups where ENERGY STAR® labels are not yet available, the City will select products that are in the upper 25% of energy efficiency for their respective product categories. The City will incorporate energy efficient criteria consistent with ENERGY STAR® and other designated energy efficiency levels into all guide specifications and project specifications developed for new construction and renovation, as well as into product specification language developed for Basic Ordering Agreements, Blanket Purchasing Agreements, and all other purchasing procedures.

2.8.2 EFFICIENT LIGHTING AND LIGHTING CONTROLS

The City will install current generation of energy efficient lighting and lighting controls for interior and exterior applications. Energy efficient lighting technologies include low-wattage linear fluorescent lights, compact fluorescent lights, LEDs, and induction lighting. Examples of lighting controls include occupancy sensors, photocell installations for turning off lights when there is enough daylight, and time clocks for scheduling lights on and off automatically.

Install Energy Efficient HVAC Systems

In addition to buying energy efficient air conditioners, chillers, and boilers, the City will further increase the energy efficiency of their HVAC systems by pursuing the following measures.

Install Economizers

Air-side economizers can be added to allow the use of "free cooling", which is to use outside air to ventilate the building when outside air temperatures are favorable. Air-side economizers can be installed on both package units and buildings with central plants. While most cities do not have central plants, those that do can install waterside economizers to further reduce chiller use.

Enhance Control of Equipment

Installing variable frequency drives (VFDs), also known as variable speed drives (VSDs), on HVAC fans and pumps can save a significant amount of energy, as fans and pumps use more energy at higher speeds. VFDs are most effective when incorporated into an EMS for better control but can also be locally controlled if needed.

Appropriately Size Equipment

Oversized equipment can waste energy by using more power than necessary to meet the load. Ensure that all equipment is sized appropriately for its load or has the ability to ramp down through controls instead of cycling on and off repeatedly when loads are low.

Reduce Unnecessary Heat Gain and Loss

Avoid unnecessary cooling and heating by reducing unwanted heat gain or loss. Examples of unwanted heat gains in buildings can be prevented by shading south- and west-facing windows or by "cool roofing" strategies and painting roofs white. Prevent unwanted heat loss in pools by using pool covers to reduce heat loss from pools, thereby reducing boiler usage.

Perform Regular Maintenance on Equipment

Effective preventive and regular maintenance programs keep equipment and systems operating optimally and reduce excess energy use. Set up a routine maintenance schedule to ensure proper maintenance is performed.

Replace equipment with energy efficient models

As old equipment is taken offline, replace it with energy efficient models. See Program 2.8.1 Establish a Purchasing Policy, above, for more guidelines.

2.8.3 MANAGING PLUG LOADS

"Plug Loads" are energy consuming equipment that draws electricity from a wall socket. Examples of plug loads include computers, printers, refrigerators, and space heaters. The City will manage plug loads by activating any energy saving features on your plug load equipment and by using occupancy sensor plug load shut-off devices, such as occupancy sensed power strips.

3. FACILITIES OPERATION

In addition to installing energy efficient equipment, the City will strive to operate high-performing facilities, buildings, and energy infrastructure systems that are optimized for inhabitant comfort, productivity, and energy and resource efficiency.

The following programs will be implemented by the City to meet this goal. The current status of each (either "planned," "in-process," "complete" or "ongoing") can be found in Appendix 2.

3.1 ENCOURAGE AND SUPPORT ENERGY EFFICIENCY TRAINING OF STAFF

The City will encourage staff to become trained in energy efficiency and offer support by paying for certification and class fees. Staff can take classes at the IOU energy centers or go through Building Operator certification, a nationally recognized program. For more information, visit: http://www.theboc.info

3.2 INSTALL ENERGY MANAGEMENT SYSTEMS

The City will consider the use of computerized EMS to provide centralized reporting and control of City energy related activities. City staff will strive to achieve optimum efficiency in the use of natural gas, electricity, or other energy resources to meet the heating, cooling, and lighting needs of the buildings and/or facilities. Except for areas requiring special operating conditions, such as electronic data processing facilities, or other scientifically critical areas, where rigid temperature controls are required, building and/or facility temperatures will be controlled to fluctuate between the limits stated below. This will be a future project and will be considered in the annual CIP process.

3.3 ADJUST TEMPERATURE SET POINTS AND SCHEDULE OPERATING TIMES

To avoid overcooling and overheating, the City can raise cooling temperature set points and lower heating temperature set points. If there is a central plant to meet the heating and cooling needs, implementing

supply air temperature resets, chilled water and hot water resets, and chilled water and hot water set point changes can help avoid wasting energy during milder weather.

The City will heat buildings at or below 68°F and cool facilities at or above 74°F in order to avoid excess heating and cooling. In order to avoid unnecessary heat loss, domestic hot water temperatures will not be set above 120°F.

3.4 OPTIMIZE HVAC EQUIPMENT SCHEDULING

All air conditioning equipment, including supply and return air fans, will be shut off on weekends, holidays, and for varying periods each night, except where it would adversely affect electronic data processing installations or other critical, or 24-hour operations.

The City will avoid cooling and heating spaces when unnecessary. This can be done by scheduling HVAC systems off during unoccupied times while implementing a pre-cooling strategy to cool the building in the early hours of the morning before outside temperatures heat up. If there is a central plant, scheduling lockouts for chillers and boilers can be used to avoid running this equipment when unneeded.

3.5 ACTIVATE ENERGY-SAVING FEATURES FOR APPLIANCES AND COMPUTERS

The City will activate energy-saving features on all appliances and computer equipment within City facilities, for example, power-saving modes on PCs, copiers, printers, and other office equipment. Install server and desktop virtualization and PC power management systems to reduce computer energy use.

4. SUSTAINABLE BUILDING PRACTICES

Construction and renovation of new and existing facilities provides a significant opportunity to reduce the environmental impacts of the built environment through sustainable building practices. The City will incorporate energy and resource efficient "Green Building" practices in the design and construction of all new and renovated facilities.

The following implementation programs will be implemented by the City to meet this goal. The current status of each (either "planned," "in-process," "complete" or "ongoing") can be found in Appendix 2.

4.1 ESTABLISH A GREEN BUILDING STANDARD

Green Building Standards for new construction and renovation projects will be adopted based on Best Practices, industry standards, professional organizations, institutions of higher learning (UC, CSU, or CCC) or other local governments. All new construction and major remodeling projects will be designed to achieve at least a U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) Silver rating or equivalent performance. For more information about LEED ratings, visit: www.usgbc.org/DisplayPage.aspx?CMSPageID=222

4.2 IMPLEMENT SUSTAINABLE DESIGN PRACTICES

All City new construction, renovation, maintenance, and repair projects will be designed with consideration of optimum energy utilization, low lifecycle operating costs, and compliance with the City's goals and all applicable energy codes and regulations. Energy efficient and sustainable design will be addressed early in the project planning and design phases to maximize cost effectiveness and will be implemented in balance with the academic program needs of the project. The following elements will be implemented in the design of all buildings for the City:

- Siting and design considerations that optimize local geographic features to improve sustainability of the project, such as proximity to public transportation, consideration of microclimates, and passive or active solar energy opportunities
- Durable systems and finishes with long life cycles that minimize maintenance and replacement
- Optimization of layout and design of spaces to accommodate reconfiguration, with the expectation that the facility will be renovated and re-used (versus demolished)
- Systems designed for optimization of energy, water, and other natural resources
- Designed to maximize natural daylighting and ventilation
- Optimization of indoor environmental quality for occupants
- Utilization of environmentally preferable products and processes, such as recycled content materials and recyclable materials
- Procedures that monitor, trend, and report operational performance
- Space will be provided in each building to support an active program for recycling and reuse of materials
- Design outdoor spaces to minimize parking lots, use permeable pavement, and avoid blacktopping pavement and plant trees to shade parking lots to prevent the heat island effect. Utilize sustainable landscaping practices
- Any energy-using equipment acquired for the furnishing of new and renovated buildings will be ENERGY STAR® rated or equivalent in accordance with the purchasing policy adopted by the City

4.3 USE AN INTEGRATED SYSTEMS APPROACH IN BUILDING DESIGN

Sustainable building goals will be evaluated in a cost effective manner by identifying economic and environmental performance criteria, evaluating life cycle savings, and adopting an integrated systems approach. Such an approach treats the entire building as one system and recognizes that individual building features, such as lighting, windows, heating and cooling systems, will be evaluated and designed as interactive systems.

4.4 HIRE SUSTAINABLE BUILDING DESIGN PROFESSIONALS

The City will utilize architectural firms, consultants, and energy engineers experienced in all phases of the sustainable building design process to assist in constructing energy and resource efficient buildings. The City will take advantage of the utility provided energy efficiency new construction design programs, such as Savings by Design.

4.5 COMMISSION NEW BUILDINGS

All new buildings will be commissioned after construction to ensure that systems were installed and operating as designed. Individual systems will also be commissioned to ensure that they run as efficiently as possible.

5. ON-SITE GENERATION AND RENEWABLE ENERGY

Renewable generation implementation will occur only after significant efficiency and conservation plans have been implemented to ensure that any self-generation or demand response programs or projects are sized appropriately.

The following implementation programs will be implemented by the City to meet this goal. The current status of each (either "planned," "in-process," "complete" or "ongoing") can be found in Appendix 2.

5.1 EVALUATE CLEAN COGENERATION AND RENEWABLE ENERGY GENERATION

The City will evaluate and implement cogeneration projects, such as cogeneration powered by renewable resources like biomass and landfill gas, and renewable energy generation technologies in order to reduce greenhouse gas emissions and to improve campus energy efficiency, utility reliability, and service diversity. The feasibility of solar photovoltaic (PV) systems, wind power, solar thermal water heating for pools and domestic use, biomass and biogas generation, fuel cells, wind energy, and geothermal heat pumping applications will also be evaluated

5.2 MINIMIZE GREENHOUSE GAS INTENSITY OF PURCHASED ELECTRICITY

Where direct access to energy providers is permitted by law, such as with community choice aggregation, the City will consider the source of the electricity and strive to minimize the greenhouse gas intensity of purchased electricity. The City will include provisions for the purchase of electricity from renewable energy sources as a component of their requests for bids whenever procuring electricity and evaluate any climate change mitigation programs offered by providers. The City will strive to exceed the State of California Renewable Portfolio Standard (RPS) in procuring energy. The City will set more aggressive renewable energy purchasing goals than the statewide RPS and set a long term goal to only use and purchase renewable energy.

5.3 PARTICIPATION IN COMMUNITY CHOICE AGGREGATION

The City will participate in Community Choice Aggregation (CCA) efforts as developed by Alameda County or other local agencies, as appropriate. CCA permits public agencies to aggregate the electric loads of residents, businesses, and City and purchase electricity on their behalf. CCA Programs usually have higher RPS than the investor owned utilities. For example, CleanPowerSF, the San Francisco CCA Program, aims

to be 51% renewable energy by 2017, which is almost double the statewide RPS of 33% renewable energy generation.

For the CCA Programs currently available, visit:
http://www.cpuc.ca.gov/PUC/energy/Retail+Electric+Markets+and+Finance/070430_ccaggregation.htm

Many other cities and counties are currently evaluating the feasibility of a CCA program.

5.4 IDENTIFY AND TAKE ADVANTAGE OF GRANT AND INCENTIVE PROGRAMS

The City will identify and take advantage of all grant and incentive programs available for self-generation or renewable energy through the local utilities. See SEP Section 5: Funding and Financing Opportunities for more details.

6. OUTREACH & AWARENESS

The effectiveness of a Local Government Strategic Energy Plan is highly dependent on the actions of individual City staff and employees. While energy efficient equipment and the installation of solar panels will make a city more energy responsible, cultural and behavioral changes can have a large impact on the effectiveness of these projects. These factors also strongly influence the likelihood of the continued prioritization of sustainability within City operations and buildings and within the community itself. Additionally, it is important to maintain transparency and keep employees and the community informed of the City's progress with energy planning and action. Ideally, the Emeryville SEP will act as a springboard toward more robust activities with the larger community.

The City will implement the following activities to achieve this goal. The current status of each (either "planned," "in-process," "complete" or "ongoing") can be found in Appendix 2.

6.1 WEBPAGE DEDICATED TO CITY SUSTAINABILITY

The City will create a page on the City website dedicated to sharing information about sustainable energy practices. The website will host the latest version of the City's completed SEP and provide a summary of the vision, goals, and past, current, and planned projects. The website can be a great platform to celebrate successes by detailing the energy savings realized by implemented energy projects and can serve as a publicity tool for sustainability events. In addition, the website can serve as a valuable resource for the community, providing information on available incentive programs offered through the local utility and hosting links to energy and sustainability related educational webpages. The Energy Plan Coordinator or a member of the Leadership Team will manage the webpage and ensure that it is kept up to date with the latest City developments and project results.

6.2 WORKSHOPS AND PRESENTATIONS

The City will sponsor workshops or presentations to enable City employees to stay informed about sustainability activities, ask questions, and participate in decisions. Workshops and presentations will be well publicized and open to all, and they will be led by individuals who can knowledgably field questions

from the audience and efficiently facilitate the workshop process. The City will also establish a "suggestion program" to allow staff to provide input into future energy program and project ideas.

6.3 SUSTAINABILITY EVENTS

The City will participate in fairs or celebrations for local, national, or global sustainability events to spread awareness of worldwide sustainability. These events are also a good avenue for publicity for achievements. Notable national or global events surrounding sustainability include Earth Day on April 22, 350.org in the fall, and Earth Hour in the spring.

6.4 SUSTAINABILITY CHALLENGES AND COMPETITIONS

The City will challenge City employees to think actively and creatively about solutions for making City buildings and operations more sustainable. Constructive competition will be used to encourage water conservation, energy conservation, reduction in single passenger vehicles driven, or any other sustainability goal. Offering small cash prizes to assist in implementing small sustainability changes can spread awareness and get people thinking about possible changes. If appropriate, the challenge or competition can be extended to the local community.

6.5 CITY ORGANIZATIONAL OUTREACH AND AWARENESS

The City recognizes the importance of internal outreach and awareness efforts for City employees in the overall success of the SEP. The following projects and programs have been selected to assist with this effort.

6.5.1 POST BEHAVIORAL REMINDERS

Reminders will be posted where appropriate to encourage City employees to conserve energy and water, reduce and sort solid waste, turn off car engines to prevent idling, and encourage other sustainable habits by posting reminders where appropriate.

6.5.2 NEW EMPLOYEE ORIENTATION

When hiring a new employee, they will be introduced to the City's strategic energy plan and other sustainability plans and goals so that they are aware of the City's culture of conservation and environmental commitment. Employees will be encouraged to participate on the Leadership Team or get involved in other areas of sustainability within the City.

6.5.3 CITY EMPLOYEE E- NEWSPAPER OR NEWSLETTER

Updates on the SEP and energy projects will be included within regular City e-newsletters or updates. The City Energy/Sustainability Coordinator or a member of the Leadership Team will coordinate with the employee responsible for creating the newsletter to ensure City employees stay informed on successes, new developments, and progress towards defined goals.

6.6 COMMUNITY-WIDE OUTREACH AND AWARENESS

When the City expands the SEP to be inclusive of the entire community by developing a community-wide strategic energy plan, the following engagement strategies will be employed. The current status of each (either "planned," "in-process," "complete" or "ongoing") can be found in Appendix 2.

6.6.1 ENGAGE LOCAL BUSINESSES

The City will engage local businesses, ranging from a variety of industries and sizes, by informing them of the City's energy use reduction goals and inviting representatives to participate in the creation of the larger, community-wide SEP. The City webpage will host information on sustainability and energy resources available for local businesses, including funding and financing opportunities and rebate programs, and will actively involve interested businesses in City sustainability events and programs, where applicable.

6.6.2 REV "SUSTAINABILITY CIRCLE" PROGRAM

REV is an organization based in San Francisco that specializes in accelerating sustainability within businesses. Several local governments have used REV's Sustainability Circle program to engage local businesses in the strategic energy and sustainability planning process. A REV Sustainability Circle is a 6-month comprehensive peer-learning program that improves the way business is conducted through embedding sustainably practices across the organization. The outcome is a customized Sustainability Action Plan for local businesses. The City will consider participating in the REV program or encouraging local businesses to participate.

6.6.3 ENGAGE RESIDENTIAL SECTOR

The City recognizes that effective engagement of the residential sector will be crucial to the success of the community-wide energy plan. Community members wishing to be involved in the SEP creation process will be encouraged to participate throughout Plan creation and implementation. The City will develop and implement a Community Outreach Plan consisting of a variety of engagement strategies and opportunities for community involvement. Resources available for multi-and single family residences will be hosted on the City webpage and advertised at appropriate City events.

6.6.4 ENGAGE EDUCATIONAL INSTITUTIONS

Colleges, K-12 schools and other educational institutions are large energy users and hold a lot of potential for energy efficiency improvements and renewable energy installations. A variety of incentive programs, grants, and financing programs exist for educational institutions that greatly aid in the feasibility of these projects. The City will engage its schools and colleges in the overall effort to reduce City energy use and invite them to participate in the planned creation of a more expansive, community-wide energy plan. The City will also encourage its educational institutions to complete an energy or sustainability plan of their own, which will result in specific, actionable energy reduction programs and projects that will help meet the larger energy goals of the City.

The California Community Colleges Sustainability Template has been effectively used and implemented at many community colleges throughout the State and is a valuable resource for all educational institutions who wish to become more sustainable. A link the Template and its resource documents is provided below:

California Community College Sustainability Template:
http://extranet.cccco.edu/Divisions/FinanceFacilities/Sustainability/CCCSustainabilityPlanTemplateFiles.aspx

APPENDIX 2: ENERGY PROGRAMS AND PROJECTS CHECKLIST

Strategic Energy Plan Summary
Implementation Programs and Checklist

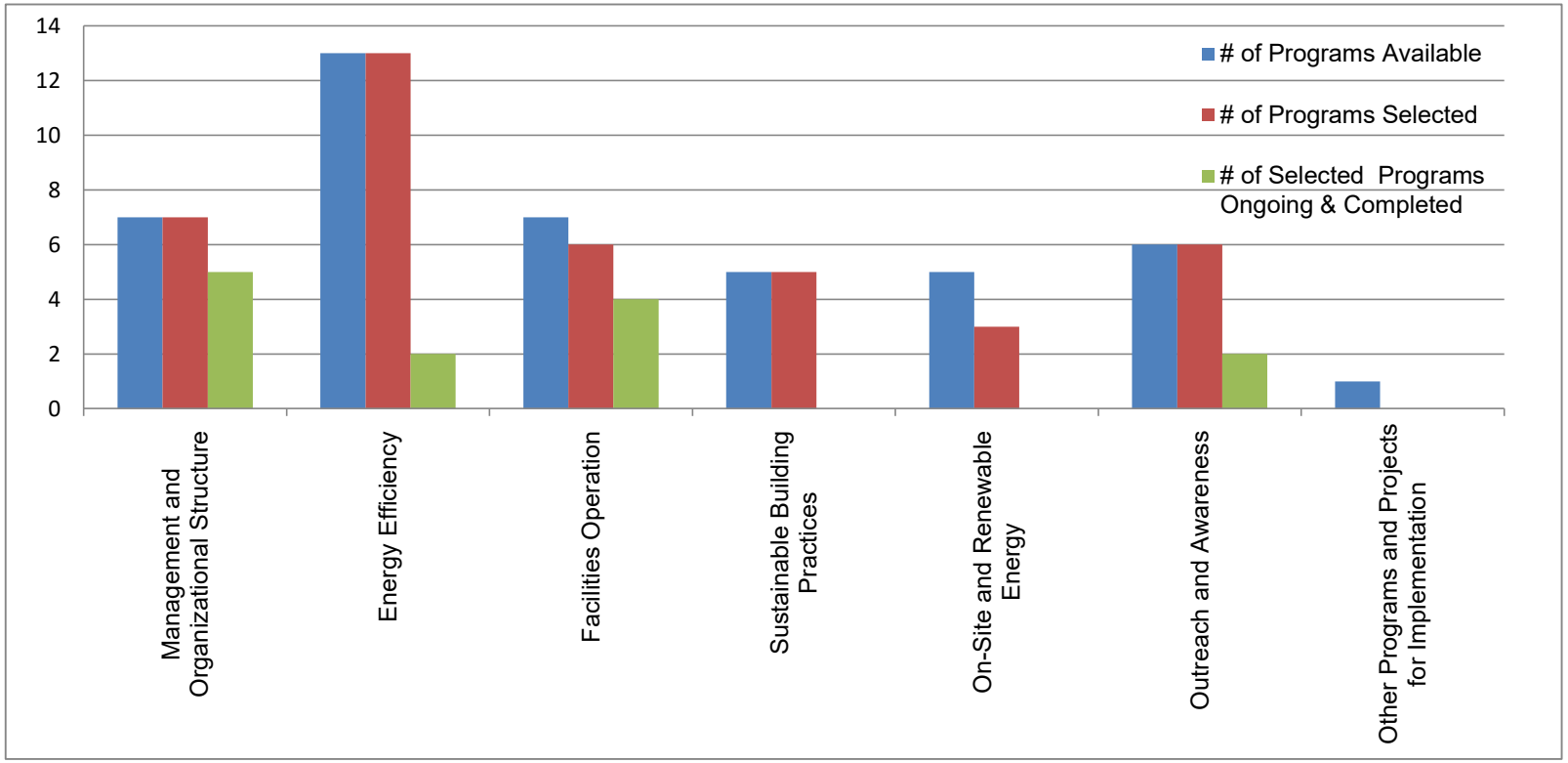
City: Emeryville
Project: Strategic Energy Plan
Date: 10/29/2015

Plan Section	Template Plan Section Description	# of Programs Available	# of Programs Selected	# of Selected Programs Ongoing & Completed
1	Management and Organizational Structure	7	7	5
2	Energy Efficiency	13	13	2
3	Facilities Operation	7	6	4
4	Sustainable Building Practices	5	5	0
5	On-Site and Renewable Energy	5	3	0
6	Outreach and Awareness	6	6	2
7	Other Programs and Projects for Implementation	1	0	0
	Totals	**43**	**40**	**13**

For questions, comments, or feedback, please contact Matt Sullivan, Newcomb | Anderson | McCormick, 415-896-0300, matt_sullivan@newcomb.cc

Strategic Energy Plan Programs and Projects Chart

City: Emeryville
Project: Strategic Energy Plan
Date: 10/29/2015



Sustainability Template Plan
Implementation Programs and Plans Checklist

City: Emeryville
Project: Strategic Energy Plan
Date: 10/29/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 1	**MANAGEMENT AND ORGANIZATIONAL STRUCTURE**		**Comments**
☑	1.1	Establish a City Council Sustainability Committee	
☑	1.2	Adopt a City Energy Policy/ Vision Statement	
☑	1.3	Appoint a City Energy Leadership Team	
☑	1.4	Appoint an Energy Plan Coordinator	
☑	1.5	Funding and Resources to Support Energy Plan Activities	
☑	1.6	Engage Energy Professionals as Required	
☑	1.7	Integrate Energy Planning into City General Plan or Climate Action Plan	
☐	*1.8*	*Enter Other Program and Project 1, text will change color*	
☐	*1.9*	*Enter Other Program and Project 2, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan
Implementation Programs and Checklist

City: Emeryville
Project: Strategic Energy Plan
Date: 10/29/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 2	**ENERGY EFFICIENCY**		**Comments**
☑	2.1	Set Energy Efficiency Goals	
☑	2.2	Evaluate Mechanisms for the Implementation of Energy Conservation and Efficiency Projects	
☑	2.3	Conduct Facility Prioritization Survey	
☑	2.4	Conduct Comprehensive Facility Energy Audits	
☑	2.4.1	Implement New and Existing Audit Recommendations	
☑	2.5	Implement Ongoing Energy Monitoring	
☑	2.6	Participate in Demand Response (DR) Programs	
☑	2.7	Identify and Take Advantage of Grant and Incentive Programs	
☑	2.8	Energy Efficiency Equipment	
☑	2.8.1	Establish an Energy Efficiency Purchasing Policy	
☑	2.8.2	Efficient Lighting and Lighting Controls	
☑	2.8.3	Install Energy Efficient HVAC Systems	
☑	2.8.4	Managing Plug Loads	
☐	*2.x*	*Enter Other Program and Project 1, text will change color*	
☐	*2.x*	*Enter Other Program and Project 2, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan
Implementation Programs and Checklist

City: Emeryville
Project: Strategic Energy Plan
Date: 10/29/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 3	**FACILITIES OPERATION**		**Comments**
☑	3.1	Encourage and Support Energy Efficiency Training of Staff	
☑	3.2	Install Energy Management Systems	
☑	3.3	Adjust Temperature Set Points and Schedule Operating Times	
☑	3.4	Optimize Building Occupancy Scheduling	
☑	3.5	Optimize HVAC Equipment Scheduling	
☑	3.6	Activate Energy-Saving Features for Appliances and Computers	
☐	3.x	Pursue Monitoring-Based(MBCx)/Retro-Commissioning (RCx)	
☐	*3.x*	*Enter Other Program and Project 1, text will change color*	
☐	*3.x*	*Enter Other Program and Project 2, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan
Implementation Programs and Checklist

City:	Emeryville
Project:	Strategic Energy Plan
Date:	10/29/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 4	**SUSTAINABLE BUILDING PRACTICES**		**Comments**
☑	4.1	Establish a Green Building Standard	
☑	4.2	Implement Sustainable Design Practices	
☑	4.3	Use an Integrated Systems Approach in Building Design	
☑	4.4	Hire Sustainable Design Professionals	
☑	4.5	Commission New Buildings	
☐	*4.x*	*Enter Other Program and Project 1, text will change color*	
☐	*4.x*	*Enter Other Program and Project 2, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan
Implementation Programs and Checklist

City:	Emeryville
Project:	Strategic Energy Plan
Date:	10/29/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 5	**ON-SITE AND RENEWABLE ENERGY**		**Comments**
☑	5.1	Evaluate Clean Cogeneration and Renewable Energy Generation	
☐	5.x	Evaluate Load Shifting Technologies	
☑	5.2	Minimize Greenhouse Gas Intensity of Purchased Electricity	
☑	5.3	Participation in Community Choice Aggregation	
☐	5.x	Identify and Take Advantage of Grant and Incentive Programs	
☐	*5.x*	*Enter Other Program and Project 1, text will change color*	
☐	*5.x*	*Enter Other Program and Project 2, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan
Implementation Programs and Checklist

City: Emeryville
Project: Strategic Energy Plan
Date: 10/29/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 6	**OUTREACH AND AWARENESS**		**Comments**
☑	6.1	Webpage Dedicated to City Sustainability	
☑	6.2	Workshops and Presentations	
☑	6.3	Sustainability Events	
☑	6.4	Sustainability Challeneges and Competitions	
☑	6.5	City Organizational Outreach and Awareness	
☑	6.6	Community-wide Outreach & Awareness	
☐	*6.x*	*Enter Other Program and Project 1, text will change color*	
☐	*6.x*	*Enter Other Program and Project 2, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan
Implementation Programs and Checklist

City:	Emeryville
Project:	Strategic Energy Plan
Date:	10/29/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 7	**OTHER PROGRAMS AND PROJECTS FOR IMPLEMENTATION**		**Comments**
☐	*7.x*	*Enter Other Program and Project 2, text will change color*	
☐	*7.x*	*Enter Other Program and Project 2, text will change color*	
☐	*7.x*	*Enter Other Program and Project 3, text will change color*	
☐	*7.x*	*Enter Other Program and Project 4, text will change color*	

See SEP Appendix 1 for detials on the above implementation projects and programs.

Strategic Energy Plan
Implementation Programs and Plans Checklist

City: Emeryville
Project: Strategic Energy Plan
Date: 10/29/2015

Priority Implementation Plans Indicated Below

Section 1 MANAGEMENT AND ORGANIZATIONAL STRUCTURE									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
1.1	Establish a City Council Sustainability Committee		Low	Complete		3		Environmental Programs Supervisor	
1.2	Adopt a City Energy Policy/ Vision Statement		High	Complete		1,2,3	Fall 2015	Environmental Programs Supervisor	
1.3	Appoint a City Energy Leadership Team		High	Complete		3	Fall 2015	Environmental Programs Supervisor	
1.4	Appoint an Energy Plan Coordinator		High	Planned		3	Spring 2016	Environmental Programs Supervisor	
1.5	Funding and Resources to Support Energy Plan Activities		High	In-process		1,2,3	June 2016	Finance, Public Works, Environmental Programs Supervisor	
1.6	Engage Energy Professionals as Required		Low	Ongoing		1,2,3	n/a	Environmental Programs Supervisor	
1.7	Integrate Energy Planning into City General Plan or Climate Action Plan		High	Complete		1,2,3	n/a	Environmental Programs Supervisor	

Section 2 ENERGY EFFICIENCY									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
2.1	Set Energy Efficiency Goals		High	In-process		1	June 2016	Environmental Programs Supervisor	
2.2	Evaluate Mechanisms for the Implementation of Energy Conservation and Efficiency Projects		Med	Planned		1	June 2016	Environmental Programs Supervisor	
2.3	Conduct Facility Prioritization Survey		Med	Complete		1	n/a	Environmental Programs Supervisor	
2.4	Conduct Comprehensive Facility Energy Audits		Med	Planned		1	2016	Environmental Programs Supervisor	
2.4.1	Implement New and Existing Audit Recommendations		Low	Planned		1	2016	Environmental Programs Supervisor	
2.5	Implement Ongoing Energy Monitoring		Low	In-process		1	2016	Environmental Programs Supervisor	
2.6	Participate in Demand Response (DR) Programs		Med	In-process		1	2017	Environmental Programs Supervisor	
2.7	Identify and Take Advantage of Grant and Incentive Programs		Med	Ongoing		1	n/a	Environmental Programs Supervisor	
2.8	Energy Efficiency Equipment		High	In-process		1	2016	Environmental Programs Supervisor	
2.8.1	Establish an Energy Efficiency Purchasing Policy		Med	Planned		1	Q2 2016	Energy Leadership Team	
2.8.2	Efficient Lighting and Lighting Controls		High	In-process		1	Q2 2016	Environmental Programs Supervisor	
2.8.3	Install Energy Efficient HVAC Systems		Med	In-process		1	2016	Environmental Programs Supervisor	
2.8.4	Managing Plug Loads		Med	In-process		1	2016	Environmental Programs Supervisor	

Strategic Energy Plan
Implementation Programs and Plans Checklist

City: Emeryville
Project: Strategic Energy Plan
Date: 10/29/2015

Priority Implementation Plans Indicated Below

Section 3 FACILITIES OPERATION									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
3.1	Encourage and Support Energy Efficiency Training of Staff	Annual "Lunch and Learn" sessions	Low	Planned		3	April 2016	Facilities Manager, Environmental Programs Supervisor	
3.2	Install Energy Management Systems		Med	Planned		1	TBD	Facilities Manager, Environmental Programs Supervisor	
3.3	Adjust Temperature Set Points and Schedule Operating Times		Med	Ongoing		1	n/a	Facilities Manager, Environmental Programs Supervisor	
3.4	Optimize Building Occupancy Scheduling		High	Ongoing		1	n/a	Facilities Manager, Environmental Programs Supervisor	
3.5	Optimize HVAC Equipment Scheduling		Med	Ongoing		1	n/a	Facilities Manager, Environmental Programs Supervisor	
3.6	Activate Energy-Saving Features for Appliances and Computers		Med	Complete		1	n/a	Facilities Manager, Environmental Programs Supervisor	

Section 4 SUSTAINABLE BUILDING PRACTICES									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.1	Establish a Green Building Standard		Med	Planned		1	TBD	Energy Leadership Team	
4.2	Implement Sustainable Design Practices		Med	Planned		1	TBD	Public Works	
4.3	Use an Integrated Systems Approach in Building Design		Med	Planned		1	TBD	Public Works	
4.4	Hire Sustainable Design Professionals		Med	Planned		1	TBD	Public Works	
4.5	Commission New Buildings		Med	Planned		1	TBD	Public Works	

Section 5 ON-SITE AND RENEWABLE ENERGY									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
5.1	Evaluate Clean Cogeneration and Renewable Energy Generation		Low	Planned		2		Energy Leadership Team	
5.2	Minimize Greenhouse Gas Intensity of Purchased Electricity		High	Planned		2		Energy Leadership Team	
5.3	Participation in Community Choice Aggregation		High	Planned		2		Energy Leadership Team	

Strategic Energy Plan
Implementation Programs and Plans Checklist

City: Emeryville
Project: Strategic Energy Plan
Date: 10/29/2015

Priority Implementation Plans Indicated Below

Section 6 OUTREACH AND AWARENESS									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
6.1	Webpage Dedicated to City Sustainability		Med	Planned		3	June 2016	Environmental Programs Supervisor	
6.2	Workshops and Presentations		Low	Planned		3	Spring 2016	Energy Leadership Team	
6.3	Sustainability Events		Low	Ongoing		3	Spring 2016	Energy Leadership Team	
6.4	Sustainability Challeneges and Competitions		Low	Ongoing		3	Summer 2016	Energy Leadership Team	
6.5	City Organizational Outreach and Awareness		Low	Planned		3	Spring 2016	Energy Leadership Team	
6.6	Community-wide Outreach & Awareness		Low	Planned		3	Spring 2016	Energy Leadership Team	

Section 7 OTHER PROGRAMS AND PROJECTS FOR IMPLEMENTATION									
Section	**Selected Program or Project**	Action Items/Notes	Priority (select)	Status (select)	Cost ($)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address

APPENDIX 3: GLOSSARY OF TERMS AND ACRONYMS

Air-side Economizer: a device that, on proper variable sensing, initiates control signals or actions to conserve energy.

ASHRAE Level II Audit: audit includes an analysis of energy use at a facility and identifies no-cost, low-cost and capital improvement energy efficiency measures with detailed energy and financial calculations.

Biomass: Organic non-fossil material of biological origin constituting a renewable energy source.

Clean Energy: energy produced from renewable sources in a process that has minimal impact to the environment

CleanPowerSF: The City and County of San Francisco's Community Choice Aggregation (CCA) program, administered by the San Francisco Public Utilities Commission (SFPUC) and monitored by the San Francisco Local Agency Formation Commission (LAFCo).

Community Choice Aggregation (CCA): efforts as developed by Alameda County or other local agencies, as appropriate. CCA permits public agencies to aggregate the electric loads of residents, businesses, and facilities to facilitate the purchase and sale of electrical energy.

Energy Benchmarking: process of collecting, analyzing and relating energy performance data of a building with the purpose of evaluating and comparing its performance to itself, other buildings within a portfolio, and/or its peers.

Energy Management System (EMS): a computer-aided tool used to monitor, measure, and control electrical building loads. Energy management systems can be used to central control devices like HVAC units and lighting systems across multiple locations. They can also provide metering, sub-metering, and monitory functions that allow facility and building managers to gather data and insight that allows them to make more informed decisions about energy activities across their sites.

ENERGY STAR ®: a government-backed labeling program that helps people and organizations save money and reduce greenhouse gas emissions by identifying factories, office equipment, home appliances and electronics that have superior energy efficiency.

Energy Use Intensity (EUI): metric that expresses a building's energy use as a function of its size or other characteristics.

Fuel Cell: A device capable of generating an electrical current by converting the chemical energy of a fuel (e.g., hydrogen) directly into electrical energy. Fuel cells differ from conventional electrical cells in that the active materials such as fuel and oxygen are not contained within the cell but are supplied from outside. It does not contain an intermediate heat cycle, as do most other electrical generation techniques.

Geothermal Energy: Hot water or steam extracted from geothermal reservoirs in the earth's crust that can be used for geothermal heat pumps, water heating, or electricity generation.

Green Building: an environmentally sustainable building, designed, constructed and operated to minimize the total environmental impacts.

Greenhouse Gas Emissions: a gas contributes to the greenhouse effect by absorbing infrared radiation, e.g., carbon dioxide and chlorofluorocarbons

Leadership in Energy and Environmental Design (LEED): a set of rating systems developed by the U.S. Green Building Council for the design, construction, operation, and maintenance of green buildings, homes and neighborhoods.

LED Lighting: a more environmentally-friendly alternative to incandescent lighting.

Plug Load: energy used by products that are powered by means of an ordinary AC plug. It typically includes office and general miscellaneous equipment, computers, elevators and escalators,

Renewable Energy: energy from a source that is not depleted when used, such as wind or solar power.

Solar Feasibility Assessment: a study that assesses energy available, risks, costs, and size of equipment most appropriate for a building or specified location

Variable Frequency Drives (VFDs): a type of motor controller that drives an electric motor by varying the frequency and voltage supplied to the electric motor.

Variable Speed Drives (VSDs): a piece of equipment that regulates the speed and rotational force, or torque output, of an electric motor.

Acronyms

ABAG: Association of Bay Area Governments
ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers
CAP: Climate Action Plan
EBEW: East Bay Energy Watch
HVAC: Heating, Ventilation, and Air-Conditioning
REN: Regional Energy Network
SEP: Strategic Energy Plan

APPENDIX 4: SCHOOL AND MUNICIPAL ADVANCED RETRO-COMMISSIONING AND TUNE-UP (S.M.A.R.T) PROJECT COMPLETION REPORT (PHASE I)

School and Municipal Advanced Retro-commissioning and Tune-up (S.M.A.R.T.)

EMERYVILLE CIVIC CENTER

PHASE 1 PROJECT COMPLETION REPORT

CUSTOMER NUMBER 0613.018.053

Prepared For:

Emeryville Civic Center
1333 Park Ave.
Emeryville Ca, 94608

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June 22, 2015

1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION

This Project Completion Report describes the energy efficiency measures (EEM's) installed for Emeryville Civic Center at ***Emeryville Civic Center*** in Emeryville Ca through participation in the Schools and Municipal Advanced Retro-commissioning and Tune-up (SMART) Program. ***Emeryville Civic Center*** is a single building with two sections; the older portion which is a small historic building, and the newer section, which is an addition to the historic building, and is comprised of mostly open office space. The addition envelope is mostly single pane windows, and the site has significant issues with its HVAC systems. The addition is approximately 12,000 square feet. Measures in this report pertain solely to the addition, and to exterior lights on and around the addition.

1.2 MEASURE SUMMARY

Table 1.1 provides a summary of the energy efficiency measures (EEMs) installed as a part of Phase 1. The EEMs were directly installed by the Program at no cost to the customer and therefore are not eligible for customer incentive. The calculated energy savings figures are based on equipment attributes and operating parameters.

Table 1.1: Direct-Install Energy Efficiency Measure Results

EEM	Measure Code	Description	Associated Bldg Area	Electricity Savings	Peak Demand Reduction	Natural Gas Savings
			ft²	*kWh/yr*	*kW*	*therms/yr*
1	CCB11	Optimize Economizer	12,000	91,763	0	0
2	CCA21	Reschedule Lighting	12,000	583	0	0
				92,346		

2.0 OVERVIEW

2.1 PROGRAM OVERVIEW

The School and Municipal Advanced Retro-commissioning and Tune-up (SMART) Program offers no-cost professional services and financial incentives to help Pacific Gas & Electric (PG&E) customers reduce energy use at their facilities through building controls and equipment retro-commissioning (RCx) measures. The SMART Program operates in Alameda County and San Mateo County to serve school and municipal facilities. Targeted facilities should be equipped with electrical interval meters and 100,000 Gross Square Feet (GSF) on average. The program is funded by PG&E ratepayers through the Public Goods Charge and the Public Purpose Surcharge under the auspices of the California Public Utilities Commission.

The SMART Program employs a "low touch" methodology to cost effectively serve smaller facilities by using whole building electrical interval data to remotely identify potential EEMs. An analytics based software tool customized by Gridium for Enovity is used to analyze building performance across various performance metrics. The SMART Program offers direct implementation of no-cost/low-cost measures and financial incentives for capital measures. Access to six-months of Drift Reporting is provided to alert the customer to any post-implementation efficiency losses.

2.2 CUSTOMER INTERACTION

Historically, utility funded energy efficiency programs have focused on larger commercial and industrial sites with significant opportunity for energy conservation. SMART is different type of program specifically designed to benefit smaller utility customers serving public school and municipal needs through operational tune-up and retrocommissioning measures. The SMART program is dependent on utility customer involvement in order to realize program wide energy goals. Without customer cooperation, schedule revisions and control sequence modifications are not feasible. Fine tuning control systems, equipment schedules and operating set points is a crucial part of reducing energy consumption state wide, and requires critical review of existing facility operations.

Emeryville Civic Center has been integral in ensuring the success of the SMART program at Phase 1. Without Emeryville Civic Center's desire to reduce energy consumption at their facilities numerous energy savings opportunities at these sites would not have been realized. Throughout the implementation process the Emeryville Civic Center has been aligned with the goals of the SMART program by attending planning meetings, providing knowledgeable site staff to assist in identifying energy savings opportunities, and supporting Enovity personnel on site.

Through an ongoing relationship with customers and site personnel it is a goal of the SMART program to see the energy savings measures persist at each site. To facilitate this, operational Drift Reports will be provided to Emeryville Civic Center for 6 months for Phase 1, as a part of on-going persistence monitoring and operational interpretation.

2.3 PROJECT OVERVIEW

Emeryville Civic Center submitted the program Enrollment Agreement on April 3, 2015. During the initial site assessment it was observed from logged 15 minute whole building demand data that ***Emeryville Civic Center*** has unexpected peak demand for a site with significant solar generation capability. Figure 2.1 shows the daily average demand for ***Emeryville Civic Center***. Figure 2.2 shows the site from satellite view. It can be seen in the figures that while the site has an approximately 38 nominal kW solar electric array (based

on an assumed 250 watt panel size), the demand curve does not reflect the expected peak hours solar offset. Estimated annual solar generation from PV watts is 58,525 kWh. Based on facility type (office space) and typical hours of operation, the demand curve indicates significant peak hours energy use. Table 2.1 shows the baseline equipment data. In addition this site was singled out as a particularly troubled site by the City of Emeryville. The civic center is not equipped with a Smart meter, Enovity logged demand data at the meter to develop figure 2.1 and to gain insight into building operations.

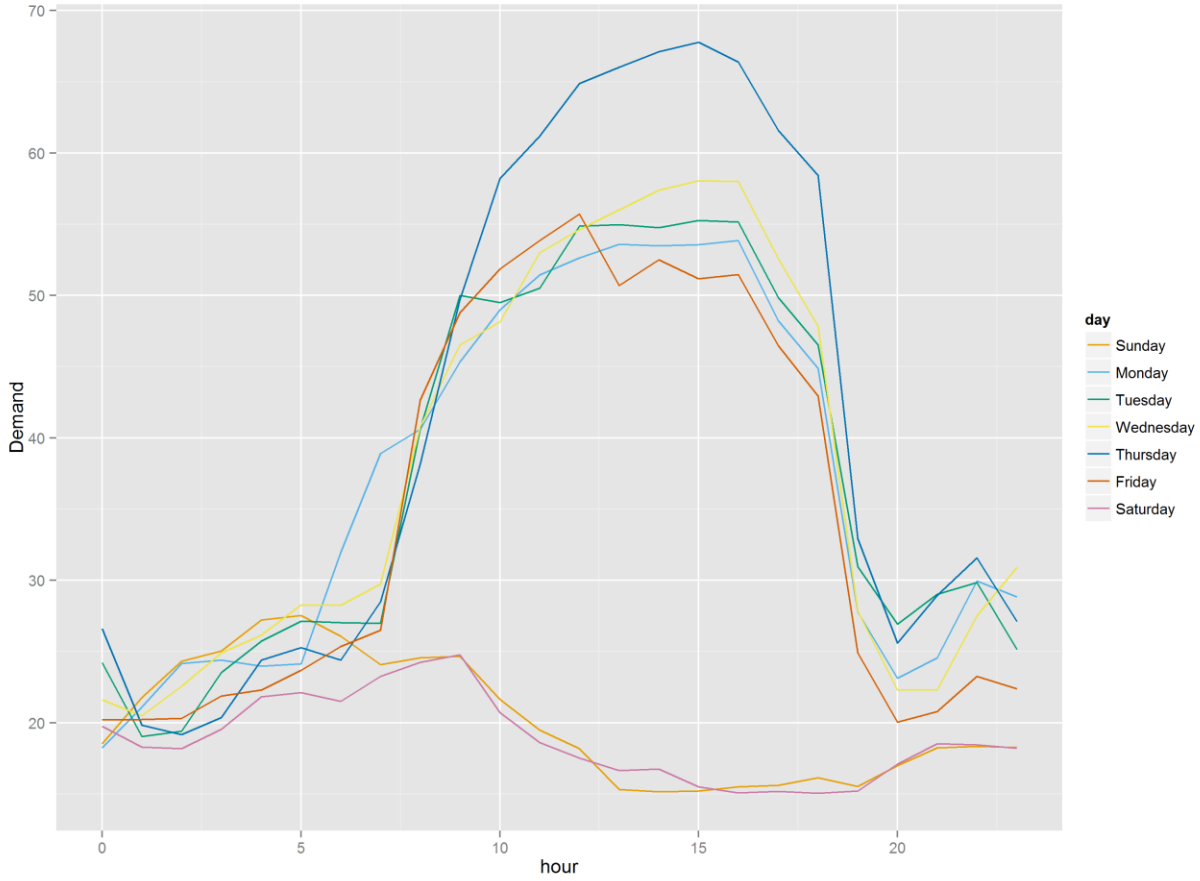


Figure 2.1: Daily average demand plot for *Emeryville Civic Center*

Figure 2.2: Satellite view of Emeryville Civic Center

Table 2.1: Baseline equipment label, service location, and schedule

Site	Equip Description	Manufacturers	Models	HP	MBH	Airflow
Emeryville Civic Center	AC-1	Trane	SXHFC75 (high capacity coil)	56	-	27,000
Emeryville Civic Center	Wattstopper Control Panel	Wattstopper	SC-100	-	-	-

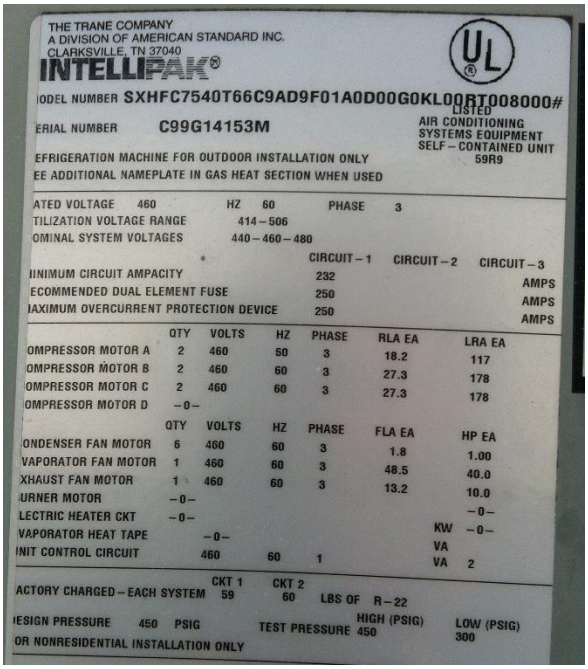


Figure 2.2: AC-1 Nameplate (Model # Indicates High Cap. And Comparative Enthalpy)

Based on the demand data the site schedule is assumed to be 6 am to 7 pm Monday through Friday for HVAC operation. Figure 2.3 shows a 3 day demand plot supporting this assumption. The days shown are typical of building operation, data has been logged for 2 months, and weekend demand is significantly reduced, showing no occupancy. The hours the building is open to the public are from 9 am to 5 pm Monday through Friday.

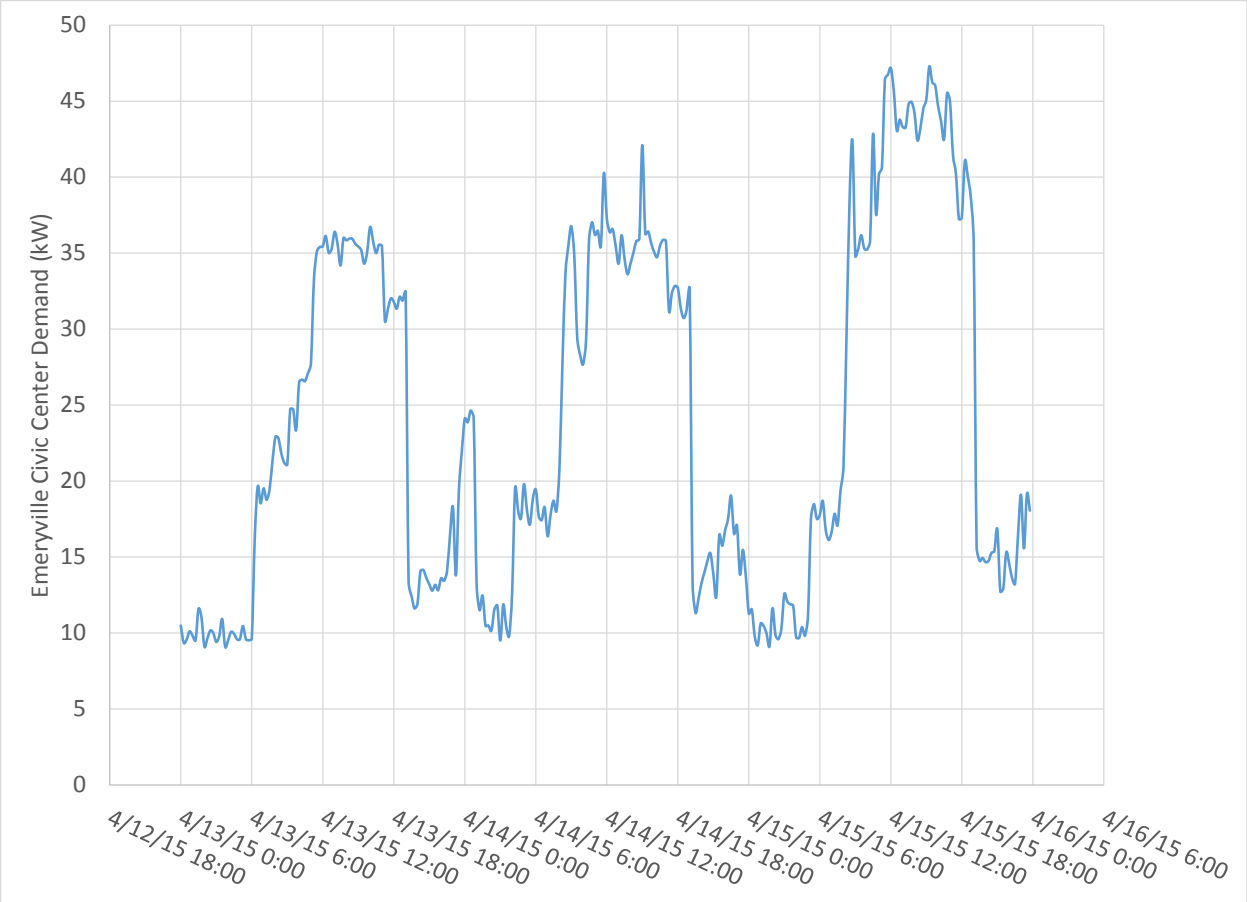


Figure 2.3: Typical Weekday Operation, (Unit has un-occupied set back operation)

3.0 ENERGY EFFICIENCY MEASURES

3.1 EEM 1 – OPTIMIZE ECONOMIZER CONTROL

3.1.1 Existing Condition

One AC unit serves the entire new wing of the Emeryville Civic Center. The unit AC-1 is a 75 ton Trane Cooling only unit. Heating is comprised of a hot water boiler and zone level re-heat coils. The building HVAC controls are on an older Delta BAS system, and includes zone level DDC control. The Trane AC unit is equipped with both a stand-alone controller and is tied into the BAS. A demand based SAT reset algorithm is in place controlling SAT based on cooling demand.

It was observed during the site inspection that the Outside Air (OA) damper set was rusted stuck, and the OA / Return Air (RA) damper actuator was no longer operational as a result of working for too long against the frozen OA damper set. The actuator was tested by disengaging the linkage and driving the OA damper 100% open. The damper blades were stuck in the minimum outside air position (20% based on local control screen set point).

By replacing the broken actuator, and ensuring a functional OA damper set, significant cooling demand can be eliminated. The site was observed to have a 72-74 degree space set point. Due to the large percentage of re-circulated air during cooling conditions, enabling the economizer should reduce excess energy consumption due to re-cooling and re-heating.

In addition, the unit is equipped with a comparative enthalpy sensor, which compares return air to outside air and disables the economizer if the outside air has a higher enthalpy than the return. Due to the zone re-heat, and the nature of the coastal climate, this control scheme is not optimal and results in significant loss of economizer operation. By disabling the comparative enthalpy control, the unit will look solely at the OA enthalpy, and lockout based on a set point, which allows for increased economizer operation depending on the set point selection. Due to the warm space temperature set point, an OA enthalpy control strategy is preferred over comparative enthalpy. The unit does not have dry bulb economizer control.

OA Damper set, Showing baseline linkage condition

Figure 3.2: Broken Actuator Serving AC-1 OA and RA Damper set

3.1.2 Measure Implemented

By removing the stuck linkage, and replacing the linkage hardware, as well as liberal application of lubricant and thorough working of blades, the damper set was made fully operational again. The actuator was replaced and tested. It proved to be fully operational. The comparative enthalpy control was disabled, and an Outside Air Enthalpy set point of 27 btu/lb was used as the economizer lockout. Figure 3.3 and 3.4 show the repaired linkage and new actuator respectively. Figure 3.5 shows the new enthalpy lockout. The unit was tested to ensure that the economizer control sequence will open the damper at enthalpies lower than the set point and successful operation was confirmed by Enovity and site personnel.

Figure 3.3: AC-1 OA Damper Linkage with new hardware

Figure 3.4: New Actuator Installed

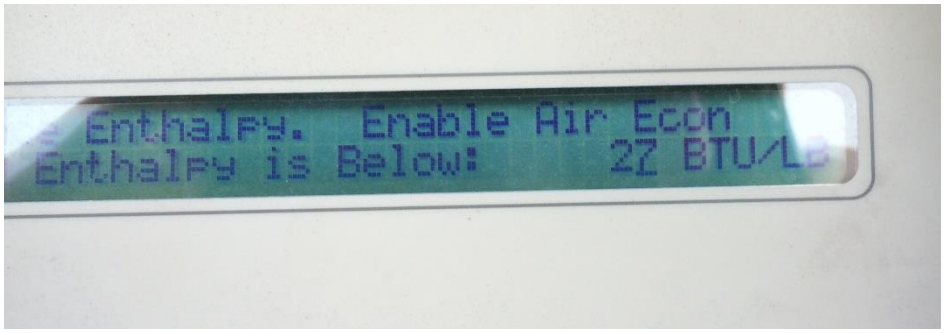


Figure 3.5: New Enthalpy Set point at 27 Btu / lb

3.2 EEM 2 – REPROGRAM WATTSTOPPER CONTROLLER TO UTILIZE ASTRONOMIC CONTROL ON OUTSIDE LIGHTS

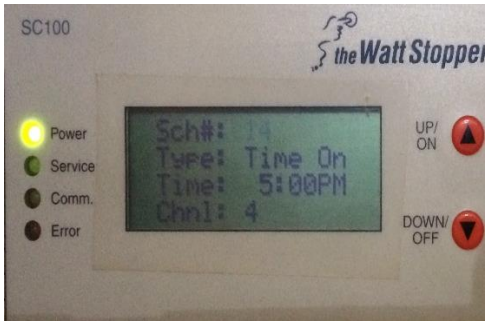
3.2.1 Existing Condition

It was observed during the site visit that the building time clock, which controls both interior and exterior lighting, uses a schedule for exterior zones, which does not reflect daylight conditions. It was requested by the site that the exterior lights be put on astronomical control, to reduce energy usage during daylight hours and summer months. Two circuits are controlled by the Wattstopper controller, one circuit serves the parking lot lighting and front entry lighting, which is comprised of 18 150 watt MH fixtures (a total of 2.7 kW). The other circuit controls main entrance, fountain, and ground lighting, which is comprised of 2 150 watt MH fixtures and 14 ground lights at 35 watts each (a total of 0.790 kW). The baseline schedule

for the parking lot lights is 7 pm to 7 am. The baseline schedule for the front entry / fountain lights is 5 pm to 10 pm. Fountain / Landscape lighting operate Monday through Friday, parking lot and entry lighting operate 7 days a week and on holidays. Figure 3.6 shows the baseline control for the exterior lighting circuits. Daily operation is indicated by asterisk beneath the day letter.

Figure 3.6: Baseline Schedules

Baseline Start for Fountain / Landscape Lights



Baseline days for Fountain / Landscape Lights

Baseline Start for Parking / Front Entry

Baseline Stop for Parking Front Entry

Figure 3.7: Parking Days of Operation

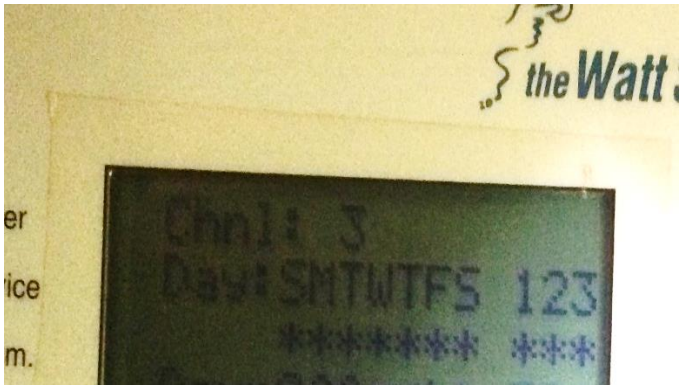
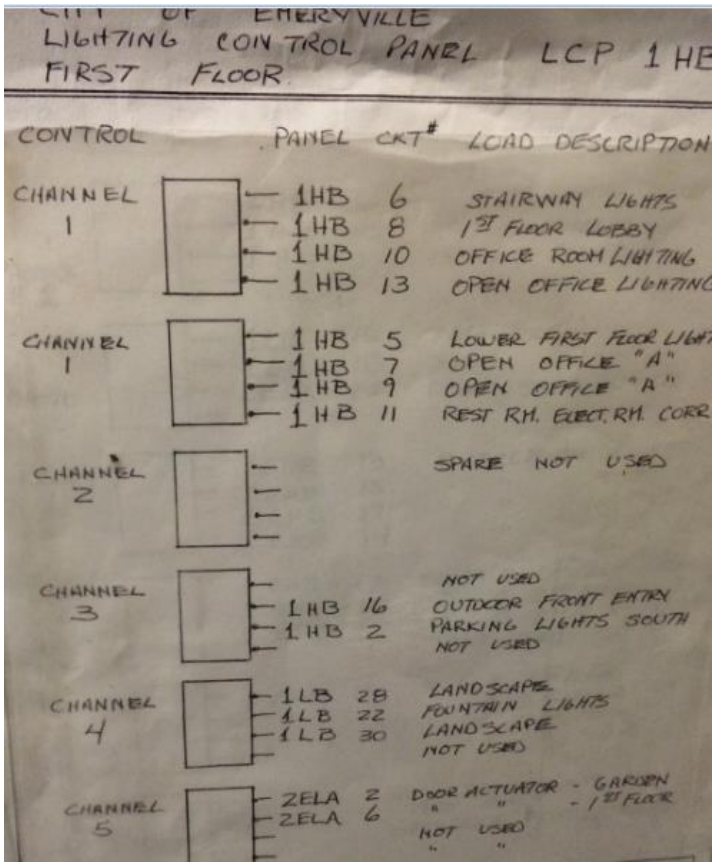


Figure 3.8: AH-1 Watt stopper Channels (Channels 3 and 4 are affected by this measure)

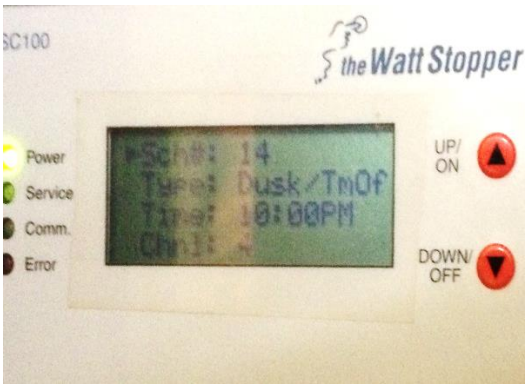


3.2.2 Measure Implemented

Both lighting circuits were re-programmed to take advantage of astronomic control strategies. The fountain and landscape lighting (Circuit 4) was re-programmed to turn on at sunset, and off at the scheduled time of 10 pm, while the parking lot lighting was programmed to turn on at Dusk, and off at Dawn. There is little energy savings from this measure, however the resulting lighting operation will better fit the intended use.

Figure2.5: Return Air Damper after Repair

Revised Start Stop for Landscape Lights



Revised Start Stop for Parking Lights

4.0 ATTACHMENTS AND KEY PARAMETERS

Measure savings were calculated using the BOA[1] tool, and a Custom Calculation Bin Analysis. This tool is endorsed by PG&E for calculating the energy and cost savings from common energy measures. Crucial inputs and performance parameters are described below.

4.1 ATTACHMENTS

1. BOA Calculation File, see Economizer tab for AC unit
2. Custom Calculation Spreadsheet for Astronomic Lighting Control
3. Initial Site Visit Findings
4. Invoice

4.2 KEY PARAMETERS

Equipment specifications can be found in Table 2.1.

EEM 1: Measure savings for AC equipment were calculated using the BOA tool. The BOA tool is an industry standard calculation tool. Inputs to the BOA tool include:

1. System inputs
    a. VAV, DX cooling, Hot Water Re-heat, Building Vintage
2. TMY zone
    a. CZ 3
3. Baseline % outside air
    a. 20%
4. AC-1 Cooling Capacity
    a. 75 tons

EEM 2: Measure savings for lighting equipment were made using a custom bin analysis. Inputs to Custom Calculation include:

1. Baseline schedules for both circuits
    a. Parking and Entry: 7 pm to 7 am 7 days a week
    b. Landscape and fountain: 5 pm to 10 pm 5 days a week
2. Sunrise and sunset times for 2015 (from Federal website)
3. DST start and stop for 2015
    a. March 8 start, Nov. 1 finish

[1] http://www.cacx.org/resources/rcxtools/spreadsheet_tools.html

4.3 ACTUATOR INVOICE

Your Order #111630 (placed on May 5, 2015 10:41:25 AM PDT)

Shipping Information:	Shipping Method:
robert rodriguez enovity 100 montgomery st suite 600 san francisco, California, 94104 United States T: [redacted] Cell Number: [redacted] F: 112	Select Shipping Method - UPS Ground

Item	Sku	Qty	Subtotal
24V S/R 2/10VDC DamperActuator	OPR0143	1	$533.52
		Subtotal	$533.52
		Shipping & Handling	$24.95
		Grand Total	**$558.47**

APPENDIX 5: SCHOOL AND MUNICIPAL ADVANCED RETRO-COMMISSIONING AND TUNE-UP (S.M.A.R.T) PROJECT COMPLETION REPORT (PHASE II)

School and Municipal Advanced Retro-commissioning and Tune-up (S.M.A.R.T.)

EMERYVILLE CIVIC CENTER

PHASE 2 PROJECT COMPLETION REPORT

CUSTOMER NUMBER 0613.018.053

Prepared For:

Emeryville Civic Center
1333 Park Ave.
Emeryville Ca, 94608

Prepared By:

CORPORATE OFFICE
San Francisco, CA
100 Montgomery Street, Suite 600
San Francisco, CA 94104-4331

Irvine • **Sacramento** • **Phoenix** • **Seattle**

James Lonergan, Project Engineer
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Dave Shelton, Program Manager
(415) 974-0390 ext. 2109
dshelton@enovity.com

August 10, 2015

1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION

This Project Completion Report describes the energy efficiency measures (EEM's) installed for Emeryville Civic Center at ***Emeryville Civic Center*** in Emeryville Ca through participation in the Schools and Municipal Advanced Retro-commissioning and Tune-up (SMART) Program. ***Emeryville Civic Center*** is a single building with two sections; the older portion which is a small historic building, and the newer section, which is an addition to the historic building, and is comprised of mostly open office space. The addition envelope is mostly single pane windows, and the site has significant issues with its HVAC systems. The addition is approximately 12,000 square feet. Measures in this report pertain solely to the addition, and to exterior lights on and around the addition.

1.2 MEASURE SUMMARY

Table 1.1 provides a summary of the energy efficiency measures (EEMs) installed as a part of Phase 2. The EEMs were directly installed by the Program at no cost to the customer and therefore are not eligible for customer incentive. The calculated energy savings figures are based on equipment attributes and operating parameters.

Table 1.1: Direct-Install Energy Efficiency Measure Results

EEM	Measure Code	Description	Associated Bldg Area	Electricity Savings	Peak Demand Reduction	Natural Gas Savings
			ft²	*kWh/yr*	*kW*	*therms/yr*
1	CCB11	Reduce Zone Airflow Set Points	12,000	11,432	4.72	4,574
				11,432	**4.72**	**4,574**

2.0 OVERVIEW

2.1 PROGRAM OVERVIEW

The School and Municipal Advanced Retro-commissioning and Tune-up (SMART) Program offers no-cost professional services and financial incentives to help Pacific Gas & Electric (PG&E) customers reduce energy use at their facilities through building controls and equipment retro-commissioning (RCx) measures. The SMART Program operates in Alameda County and San Mateo County to serve school and municipal facilities. Targeted facilities should be equipped with electrical interval meters and 100,000 Gross Square Feet (GSF) on average. The program is funded by PG&E ratepayers through the Public Goods Charge and the Public Purpose Surcharge under the auspices of the California Public Utilities Commission.

The SMART Program employs a "low touch" methodology to cost effectively serve smaller facilities by using whole building electrical interval data to remotely identify potential EEMs. An analytics based software tool customized by Gridium for Enovity is used to analyze building performance across various performance metrics. The SMART Program offers direct implementation of no-cost/low-cost measures and financial incentives for capital measures. Access to six-months of Drift Reporting is provided to alert the customer to any post-implementation efficiency losses.

2.2 CUSTOMER INTERACTION

Historically, utility funded energy efficiency programs have focused on larger commercial and industrial sites with significant opportunity for energy conservation. SMART is different type of program specifically designed to benefit smaller utility customers serving public school and municipal needs through operational tune-up and retrocommissioning measures. The SMART program is dependent on utility customer involvement in order to realize program wide energy goals. Without customer cooperation, schedule revisions and control sequence modifications are not feasible. Fine tuning control systems, equipment schedules and operating set points is a crucial part of reducing energy consumption state wide, and requires critical review of existing facility operations.

Emeryville Civic Center has been integral in ensuring the success of the SMART program for Phase 2. Without Emeryville Civic Center's desire to reduce energy consumption at their facilities numerous energy savings opportunities at these sites would not have been realized. Throughout the implementation process the Emeryville Civic Center has been aligned with the goals of the SMART program by attending planning meetings, providing knowledgeable site staff to assist in identifying energy savings opportunities, and supporting Enovity personnel on site.

Through an ongoing relationship with customers and site personnel it is a goal of the SMART program to see the energy savings measures persist at each site. To facilitate this, operational Drift Reports will be provided to Emeryville Civic Center for 6 months for Phase 2, as a part of on-going persistence monitoring and operational interpretation.

2.3 PROJECT OVERVIEW

Emeryville Civic Center submitted the program Enrollment Agreement on April 3, 2015. During the initial site assessment it was observed from logged 15 minute whole building demand data that ***Emeryville Civic Center*** has unexpected peak demand for a site with significant solar generation capability. Figure 2.1 shows the daily average demand for ***Emeryville Civic Center***. Figure 2.2 shows the site from satellite view. It can be seen in the figures that while the site has an approximately 38 nominal kW solar electric array (based

on an assumed 250 watt panel size), the demand curve does not reflect the expected peak hours solar offset. Estimated annual solar generation from PV watts is 58,525 kWh. Based on facility type (office space) and typical hours of operation, the demand curve indicates significant peak hours energy use. Table 2.1 shows the baseline equipment data. In addition this site was singled out as a particularly troubled site by the City of Emeryville. The civic center is not equipped with a Smart meter, Enovity logged demand data at the meter to develop figure 2.1 and to gain insight into building operations.

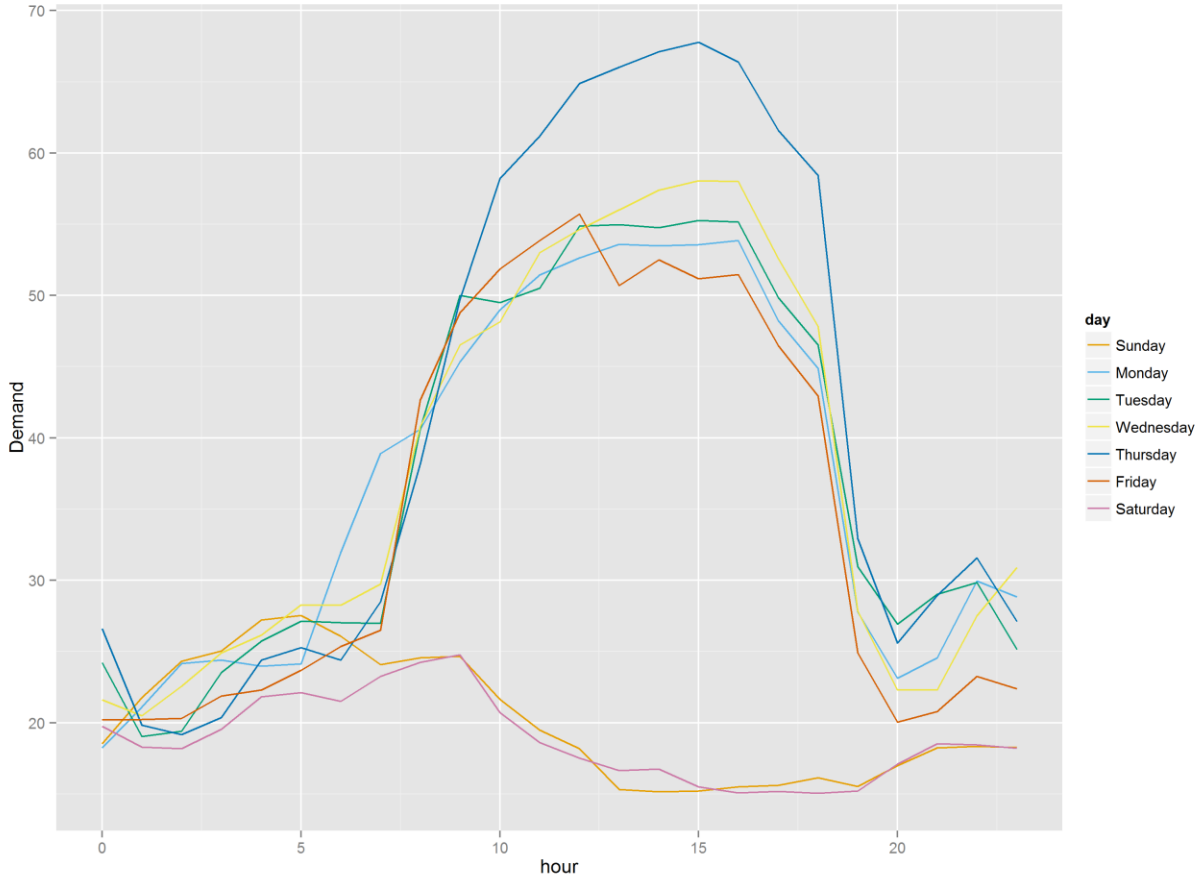


Figure 2.1: Daily average demand plot for *Emeryville Civic Center*

Figure 2.2 shows the site from satellite view. AC-1, the two building wings, and the solar array can be seen in the figure.

Figure 2.2: Satellite view of Emeryville Civic Center

Table 2.1 shows relevant equipment and specifications. Figure 2.2 shows the AC-1 nameplate, while Figure 2.3 shows the heating hot water system.

Table 2.1: Baseline equipment label, service location, and schedule

Site	Equip Description	Manufacturers	Models	HP	MBH	Airflow
Emeryville Civic Center	AC-1	Trane	SXHFC75 (high capacity coil)	56	-	27,000
Emeryville Civic Center	Boiler B-1	Teledyne Laars	PH1010	-	1010	-

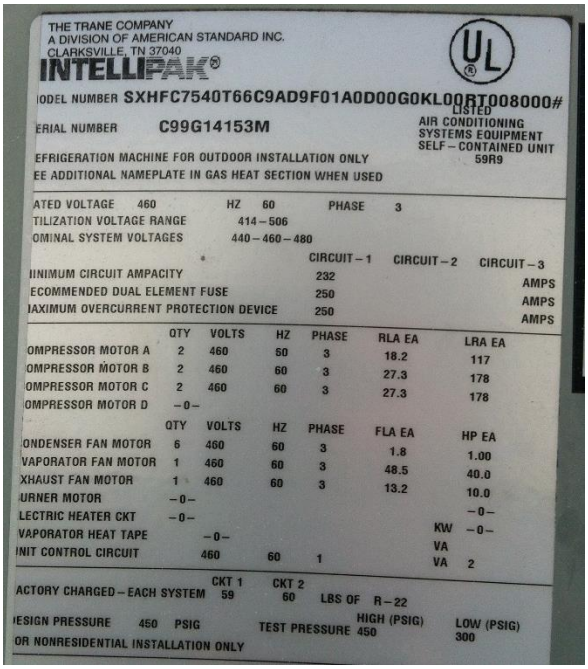


Figure 2.2: AC-1 Nameplate (Model # Indicates High Cap. And Comparative Enthalpy)

Figure 2.3: Boiler B-1, Providing HHW for the Civic Center

The Boiler schedule, seen at the BAS is from 5 am to 6 pm Monday, and 6 am to 6 pm Tuesday through Friday. Figure 2.4 shows a 3 day demand plot from logged electrical data. The days shown are typical of building operation, data has been logged for 2 months, and weekend demand is significantly reduced, showing no occupancy. The hours the building is open to the public are from 9 am to 5 pm Monday through Friday.

Figure 2.5 shows monthly gas usage for the civic center, with the annual total at about 17,500 Therms. This is about 1.5 Therms per square foot, which is significantly higher than benchmarked average gas usage for office buildings.

The BAS is 15 years old, and the site would benefit from a retrofit or upgrade, with additional control of AC-1, and advanced demand based sequences.

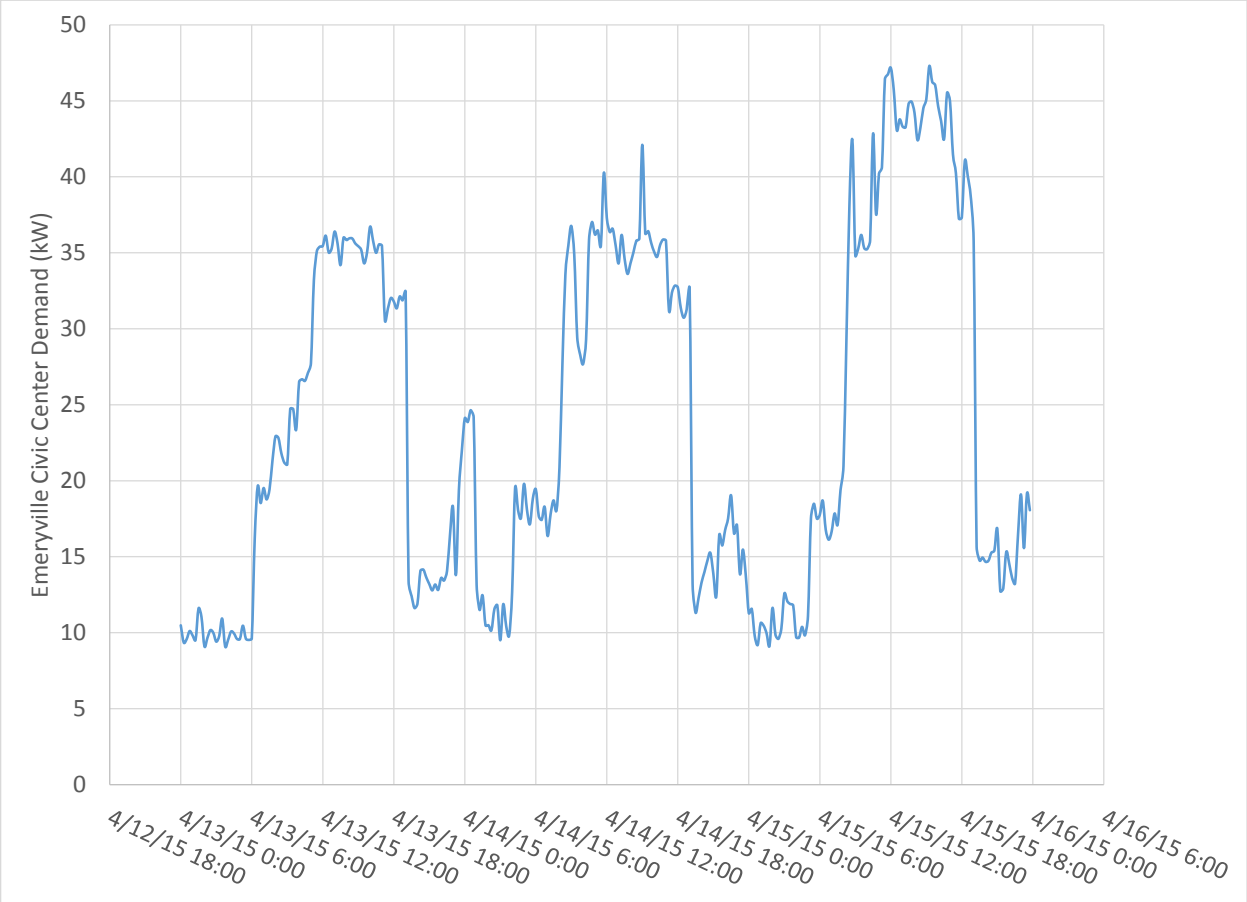


Figure 2.4: Typical Weekday Operation, (Unit has un-occupied set back operation)

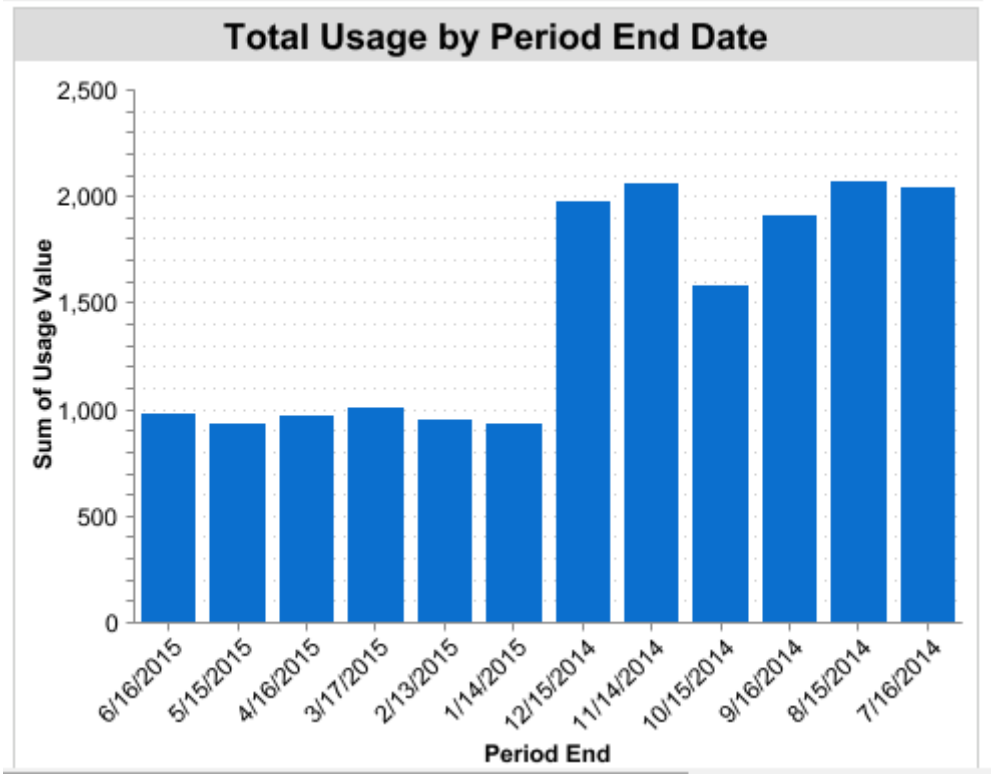


Figure 2.5: Annual Gas Usage at Emeryville Civic Center

3.0 ENERGY EFFICIENCY MEASURES

3.1 EEM 1 – REDUCE ZONE LEVEL AIRFLOWS

3.1.1 Existing Condition

It was observed during site visits that zone airflows, specifically maximum heating airflow set points are much higher than either design airflow set points, or maximum cooling airflow set points. Typically cooling airflows are higher than heating airflows. Additionally, facility gas usage is very high for the site, as seen in figure 2.5. Site facilities personnel expressed a desire to reduce gas consumption, and if possible improve comfort for occupants. An occupant survey indicated that high airflows are the driving factor in discomfort, due to noise, and noticeable air movement.

The zone valves and dampers are equipped with digital control, and a dual maximum airflow control strategy. Zones are equipped with airflow sensors, however many of them (especially on the first floor) appear to be broken, or disabled.

It is recommended that in the short term zone airflow set points are standardized, and heating airflows reduced. In the long term, retrofitting the BAS system, and optimizing the zone control is recommended, which may require some mechanical upgrades (zone valves, and diffusers), as well as for the zones to be re-balanced.

Figure 3.1 shows an example screen shot showing the airflow set points during the baseline condition. All but two zones were found to have higher heating flows than cooling flows.

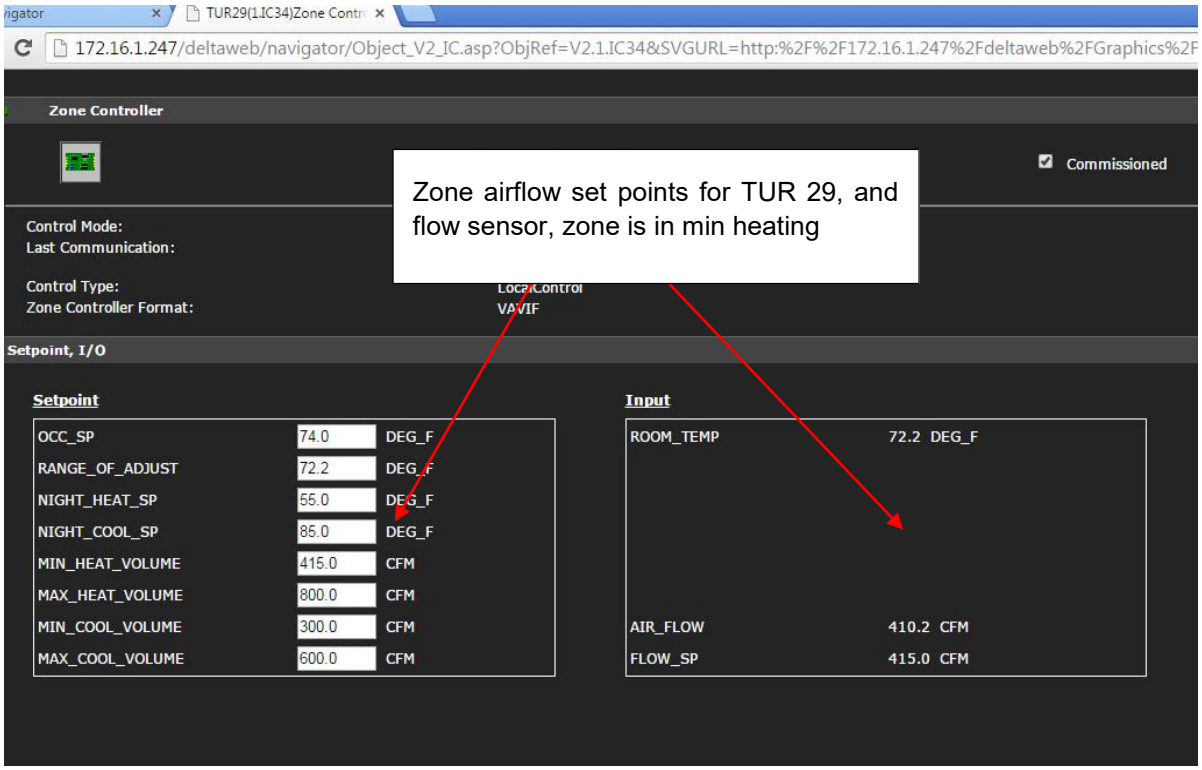


Figure 3.1: TUR 29 zone flow set points and flow sensor output

3.1.2 Measure Implemented

Maximum heating airflows were reduced for most zones. For zones where cooling flows matched design flows, and heating flows exceeded design flows, design airflows were used as the new set points. Due to the design of the HVAC system, some of the high ceiling open area zones, such as the stair case, and the lobby, had high design airflows, however both heating and cooling flows have been subsequently reduced. For zones with reduced flows already, max heating airflows were reduced to match max cooling airflows, and the same for min heating airflows. The baseline and post airflow totals can be seen in table 3.1. A more detailed account of changes zone by zone can be found in Appendix A.

set point	heating (CFM)		Cooling (CFM)	
	baseline	post	baseline	post
max	28,065	16,570	19,516	18,641
min	14,950	9,325	9,960	9,680

Figure 3.3: Baseline and Post Airflow Set points

Figure 3.4 shows the post installation airflow set points. For this zone, the maximum heating airflow was revised to match design heating airflow, reducing the max heating flow by 285 CFM. All other airflows were left as found. For TUR 29. For most zones cooling airflows were left alone. A few zones were found to have cooling airflows in significant excess of design airflows, these zones were reduced to match design.

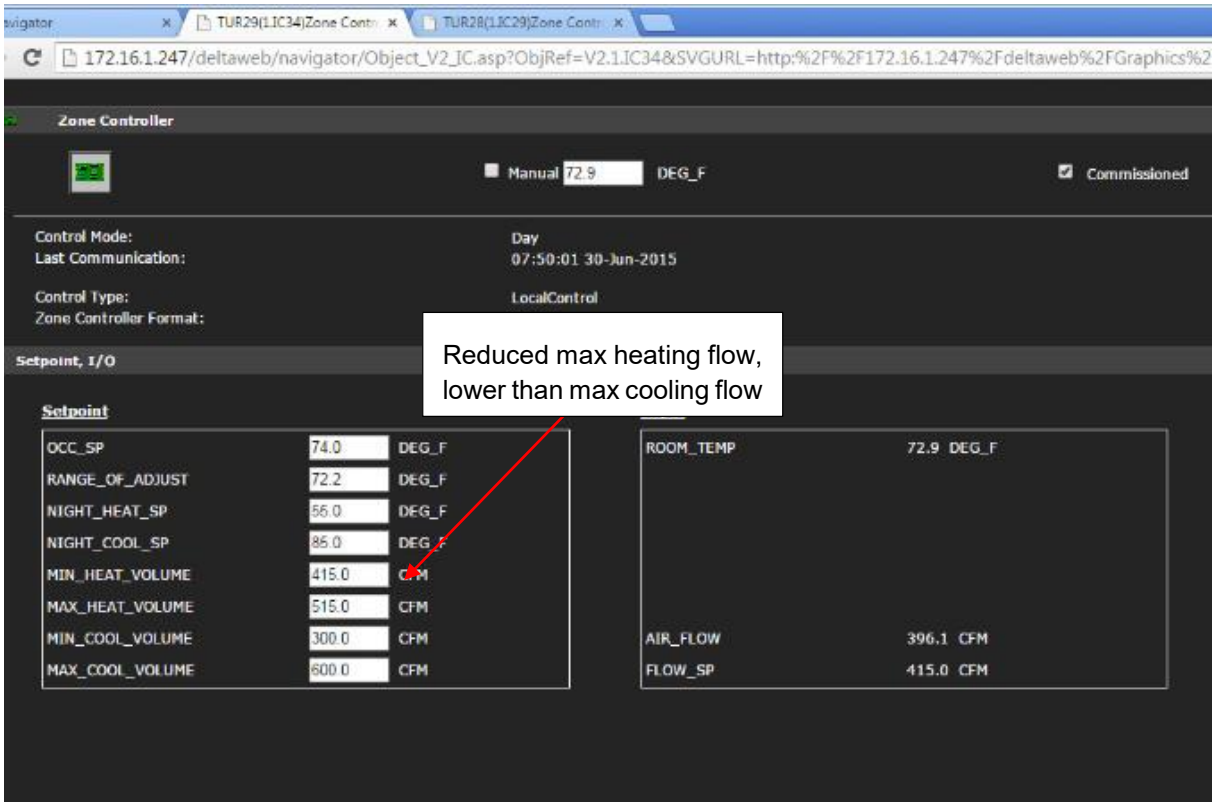


Figure 3.4: Post install flow set points for TUR 29

4.0 ATTACHMENTS AND KEY PARAMETERS

Measure savings were calculated using the CBOA[1] tool. This tool is endorsed by PG&E for calculating the energy and cost savings from common energy measures. Crucial inputs and performance parameters are described below.

4.1 ATTACHMENTS

1. CBOA Calculation File
2. Baseline and post installation zone airflow set point spreadsheet
3. Initial Site Visit Findings

4.2 KEY PARAMETERS

Equipment specifications can be found in Table 2.1.

EEM 1: Measure savings were calculated using the CBOA tool. The CBOA tool is an industry standard calculation tool. Boiler plant efficiency, and re-heat temperature were used to calibrate the model to match billed gas consumption. Inputs to the CBOA tool include:

1. AC unit specifications (See table 2.1)
2. Boiler Specifications (See table 2.1)
3. Minimum and maximum flows for heating and cooling
    a. Taken from baseline and post install screen shots
4. Economizer operation
    a. 20% to 100% based on outside air enthalpy
5. Re-heat temperature (measured on site, adjusted to calibrate modeled gas consumption to match bills.)
6. Return air temperature (estimated 2 degree rise from average zone set point of 74 degrees.)

[1] http://www.cacx.org/resources/rcxtools/spreadsheet_tools.html

4.3 APPENDIX A: DESIGN AIRFLOWS

TERMINAL UNITS

SYMBOL	MANUFACTURER	SERIES	INLET SIZE	COOLING (CFM)	HEATING (CFM)	TOTAL P UNIT & COIL (IN. W.C.)	EAT / EWT	HEATING COIL CAPACITY (MBH/HR.)	GPM	BRANCH PIPING SIZE	COIL
TUR 1	TITUS	DESV	14"	3,135	1,570	0.5 MAX	55°F / 180°F	77.7	5.2	1"	2 ROW
TUR 2	TITUS	DESV	10"	790	395	0.5 MAX	55°F / 180°F	18.5	1.2	3/4"	2 ROW
TUR 3	TITUS	DESV	10"	840	420	0.5 MAX	55°F / 180°F	24.8	1.7	3/4"	2 ROW
TUR 4	TITUS	DESV	10"	715	390	0.5 MAX	55°F / 180°F	19.2	1.3	3/4"	2 ROW
TUR 5	TITUS	DESV	12"	1,590	795	0.5 MAX	55°F / 180°F	39.7	2.7	3/4"	2 ROW
TUR 6	TITUS	DESV	8"	620	310	0.5 MAX	55°F / 180°F	12.1	0.8	3/4"	2 ROW
TUR 7	TITUS	DESV	8"	665	335	0.5 MAX	55°F / 180°F	12.7	0.9	3/4"	2 ROW
TUR 8	TITUS	DESV	10"	1,095	550	0.5 MAX	55°F / 180°F	27.4	1.8	3/4"	2 ROW
TUR 9	TITUS	DESV	10"	930	465	0.5 MAX	55°F / 180°F	15.9	1.1	3/4"	2 ROW
TUR 10	TITUS	DESV	10"	1,030	515	0.5 MAX	55°F / 180°F	21.7	1.5	3/4"	2 ROW
TUR 11	TITUS	DESV	10"	935	470	0.5 MAX	55°F / 180°F	18.9	1.3	3/4"	2 ROW
TUR 12	TITUS	DESV	10"	935	470	0.5 MAX	55°F / 180°F	18.9	1.3	3/4"	2 ROW
TUR 13	TITUS	DESV	8"	415	210	0.5 MAX	55°F / 180°F	13.3	0.9	3/4"	2 ROW
TUR 14	TITUS	DESV	8"	640	395	0.5 MAX	55°F / 180°F	16.7	1.2	3/4"	2 ROW
TUR 15	TITUS	DESV	10"	1,020	650	0.5 MAX	55°F / 180°F	28.2	1.8	3/4"	2 ROW
TUR 16	TITUS	DESV	14"	1,815	940	0.5 MAX	55°F / 180°F	63.7	4.2	3/4"	2 ROW
TUR 17	TITUS	DESV	10"	1,045	525	0.5 MAX	55°F / 180°F	31.1	2.1	3/4"	2 ROW
TUR 18	TITUS	DESV	10"	965	485	0.5 MAX	55°F / 180°F	30.0	2.0	3/4"	2 ROW

L UNITS

SYMBOL	MANUFACTURER	SERIES	INLET SIZE	COOLING (CFM)	HEATING (CFM)	TOTAL P UNIT & COIL (IN. W.C.)	EAT / EWT	HEATING COIL CAPACITY (MBH/HR.)	GPM	BRANCH PIPING SIZE	COIL
TUR 19	TITUS	DESV	10"	960	480	0.5 MAX	55°F / 180°F	29.9	2	3/4"	2 ROW
TUR 20	TITUS	DESV	12"	1,350	665	0.5 MAX	55°F / 180°F	41.8	2.8	3/4"	2 ROW
TUR 21	TITUS	DESV	10"	710	385	0.5 MAX	55°F / 180°F	17.5	1.2	3/4"	2 ROW
TUR 22	TITUS	DESV	10"	710	385	0.5 MAX	55°F / 180°F	17.5	1.2	3/4"	2 ROW
TUR 23	TITUS	DESV	12"	1,270	635	0.5 MAX	55°F / 180°F	32.9	2.2	3/4"	2 ROW
TUR 24	TITUS	DESV	8"	690	345	0.5 MAX	55°F / 180°F	16.0	1.1	3/4"	2 ROW
TUR 25	TITUS	DESV	10"	1,015	510	0.5 MAX	55°F / 180°F	25.0	1.7	3/4"	2 ROW
TUR 26	TITUS	DESV	10"	3,190	1,595	0.5 MAX	55°F / 180°F	76.2	5.1	1"	2 ROW
TUR 27	TITUS	DESV	10"	715	390	0.5 MAX	55°F / 180°F	16.8	1.1	3/4"	2 ROW
TUR 28	TITUS	DESV	6"	325	300	0.5 MAX	55°F / 180°F	10.7	0.7	3/4"	2 ROW
TUR 29	TITUS	DESV	10"	1,025	515	0.5 MAX	55°F / 180°F	23.3	1.6	3/4"	2 ROW
TUR 30	TITUS	DESV	8"	700	350	0.5 MAX	55°F / 180°F	16.5	1.1	3/4"	2 ROW

APPENDIX 6: EMERYVILLE CIVIC CENTER INVESTIGATION REPORT

Emeryville Civic Center
Investigation Report
QuEST, Inc.

1. Overview

Description of Building

The Emeryville Civic Center is comprised of an 8,000 square foot historic town hall built in 1903, which was renovated in 2000; and a newer 18,000 square foot building which was constructed in 2000. Both buildings are two stories tall and house City offices.

The new building is conditioned by a Trane self-contained air-cooled packaged air handler with 30 VAV terminal boxes. Terminal heating is provided by a 1 Million BTUH Reypak boiler at the terminal reheat boxes. The boiler used to have a 2 HP constant speed pump for hot water circulation but was recently replaced by a 0.5 HP constant speed pump. There are two rooftop split units that serve the elevator machine room and the IT and server closet.

The old town hall building is conditioned by six (6) Trane split heat pumps with indoor and outdoor units. There are two (2) ~5000 CFM and six (6) ~1000 CFM exhaust fans for smoke control. The building has a Delta Controls EMCS System which was installed in 2000. Even though all the units are integrated into the EMCS, the controls system has very limited control capability over the HVAC system in the building.

Taylor Engineering, Inc. conducted a broad assessment of the HVAC system of the Civic Center building in 2012, and made various recommendations that address different occupancy and energy consumption issues in

the building. However the potential energy efficiency measures that address energy saving and occupant comfort recommended by Taylor Engineering had not yet been addressed or implemented.

By taking the Taylor Engineering report as a basis, QuEST conducted a site visit to assess the HVAC system at the Emeryville Civic Center on April 6, 2015. The assessment revealed a number of potential energy efficiency measures which are outlined in this report. During the site visit at the Emeryville Civic Center, staff explained that the Old Town Hall building does not have serious occupant comfort issues. On the other hand, the new civic center building has a number of issues that need immediate attention. This report discusses energy-saving strategies at the new building.

Utility Information

There is one shared electric meter for both buildings and separate gas meters for each building. Since there are no major issues at the Old Town Hall building, only the gas consumption of the new building is displayed below (Figure 1.1c). Figures 1.1a, 1.1b, and 1.1c show the Civic Center's monthly electric consumption, monthly electric demand, and monthly gas consumption (new building), respectively.

Figure 1.1a
Monthly Electric Consumption of the Civic Center Building

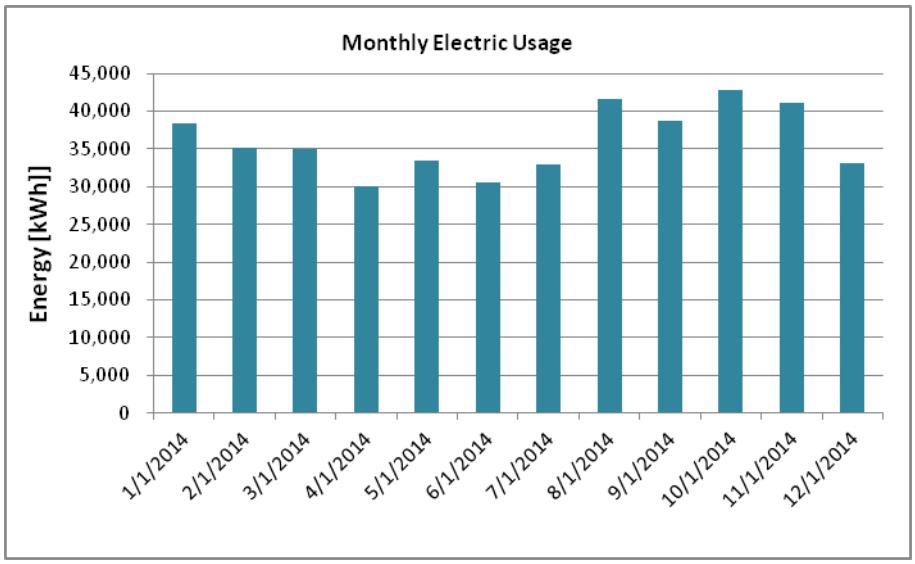


Figure 1.1b
Monthly Electric Demand of the Civic Center Building

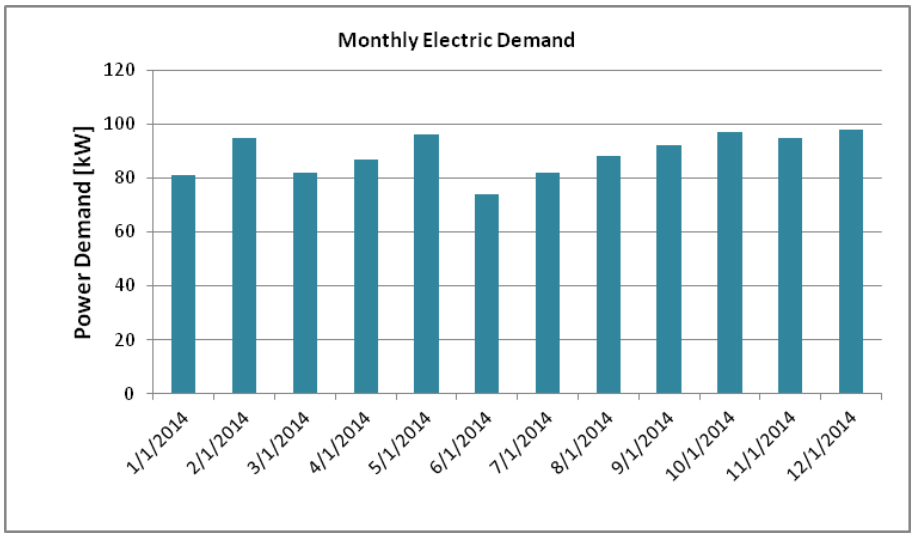
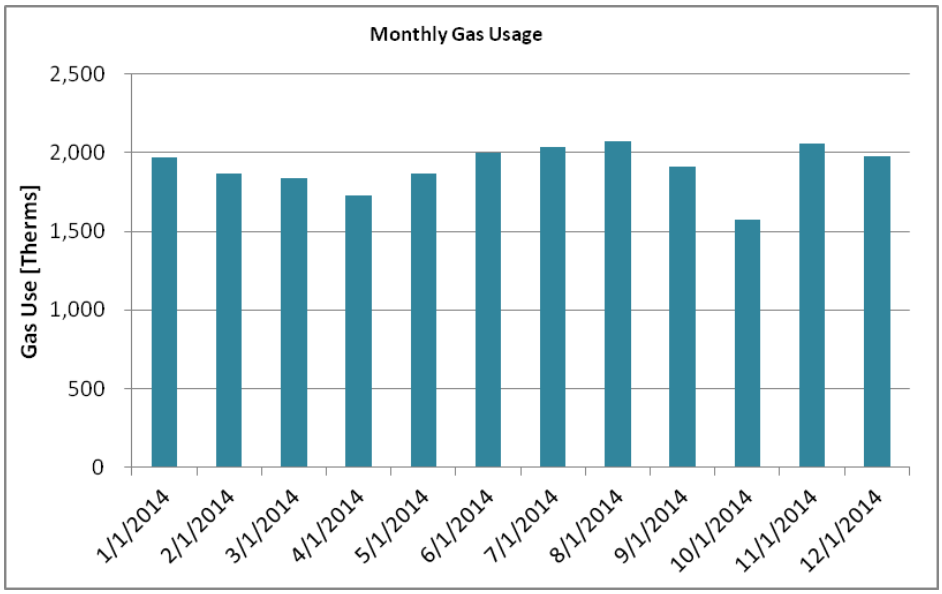


Figure 1.1c
Monthly Gas Consumption of the New Civic Center Building



The new building has an unusual gas consumption pattern where the highest gas consumption occurs in summer. QuEST has been working in partnership with PG&E and Enovity's SMART RCx (retrocommissioning) Program to identify the causes of atypical energy use patterns and high energy use. Enovity has already implemented a number of energy saving strategies to address energy performance of HVAC equipment and systems. Strategies presented in this report are exclusive of those implemented by Enovity.

Equipment

- Single 75 Ton TRANE self-contained packaged unit that serves 30 VAV terminal boxes.
- Single heating hot water system comprised of 1 Million BTUH Raypak Boiler and one 0.5-HP single-phase constant speed pump that serve the new building.
- Two Roof top split units that serve the elevator machine room and the server closet.
- Six (6) TRANE split heat pumps with air handler units with cooling capacity ranging from 2.5 to 5 Tons and heating capacity ranging from 31.2 to 40 kBTUH that serve the Old Town hall building.
- Two (2) 5000 CFM and six (6) 1000 CFM exhaust fans for smoke control.
- Approximately 35 Delta Room Thermostats between both buildings.

2. Potential Energy Efficiency Measures

There are a number of energy performance issues at the new Emeryville Civic Center building. The energy efficiency strategies, or measures, that are described below can correct targeted issues and are eligible for rebate funds through the MIT program. Since the Old Town Hall building has no reported efficiency or comfort issues, all efficiency opportunities described in this report address the issues in the new building.

M1 – Boiler Retrofit

The existing Raypak boiler is a 14-year-old 1 Million BTUH atmospheric combustion boiler with 84% thermal efficiency. The boiler is situated in an exposed area with no weather protection and has worn-out parts. It is integrated to the Delta EMCS but, other than a simple enable set-point control, it has no demand based control. This measure recommends replacing this boiler with a more efficient (~95%) condensing boiler with similar capacity and integrating it to the EMCS. The estimated natural gas savings associated with replacing the existing boiler with a more efficient boiler is presented in Table 2.2.

M2 – Heating Hot Water System Schedule Optimization

Currently the heating hot water system in the building runs 24/7 and has no schedule. Given that the building is entirely for office purpose and is not occupied during weekends, schedule optimization is an appropriate and high-impact saving strategy for the Civic Center. This measure proposes to optimize the operating schedule of the building to match the occupancy schedule. The proposed heating hot water system schedule is Monday to Friday, 8:00 AM to 6:00 PM and off on weekends. The estimated savings associated with schedule optimization is presented in Table 2.2. Note that natural gas savings are based on implementation of M2 after installation of a high efficiency boiler per M1.

M3 – AC-1 Schedule Optimization

AC-1 has a baseline (existing) schedule as shown in Table 2.1a. Discussions with the facilities personnel indicated that further optimization of the AC-1 schedule to match the current occupancy schedule is important and feasible. Table 2.1b shows the proposed schedule for AC-1. The proposed schedule should give ample ramp-up time for the AC unit to deliver the necessary conditioning once the building is occupied.

Table 2.1a
AC-1 Baseline Schedule

	Baseline Schedule	
	Start	Stop
Mon	6:00 AM	7:00 PM
Tues	8:00 AM	7:00 PM
Wed	8:00 AM	7:00 PM
Thur	8:00 AM	7:00 PM
Fri	8:00 AM	7:00 PM
Sat	OFF	OFF
Sun	OFF	OFF

Table 2.1b
AC-1 Proposed Schedule

	Proposed Schedule	
	Start	Stop
Mon	8:00 AM	6:00 PM
Tues	8:00 AM	6:00 PM
Wed	8:00 AM	6:00 PM
Thur	8:00 AM	6:00 PM
Fri	8:00 AM	6:00 PM
Sat	OFF	OFF
Sun	OFF	OFF

A summary outlining potential measures, estimated energy savings, estimated cost and incentive details of the proposed measures is provided in Table 2.2 below.

Table 2.2
Estimated Energy Savings Summary

EEM	Measure Description	Peak Demand Savings (kW)	Electrical Energy Savings (kWh / yr)	Natural Gas Energy Savings (Thrm / yr)	Energy Cost Savings ($ / yr)	Measure Cost ($)	Simple Payback Period (years)	Incentive Rebate ($)	Adjusted Payback Period (years)
M1	Boiler Retrofit	0.0	0	2,182	$2,182	$43,140	19.8	$2,182	18.8
M2	HHW System Schedule Optimization	0.0	11,670	4,949	$7,516	$1,320	0.2	$660	0.1
M3	AC-1 Schedule Optimization	0.0	12,641	309	$2,781	$1,320	0.5	$660	0.2
Total		**0.0**	**24,311**	**7,440**	**$12,479**	**$45,780**	**3.7**	**$3,502**	**3.4**

Next steps

1. The City should review the energy efficiency measures in this report and provide comments to QuEST.
2. The City will select the measures it wishes to implement and sign a program participation agreement.
3. QuEST will submit energy savings calculations to PG&E for review and pre-installation approval.
4. Once the calculations are approved by PG&E, the City is permitted to commence installation of measures.

5. The City will implement the measures and maintain invoices for all work performed by internal or contracted staff.
6. QuEST will verify that measures were implemented and submit verification documentation to PG&E.
7. QuEST pays the incentive upon post-installation approval from PG&E.

3. Additional measures

Some potential measures which are not described in Section 2 should be considered, but were either difficult to quantify or not offered by the MIT Program. Further investigation of these measures is warranted.

- Upgrade of the existing Delta EMCS Controls
- Supply Air Temperature Reset
- Re-program economizer operation
- Duct Static Pressure Reset
- Heating Hot Water Supply Temperature Reset

APPENDIX 7: ENERGY USE BENCHMARKING STUDY

The East Bay Energy Watch (EBEW)[1] benchmarked the energy performance of the buildings and facilities operated by the City of Emeryville. The purpose of energy benchmarking is to measure changes in energy performance of a building, or portfolio of buildings, against an established baseline. Buildings can be benchmarked against their own historic baseline, or using the energy performance of other, similar buildings. It should be noted that Energy Star Portfolio Manager, the industry-standard benchmarking tool, does not standardize energy use by building operations for the many types of buildings local governments manage. Therefore, benchmarking should not be the only tool in a facility manager's toolbox. It provides a platform on which an agency can collect and organize its energy data, draw comparisons on building energy performance using very limited information, and form questions that require deeper investigation.

The data presented below provides a snapshot of benchmarking results. Benchmarking utilizes 12-month periods of energy use data; the end of each building's baseline and current energy period is indicated in Table 1[2]. All energy sources (e.g. electricity and natural gas) used in a building are converted to kBtu and standardized by floor area. Figure 1 compares baseline to current energy performance for each building. Energy performance of all buildings improved over time. The largest and most used buildings—City Hall and the Police Department—remain the most energy intense. In general, this is true for the majority of local governments. Both of these buildings are, by far, the most expensive in terms of energy costs (Figure 2).

Table 1. City buildings, space type as designated by Energy Star, and 12-month baseline and current energy period ending dates.

Emeryville Building	Baseline Period End Date	Current Period End Date	Space Type
Child Dev. Center	5/31/2010	5/31/2015	Pre-School/Daycare
City Hall	5/31/2010	5/31/2015	Office
Corp. Yard	5/31/2010	5/31/2015	Services - Other
Police Dept.	5/31/2010	5/31/2015	Police Station
Recreation Dept.	12/31/2008	12/31/2011	Social/Meeting Hall
Fire Station 1	5/31/2010	6/30/2015	Fire Station
Fire Station 2	5/31/2010	6/30/2015	Fire Station
Senior Center	5/31/2010	6/30/2015	Social/Meeting Hall

Benchmarked against the energy performance of other, similar buildings in the region, Emeryville's buildings generally perform better, with the exception of City Hall (Figure 3). The high variability of similar buildings' performance, illustrated by Figure 3, may represent both the relative efficiency of each

[1] The East Bay Energy Watch (EBEW) is a partnership between Pacific Gas and Electric Company (PG&E) and local governments, non-profit and for-profit energy service providers in the East Bay dedicated to providing innovative energy efficiency solutions for residents and businesses in communities throughout Alameda and Contra Costa Counties.

[2] Energy period ending dates necessarily differ based on availability of energy data.

building, but also the differences in their patterns of use. It is recommended that the City of Emeryville examine the patterns of energy use in all of their facilities[3] using simple tools like PG&E's MyEnergy database (www.pge.com/myenergy), and explore opportunities for energy efficiency retrofits or other efforts to reduce the energy intensity of the buildings they operate. Most energy efficiency projects are eligible for rebates from PG&E, and some projects may qualify for 0% interest On-Bill Financing.

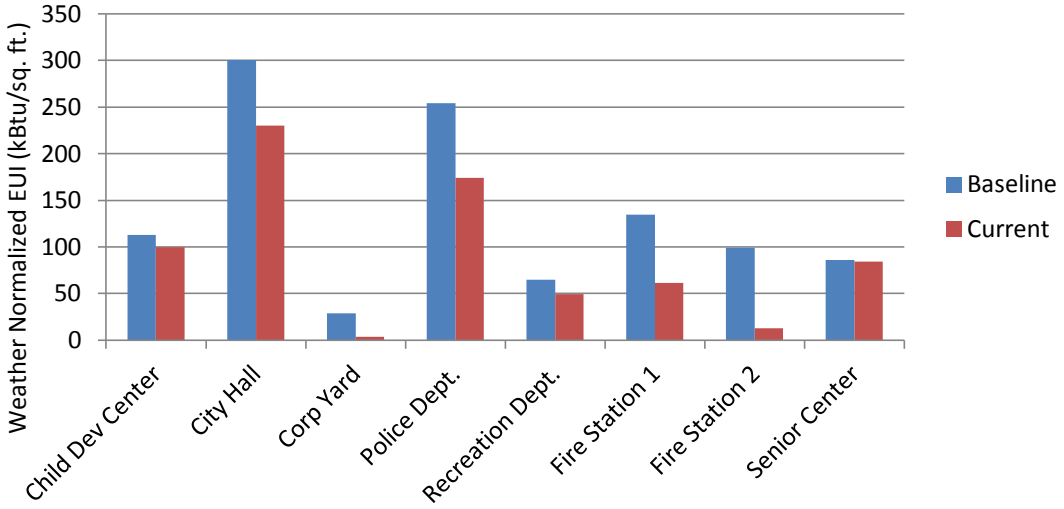


Figure 1. Comparison of baseline period EUI (energy use intensity; kBtu/ft^2) to current period EUI, by building operated by City of Emeryville.

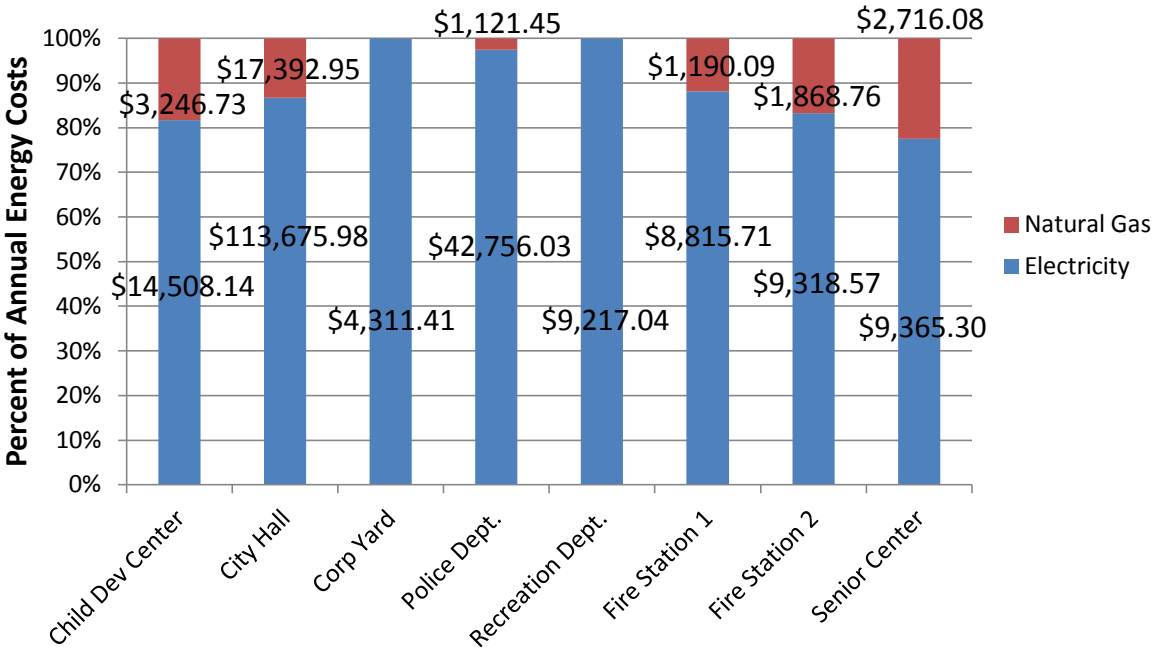


Figure 2. Comparison of current period energy costs and their percent distribution by energy source.

[3] Local governments use energy to operate numerous irrigation controllers, traffic and street lights, and park facilities. Benchmarking is not an appropriate exercise for these non-building end uses, but the usage and costs of all energy should be organized and monitored using a variety of available tools.

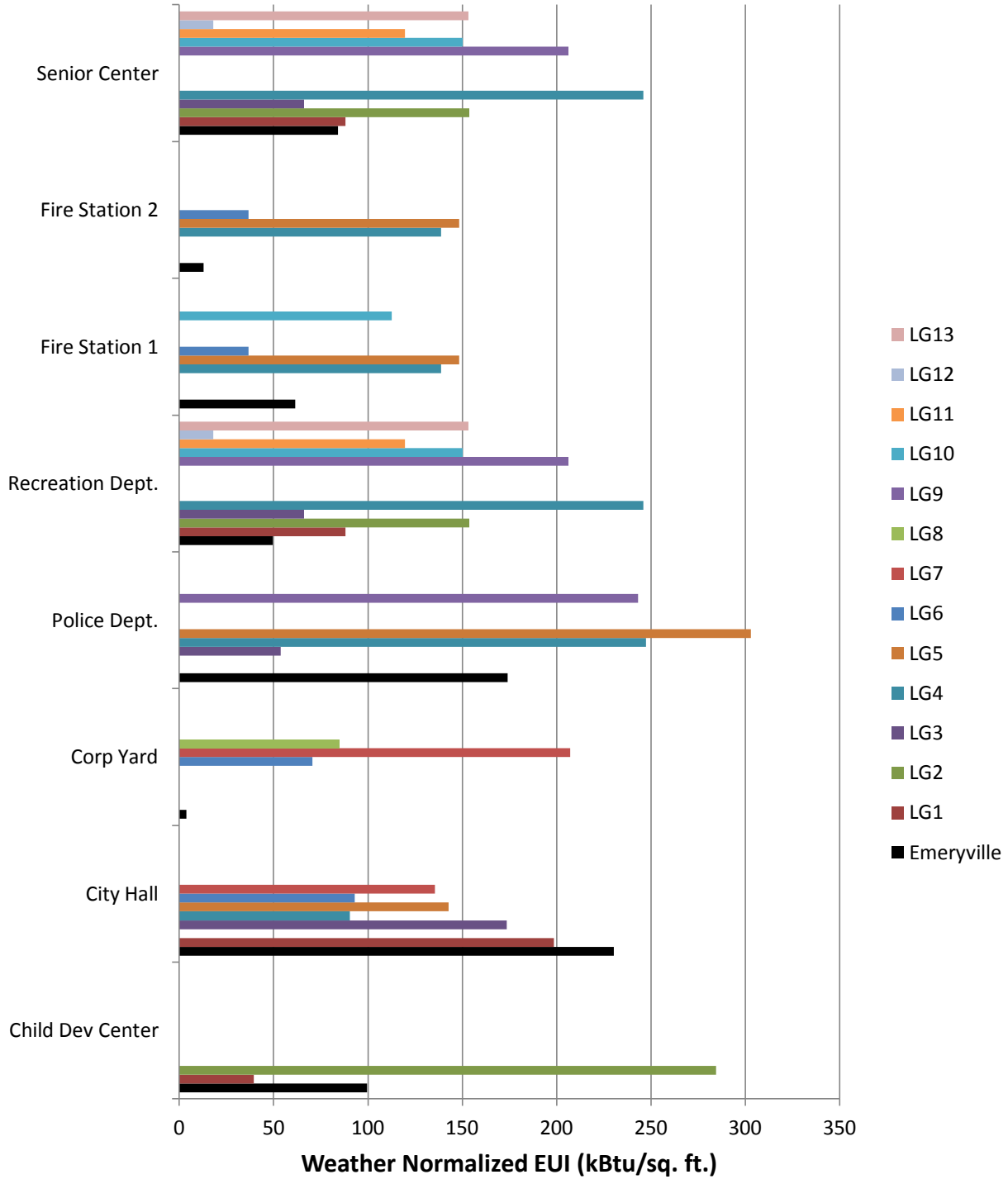


Figure 3. Comparison of current period EUI across similar buildings operated by other East Bay local governments (LG1-13). Community centers, recreation buildings, and senior centers in the region were all included in comparisons of the Emeryville Senior Center and Recreation Department because their patterns of use are not consistent or typical.