



# City of Palo Alto

## City Council Staff Report

(ID # 1532)

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**Report Type:** Consent Calendar

**Meeting Date:** 4/11/2011

**Council Priority:** Environmental Sustainability

**Summary Title:** Ten-Year Gas Energy Efficiency Goals

**Title:** Finance Committee Recommendation to Approve the 2011 Ten-Year Gas Energy Efficiency Goals

**From:** City Manager

**Lead Department:** Utilities

### **Recommendation**

Staff, the Utilities Advisory Commission (UAC), and the Finance Committee recommend that the Council approve the 2011 Ten-Year Gas Energy Efficiency Goals for the period 2011 to 2020.

### **Summary**

In 2007, Council approved the first ten-year gas energy efficiency (EE) goals, which were to reduce gas usage by 3.5% by 2017. The proposed updated goal is to reduce gas usage by 5.5% by 2020. These more aggressive goals will require a broad range of EE programs targeted at all gas uses and all customer types. Staff is preparing an implementation plan designed to meet the increased goals for both gas and electric EE. At its January 12, 2011 meeting, the UAC voted to recommend Council approve the proposed gas EE goals.

### **Committee Review and Recommendations**

At the March 1, 2011 meeting of the Finance Committee, staff presented the Proposed 2011 Ten-Year Gas EE Goals (Attachment 1: Staff Report ID #1356). The report contains a description of the methodology used to update the gas EE goals, the proposed annual gas EE goal, the ten-year cumulative goal, and the projected annual gas EE program costs. During discussion, the Finance Committee recognized the aggressiveness of the proposed goals. Committee members also pointed out that the utility bill would likely increase for most residential customers due to the fact that only a small fraction of them can take advantage of gas EE programs when they replace their water heater, furnace or boiler. Staff was encouraged to look into a "clunker" program to incent customers to replace old water heaters and also to reduce the hassle and cost of obtaining water heater permits.

After discussion, the Finance Committee voted unanimously (4-0) to support the recommendation that City Council approve the 2011 Ten-Year Gas EE Goals. The notes from the March 1, 2011 Finance Committee meeting are provided as Attachment 2.

### **Resource Impact**

Although the report contains preliminary estimates of the costs of achieving the proposed ten-year gas EE goals, the EE Implementation Plan will contain further details, including projected budgets and any additional staffing that may be required to process in-house rebates, as well as to manage contracts for third-party administered programs.

### **Policy Implications**

Approval of this recommendation conforms to the Council-approved Gas Utility Long-term Plan (GULP) Guideline, which calls for the deployment of all cost-effective, reliable and feasible EE and solar heating opportunities. The proposed gas EE goals will also help achieve the Council approved greenhouse gas emissions reduction targets by 2020.

### **Environmental Review**

Approval of the ten-year gas EE goals does not meet the definition of a project, pursuant to section 21065 of the California Environmental Quality Act (CEQA). Thus, no environmental review is required.

### **Attachments:**

- Attachment 1: Finance Committee Staff Report #1356 - Proposed Ten-Year Gas Energy Efficiency Goals (PDF)
- Attachment 2: Excerpt of Draft Minutes from March 1 Finance Committee Meeting (DOC)

Prepared By: Christine Tam, Resource Planner

Department Head: Valerie Fong, Director

City Manager Approval: James Keene, City Manager



# City of Palo Alto

## Finance Committee Staff Report

Attachment 1  
(ID # 1356)

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**Report Type:**

**Meeting Date: 3/1/2011**

**Title: Proposed Ten-Year Gas Energy Efficiency Goals**

**Subject: Proposed Ten-Year Gas Energy Efficiency Goals**

**From: City Manager**

**Lead Department: Utilities**

### **Recommendation**

Staff and the Utilities Advisory Commission (UAC) recommend that the Finance Committee recommend that the City Council approve the proposed ten-year gas energy efficiency (EE) goals for the period 2011 to 2020.

### **Executive Summary**

The attached report describes the process used to update the gas efficiency goals for the next ten years that were last updated in 2007. In 2007, the ten-year goal approved by Council was to reduce gas usage by 3.5% by 2017. The updated ten-year goal is to reduce gas usage by 5.5% by 2020. More resources will be required to achieve this goal, which is more than 50% higher than the previous 10-year goal.

The next step is the development of the gas and electric EE Implementation Plan, which is expected to be complete in the Spring of 2011. That plan will contain more details on the programs that will be implemented to achieve the EE goals and the cost of those programs.

### **Background**

The City Council approved the 2007 Ten-Year EE Plan (2007 EE Plan) in April 2007 (CMR:216:07) that established ten-year cumulative electric and gas efficiency goals of 3.5% by 2017. In addition to the 10-year cumulative goal, the 2007 EE Plan established annual gas efficiency targets for the City of Palo Alto (City).

Since the adoption of the 2007 EE Plan, annual gas savings have steadily increased each year. However, the cumulative 3-year gas EE actual achievements for FY 2008 through FY 2010 were lower than the goals set in the 2007 EE Plan. The table below provides a summary of the gas EE goals and achievements for the past three years.

Table 1: Gas Efficiency Achievements for FY 2008-FY2010

	FY 2008 (Actual)	FY 2009 (Actual)	FY 2010 (Projections)	3-Year Total
<b>Gas Efficiency - Goals</b>				
Annual gas savings (therms)	76,800	86,400	99,200	262,400
Percent of Annual load	0.25%	0.28%	0.32%	0.85%
<b>Gas Efficiency - Achievements</b>				
Annual gas savings (therms)	35,237	88,028*	106,479	229,744
Percent of Annual load	0.11%	0.28%	0.39%	0.76%

\* The gas efficiency savings in FY 2009 was originally estimated to be 146,028 therms. However, based on the recently completed consultant's evaluation of actual program savings, this number has been adjusted downward to 88,028 therms. Specifically, the originally assumed savings used in the replacement of steam traps at six dry-cleaning facilities were higher than the verified savings.

Much progress has been made in expanding gas efficiency programs since 2007. In addition to ongoing commercial and residential rebate programs, the City has contracted with third-party vendors to deliver additional gas EE projects to customers. These include contracts with the California Center for Sustainable Energy, which administers the Solar Water Heating program, and Enovity, which administers the Commercial and Industrial EE Program targeting both gas and electric efficiency opportunities for large commercial and industrial customers. A low-income program to directly install equipment, appliances and materials such as weather stripping was in place prior to 2007.

### Discussion

Every three years, the City updates the ten-year EE goals. The Council adopted new ten-year EE goals for electricity in May 2010 (CMR: 218:10). The attached report describes the process used to develop the updated EE goals for natural gas and provides a recommendation for updated annual gas efficiency targets for the period from 2011 to 2020.

This process to develop the updated goals begins with the consultant's re-evaluation of the energy saving opportunities. Such opportunities typically assume physical, long-lasting changes to buildings and equipment that result in lower energy usage. First, the potential for gas energy savings is estimated based on gas efficiency measures that are presently available commercially. Then, the portion of "cost-effective" gas savings potential is determined by screening out the non-cost-effective gas efficiency measures. Finally, staff proposes annual efficiency targets that take into account customer awareness and willingness to adopt efficiency measures based on a reasonable and feasible timeline.

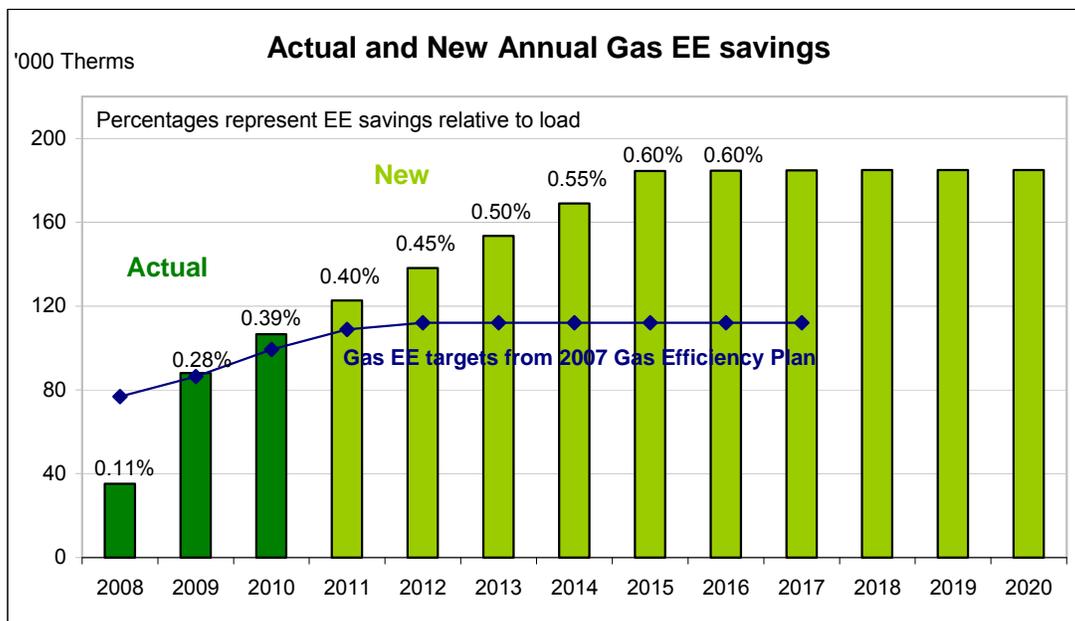
Forty gas efficiency measures – 19 residential and 21 commercial – were evaluated. The maximum possible gas energy savings from these measures is estimated to be about 45% of the total gas usage in the City. However, not all of the measures are cost-effective. The total

amount of gas savings that would accrue if all cost-effective measures were implemented is about 34% of the City's gas usage.

Based on these results and the City's success to date in implementing gas efficiency measures, the recommended updated gas efficiency goal is to reduce the City's gas usage by 5.5% from gas efficiency measures by 2020. This is an increase of over 50% from the ten-year gas efficiency goal set in 2007. Within both the residential and commercial sectors, more than half of the savings potential comes from space heating equipment and building shell improvements.

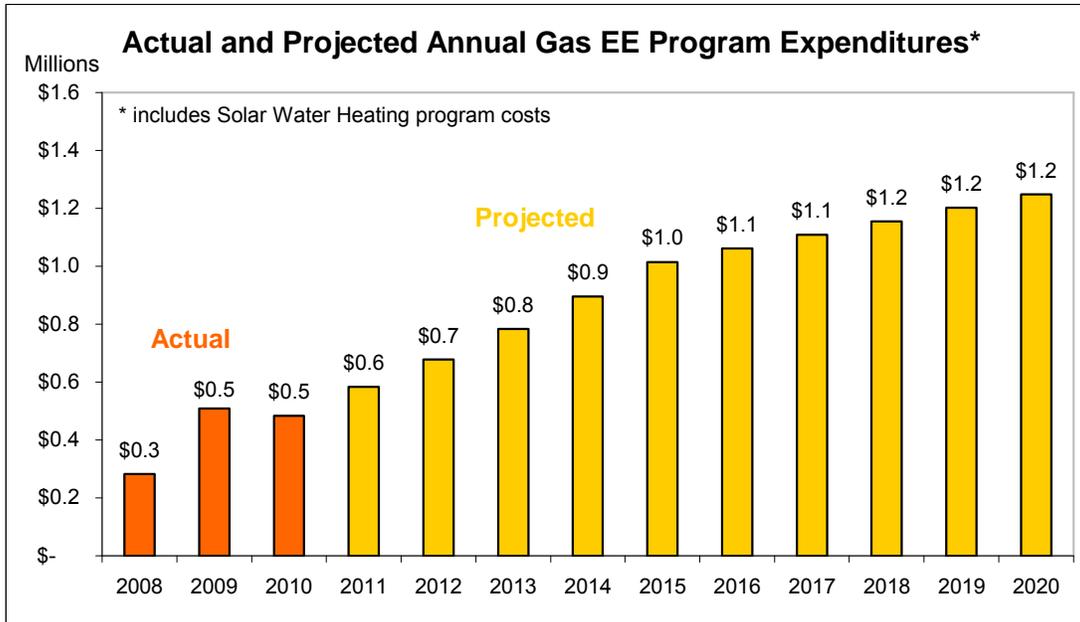
Figure 1 below shows the proposed new annual goals for the period 2011 to 2020 compared to the annual goals set in 2007 and the actual achievements for FY 2007 through FY 2009.

Figure 1



Additional resources beyond what was used in the last three years will be required to achieve these new higher proposed goals. Figure 2 shows the actual gas EE program expenditures for FY 2008 through FY 2010, and the projected program expenditures to achieve the proposed gas efficiency goals. Note that the total expenditures in FY 2009 included a one-time set up cost for the solar water heating program. These projections will be further developed with the EE Implementation Plan, which is expected to be presented in the Spring of 2011 to the UAC.

Figure 2



### Retail Rate and Bill Impacts

Energy efficiency is an investment that returns savings over a 10- to 20-year period, depending on the useful life of the EE measure. To meet the proposed ten-year gas efficiency goals, the program costs are expected to result in retail rates that are 4% to 5% higher by 2020 compared to retail rates if no gas EE programs were in place. However, despite the higher retail rates, average customer bills will decline since the measures selected for implementation are cost-effective. While participants in programs will see their bills decline, non-participants will see bill increases.

### Greenhouse Gas Emissions Reductions

The City's 2007 Climate Protection Plan (CPP) includes an annual carbon dioxide (CO<sub>2</sub>) emissions reduction target of 7,300 tonnes for gas efficiency programs and 1,500 tonnes for solar water heating by 2020. The proposed ten-year gas efficiency targets, combined with the actual gas efficiency savings since FY 2008, are projected to reduce GHG emissions by 10,200 tonnes per year in 2020, thereby exceeding the CPP target.

### **Timeline**

An EE Implementation Plan will be developed to meet the EE targets for both gas and electricity. It will include the results of a current solicitation for new program ideas to be administered by third parties. Once program proposals are received and evaluated, staff will recommend that the City Council approve contracts for specific new EE programs. Upon approval, the programs will be included in the implementation plan. The EE Implementation Plan will be presented to the UAC in Spring 2011 after the solicitation process is complete. The EE Implementation Plan will address the efficiency measures to be included in the programs, including both staff-administered programs and those administered by third-party vendors.

Gas efficiency targets will be updated again in 2013. Gas efficiency equipment costs and actual gas efficiency achievements between FY 2011 and FY 2012 will be taken into consideration at that time when establishing new ten-year gas savings goals.

### **Commission Review and Recommendations**

Staff provided a presentation on the proposed ten-year gas efficiency goals and the methodology behind the estimated gas EE potential at the January 12, 2011 UAC meeting. During the discussion, staff clarified that only efficiency savings above the City's building code requirements can be counted as achievements of the utility efficiency programs. The bulk of the potential for gas savings is from improvements to space heating for residential and commercial customers, followed by water heating. Staff confirmed that the proposed gas efficiency goals are similar to those of the California Investor-Owned Utilities such as PG&E. Commissioner Berry noted that unlike electric efficiency, which helps to avoid building new generation and transmission equipment, the benefit of gas efficiency is limited to lowering greenhouse gas emissions.

After discussion, the UAC voted 5-1 to recommend Council approval of the proposed gas efficiency goals. Commissioner Melton opposed the motion given the challenging economic environment that customers are currently facing. Instead, he supported maintaining the current goals as opposed to increasing the goals and the EE program budget to meet the more aggressive goals. The notes from the UAC's January 12, 2011 meeting are provided in Attachment B.

### **Resource Impact**

Although this report contains preliminary estimates of the costs of achieving the proposed updated ten-year gas EE goals, the EE Implementation Plan will contain further details, including projected budgets and any additional staffing that may be required to process in-house rebates, as well as to manage contracts for third-party administered programs.

### **Policy Implications**

Approval of this recommendation conforms to the Council-approved Gas Utility Long-term Plan (GULP) Guideline, which calls for the deployment of all cost-effective, reliable and feasible EE and solar heating opportunities as high priority resources. The proposed gas efficiency goals will also help achieve the Council approved greenhouse gas emissions reduction targets by 2020.

### **Environmental Review**

Approval of this recommendation does not meet the definition of a project, pursuant to section 21065 of the California Environmental Quality Act (CEQA). Thus, no environmental review is required.

This report was prepared jointly by Christine Tam (Resource Planner), Joyce Kinnear (Manager, Utility Marketing Services) and Shiva Swaminathan (Senior Resource Planner).

**Attachments:**

- Attachment A: Gas EE Goals (DOC)
- Attachment B: UAC Minutes January 12, 2011 (PDF)

Prepared By: Christine Tam, Resource Planner

Department Head: Valerie Fong, Director

City Manager Approval: James Keene, City Manager

## 2010 Gas Energy Efficiency Goals

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## 2010 Gas Energy Efficiency Goals

### EXECUTIVE SUMMARY

#### New Goals are Aggressive

The best natural gas resource is cost-effective energy efficiency. By not buying natural gas, everyone saves – gas consumers, the utility and the environment. Before making commitments to purchase gas supplies, the City attempts to ensure that the gas consumption is the most efficient it can be. The City has long had a large array of energy efficiency programs and has ramped them up in recent years.

In 2007, for the first time, the City adopted 10-year energy efficiency goals. Every three years, the goals are re-evaluated. The goals set in 2007 were exceeded, and the proposed goals for the next 10-years are higher still. The 10-year goal set in 2007 was to save 3.5% of the City's gas use by FY 2017. The proposed new 10-year goal is to save 5.5% of the gas used in the City by FY 2020. This aggressive goal is reflective of the Gas Utility Long-term Plan's objective to "Ensure the deployment of all feasible, reliable, cost-effective energy efficiency measures."

The new proposed goals are based on updated technology and market parameters, as well as actual efficiency achievements in the past three years. The cost to achieve the new aggressive goals will be higher than it has been in the past for energy efficiency, as it gets harder to achieve new gas savings every year.

#### Goals Developed Using a Comprehensive Analysis

The process used to evaluate the opportunities for gas savings involved several steps. First, 40 gas saving measures were identified. The total possible energy savings for each measure were evaluated regardless of cost. This analysis concluded that a maximum of 45% of the City's gas usage could be saved if all measures were implemented by all customers. Second, the estimated cost of implementing each of these measures was compared to the cost of buying natural gas. Measures that are not cost-effective (i.e. avoided cost of gas is less than the measure implementation cost) are screened out. The result of this analysis was that up to 34% of the City's gas usage could be saved if all cost-effective measures were fully implemented. Finally, based on actual program results to date and projected customer awareness and willingness to adopt efficiency measures, a set of energy savings goals over a ten-year period was developed.

#### Detailed Implementation Plan is Being Developed

An Energy Efficiency Implementation Plan is being prepared and is expected to be completed in the Spring of 2011. That plan will contain details on the programs to be implemented as well as program cost estimates and will discuss any other resources that may be needed to achieve the new goals.

### BACKGROUND

#### Purpose

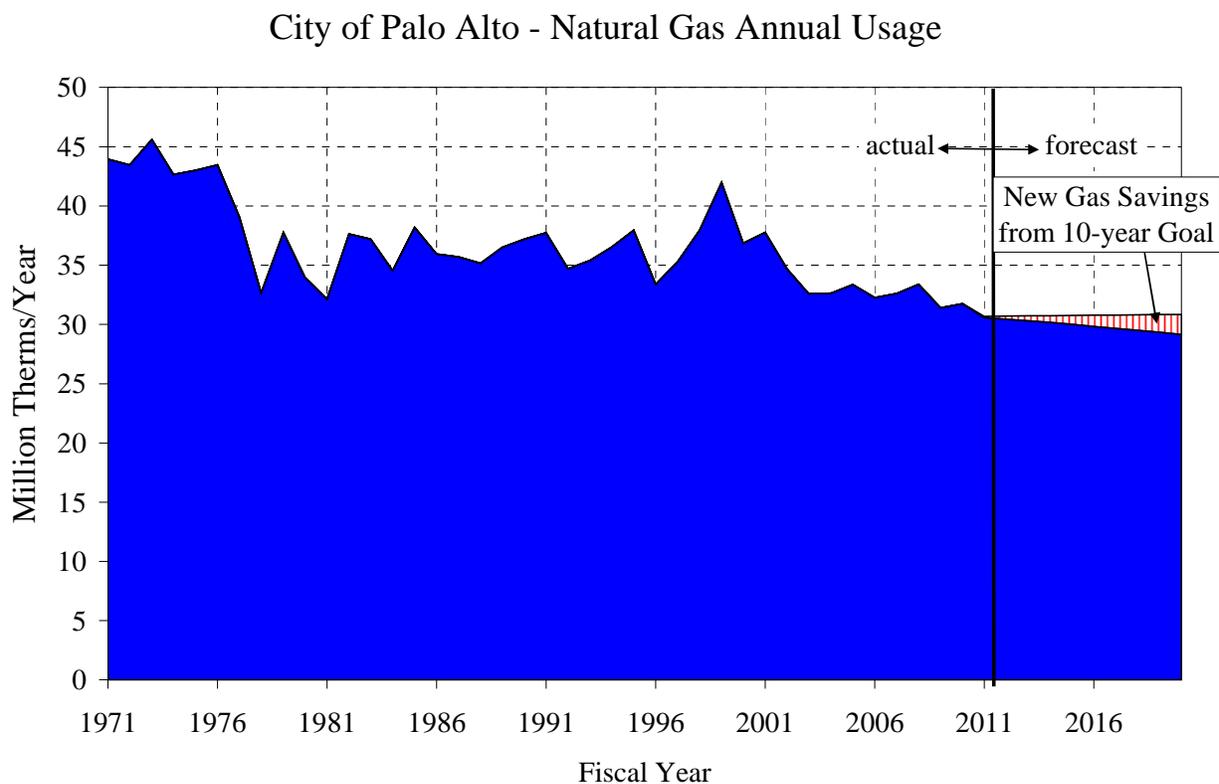
This report provides the analysis to support staff's recommendations for gas efficiency goals for 2011

2011 to 2020 for the City of Palo Alto Utilities (CPAU). The purpose of this analysis is to evaluate the opportunities for gas energy efficiency in Palo Alto and to establish a set of 10-year gas efficiency goals. These goals will update the goals in the 2007 Ten-Year Energy Efficiency (EE) Plan approved by the City Council in April 2007.

#### City Gas Consumption History

The City's usage of natural gas is shown in Figure 1 below. The figure shows that gas usage has declined from a peak in FY 1973 of about 45.6 million therms per year to usage in FY 2010 of about 31.8 million therms per year. Gas usage is projected to decline further due to the implementation of gas efficiency programs to meet the proposed goals of 5.5% of the gas usage by 2020.

**Figure 1: Gas Usage – History and Forecast**

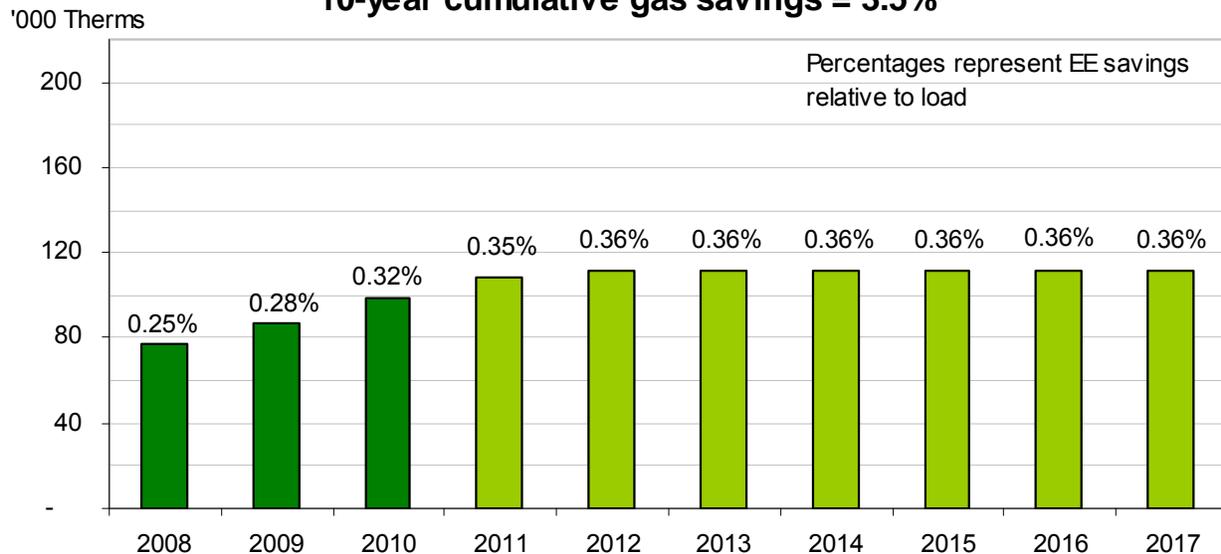


#### The 2007 Ten-Year Gas Energy Efficiency Goals and Achievements

The City Council approved the 2007 Ten-Year Energy Efficiency (EE) Plan (2007 EE Plan) in April 2007 (CMR:216:07) that established ten-year cumulative electric and gas efficiency goals of 3.5% by 2017. The primary aim of cost-effective EE programs is to reduce utility supply costs and hence average customer bills while reducing the City's carbon footprint.

In addition to the 10-year cumulative targets, the 2007 EE Plan established annual gas efficiency targets for Palo Alto as shown in Figure 2. The total (cumulative) gas EE savings goal for the period 2008 to 2017 was 3.5% of annual gas load by 2017.

**Figure 2: 2007 Gas Savings Goals**  
**2007 Ten Year Gas Efficiency Plan:**  
**10-year cumulative gas savings = 3.5%**



Since the adoption of the 2007 Ten-Year Gas Efficiency Plan, annual gas savings have steadily increased each year. Table 1 provides a summary of the EE goals, achievements and expenditures for the past three years. The gas efficiency achievements include savings from the Solar Water Heating Program.

**Table 1: Gas Efficiency Achievements for FY 2008-2010**

	<b>FY 2008 (Actuals)</b>	<b>FY 2009 (Actuals)</b>	<b>FY 2010 (Projections)</b>	<b>3-Year Total</b>
<b>Gas Efficiency - Goals</b>				
Annual gas savings (therms)	76,800	86,400	99,200	262,400
Percent of Annual load	0.25%	0.28%	0.32%	0.85%
<b>Gas Efficiency - Achievements</b>				
Annual gas savings (therms)	35,237	88,028*	106,479	229,744
Percent of Annual load	0.11%	0.28%	0.39%	0.76%
<b>Program Expenditures</b>				
Public Benefit funds	\$281,837	\$418,684	\$445,680	\$1,146,201
Supplemental funds (for solar water heating program)	\$0	\$89,870	\$37,151	\$127,022
<b>Total Cost</b>	<b>\$281,837</b>	<b>\$508,554</b>	<b>\$482,831</b>	<b>\$1,273,223</b>

\* The gas efficiency savings from FY 2009 was originally 146,028 therm. However, based on the recently completed consultant's evaluation of program savings, this number has been adjusted downward to 88,028 therms. Specifically, the originally assumed savings used in the replacement of steam traps at six dry-cleaning facilities were higher than the verified savings. The percentage of gas efficiency savings to annual load has also been reduced from 0.49% to 0.28%. As a result of the adjustment, the three-year cumulative savings are below the goals.

Much progress has been made in expanding gas efficiency programs since 2007. In addition to ongoing commercial and residential rebate programs, the City has contracted with third-party vendors to deliver gas energy efficiency projects to customers. These include contracts with the California Center for Sustainable Energy, which administers the Solar Water Heating program, and Enovity, which administers the Commercial and Industrial Energy Efficiency Program targeting both gas and electric efficiency opportunities for large commercial and industrial customers. A direct install program for low-income residential customers was in place prior to 2007.

#### Gas Efficiency is Key Part of the Gas Utility Long-term Plan

In August 2010, the Utilities Advisory Commission (UAC) recommended that the City Council approve the updated Gas Utility Long-Term Plan (GULP) Objectives and Strategies with a focus on balancing environmental and economic sustainability. The updated GULP Strategy #3 recognizes the importance of energy efficiency as a resource.

GULP Strategy #3: Ensure the deployment of all feasible, cost-effective energy efficiency measures by:

- (a) Developing and implementing a ten-year gas efficiency plan every three years that includes a reasonable carbon price premium for traditional gas supplies; and
- (b) Considering the impact (costs, benefits, and GHG emissions) of substituting electricity-using appliances for gas-using appliances and vice versa in the ten-year gas efficiency plan.

#### Gas Efficiency is Consistent with Climate Protection Plan

The City's Climate Protection Plan (CPP) adopted by Council in December 2007 (CMR: 435:07) contained the table below, which summarizes the estimated community-wide 2005 CO<sub>2</sub> emissions from electricity and natural gas use, and projected 2020 emissions with impact of each major utility program area for which quantitative estimates had been completed at the time of the adoption of the CPP. The CPP establishes a goal to reduce the City's CO<sub>2</sub> emission to 90% of the 2005 level by 2020.

**Table 2: Estimated community-wide emissions and CO<sub>2</sub> emissions reduction impacts of utility program goals.**

	<b>Electric</b> Metric Tons CO <sub>2</sub> /Year	<b>Natural Gas</b> Metric Tons CO <sub>2</sub> /Year
<b>Reference Year 2005</b>	<b>145,000</b>	<b>165,000</b>
Base Case 2020 (load growth with no efficiency reduction)	178,600	174,000
Efficiency	-15,800	-7,300
Solar	-3,800	-1,500
Mandatory Renewable Energy Supply	-91,500	TBD
Voluntary Renewable Energy Supply	-36,500	-16,400
Total In-Community Reduction	-147,600	-25,200
Net In-City Emissions	31,000 (21% of 2005)	148,800 (90% of 2005)

	<b>Electric</b> Metric Tons CO <sub>2</sub> /Year	<b>Natural Gas</b> Metric Tons CO <sub>2</sub> /Year
Low-Carbon Supply (net savings realized by state)	-20,000	n/a
<b>Net Emissions</b>	<b>11,000</b> <b>(8% of 2005)</b>	<b>148,800</b> <b>(90% of 2005)</b>

As shown in Table 2, the total expected CO<sub>2</sub> emissions reduction in 2020 from Utilities gas programs is 25,200 metric tons (or tonnes). The projected CO<sub>2</sub> emissions reductions for gas efficiency programs were based on the 2007 gas EE targets. The CO<sub>2</sub> emissions reductions estimate for solar assumed that a solar hot water and space heating incentive program would be implemented consistent with the California Solar Initiative and AB 1470, or 500 residential installations of solar water heating systems. In addition, the estimates assumed 100 installations of residential solar pool heating systems.

A voluntary renewable gas supply similar to the PaloAlto**Green** program for electricity was also assumed to account for a significant part of the CO<sub>2</sub> emissions reductions attributable to gas utility programs. However, the premium for renewable gas supplies was found to be too high to be acceptable to customers. The Gas Utility Long-term Plan (GULP) Implementation Plan includes the continued pursuit of reasonably priced non-fossil gas for a voluntary program.

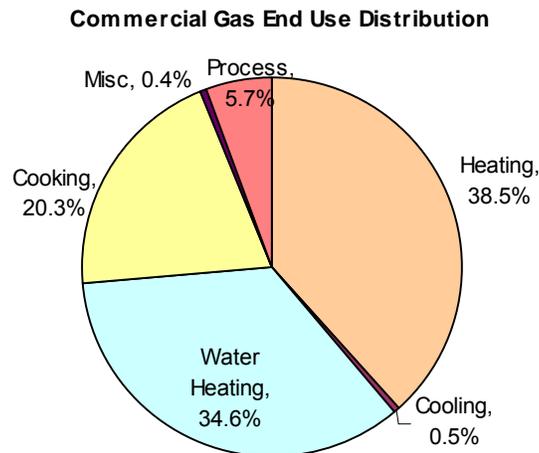
## PROCESS

The process of establishing a target for gas savings has several steps. The first step is to identify the potential measures, i.e. physical, long-lasting changes to the building as well as more efficient equipment, that result in lower gas usage. The potential for each of these measures to save gas is estimated. Second, the cost-effectiveness of each measure is evaluated. This consists of estimating the savings from not having to purchase gas supplies and the implementation cost of the measure, which includes the EE program administrative cost. Finally, the fraction of the cost-effective gas savings that can be achieved is estimated. Each of these steps is described in this section.

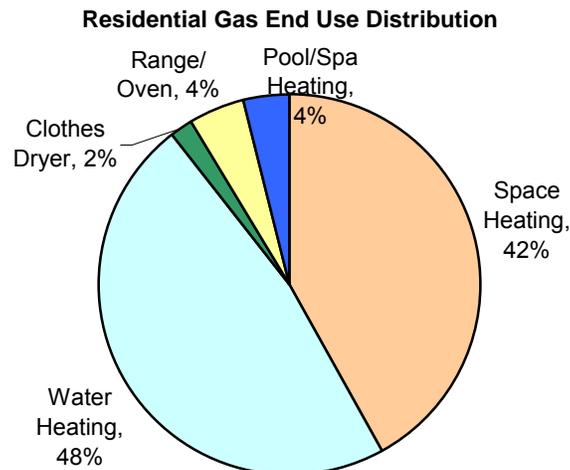
### What are the Potential Gas Saving Measures?

#### *Profile of Palo Alto's Gas Use*

Around 45% of the natural gas supplied to the City is consumed by residential customers, with businesses consuming the remaining 55%. Space heating and water heating account for the bulk of gas usage. Figure 3 and Figure 4 show how gas is used by commercial and residential customers within CEC Forecasting Climate Zone (FCZ) 4.

**Figure 3: Gas Uses of Commercial Customers within FCZ 4**

Source: Statewide Commercial End Use Study, California Energy Commission report, 2006

**Figure 4: Gas Uses of Residential Customers within FCZ 4**

Source: Statewide Residential Appliance Saturation Survey, California Energy Commission report, 2010

If Palo Alto's usage pattern mirrors that of Forecasting Climate Zone 4, then space heating and water heating account for around 80% of the gas usage in the City. Thus, these two end uses are where the bulk of the gas savings could accrue.

#### *Gas Saving Measures Included in the Analysis*

To help in the analysis, the City engaged a consultant to enhance the model that was developed for members of Northern California Power Agency (NCPA) to evaluate the electric efficiency potential for the 2010 Electric EE Plan. The model analyzed 40 gas efficiency measures – 19 for residential customers and 21 for commercial customers. These measures are listed in Appendix B and include clothes washers, dishwashers, space heating equipment, improvements to the building shell (e.g. wall and ceiling insulation, better windows), water heaters, low flow showerheads and faucets, pipe and duct insulation, cooling equipment, and solar water heating equipment. Emerging technologies that have not yet been widely commercialized or do not have reliable energy savings estimates were excluded from the analysis.

### How Much Gas Savings Are Possible?

The total amount of gas savings that are possible if all of the identified measures are implemented is equal to 13.8 million therms per year, or about 45% of the projected total citywide gas consumption in 2020. The details of how much energy savings can be achieved by each measure is found in Appendix B.

The total amount of energy that can possibly be saved is also called the “technical potential.” Technical potential represents the amount of energy efficiency savings that could be achieved if economic and market barriers did not exist. It takes into account the energy savings of efficiency measures (or equipment), the quantity of applicable equipment in each facility, the number of facilities in a utility’s service area, and the efficiency measure’s current market saturation. Technical potential estimates include measures that may not be cost-effective. These estimates, while not realistically obtainable, are used to establish the outer boundary of what might be achieved.

The model calculates the technical potential based on all available gas EE measures. For competing technologies such as high-efficiency water heaters, tankless water heaters and solar water heaters, only the most efficient technology is included in the technical potential.

### Which Measures are Cost-Effective?

The cost-effectiveness of each measure was estimated based on the savings that would accrue from not having to purchase gas supplies and the cost of installing the measures plus the cost of administering an EE program. Details of the cost-effectiveness calculations are provided in Appendix A. The total amount of gas savings if all of the cost-effective measures are implemented is about 10.4 million therms per year, or about 34% of the total citywide gas consumption in 2020.

The total amount of cost-effective gas savings is also called the “economic potential.” Economic potential represents the portion of the technical energy efficiency potential that is “cost-effective” from a societal perspective, as defined by the Total Resource Cost (TRC) test. The model takes into account gas, electric and water savings when determining the cost-effectiveness of efficiency measures. Economic potential does not consider market barriers that limit a voluntary efficiency program’s success in encouraging customers to install energy efficiency measures.

The measures that are technically feasible, but are not cost-effective include condensing water heaters, tankless water heaters and solar water heaters. If prices for condensing water heaters and solar water heaters decline in the future, the economic potential will increase.

### How Much Gas Savings Can Be Achieved From Utilities Programs?

The total amount of gas savings that can be achieved from Utilities programs is called the “market potential.” Market potential is an estimate of the portion of the economic potential that could be attributed to utility energy efficiency programs. Additional gas savings are attributed to building and appliance standards, although these savings cannot be counted towards the goals. Market potential is modeled to vary with parameters, such as the amount of incentives, customer willingness to pull permits, and other factors such as customer awareness and willingness to adopt measures.

Market potential at 5.5% is less than the full economic potential of 34% because most gas EE measures are major appliances or improvement projects requiring significant financial commitments. For the commercial sector, business owners are not likely to invest in efficient equipment with a simple payback over two years. Residential installation of space or water heating systems is typically costly and complicated, often requiring construction and related permits.

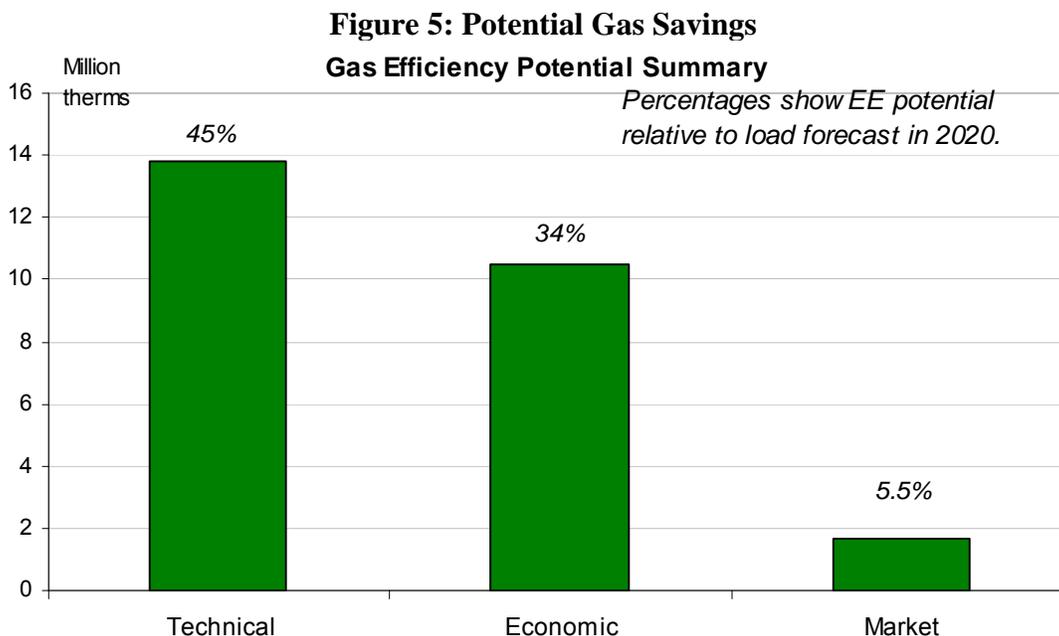
Lengthy equipment turnover cycles are another market barrier to realizing the full economic potential. Business owners and homeowners often choose to keep an older piece of equipment instead of purchasing a new efficient model with lower energy costs, if the payback period is more than one or two years. This is particularly true in a moderate climate where reductions in utility bills are often not large or are limited to a short time period. Residents are often reluctant to pull permits for hot water heaters and other similar measures. It is estimated that, in Palo Alto, less than 30% of residents who may be installing new water heaters are pulling permits. Since utility incentives are only paid to customers who pull all required permits, market potential for utility programs is further reduced.

The estimated market potential is calibrated based on program achievements between FY 2008 and FY 2010. The model also calculates the future cost-effectiveness and annual costs of gas efficiency programs, which include the program administration cost and the cost of incentives (i.e. rebates).

## RESULTS

### Summary of Achievable Gas Efficiency Savings

The gas EE potential model determined a technical potential of 45% gas energy savings by 2020. Since some of the measures that are technically feasible are not cost-effective, the economic potential is only 34% by 2020. The market potential in 2020 is 5.5% of the projected gas needs in 2020. Figure 5 compares the technical, economic and market gas EE potential in 2020 for CPAU.



Where Can We Get the Most Gas Savings?

Table 3 below shows the amount of potential gas savings for each end use for residential customers. More detail for individual measures is available in Appendix B.

**Table 3: Potential Residential Gas Savings by End Use**

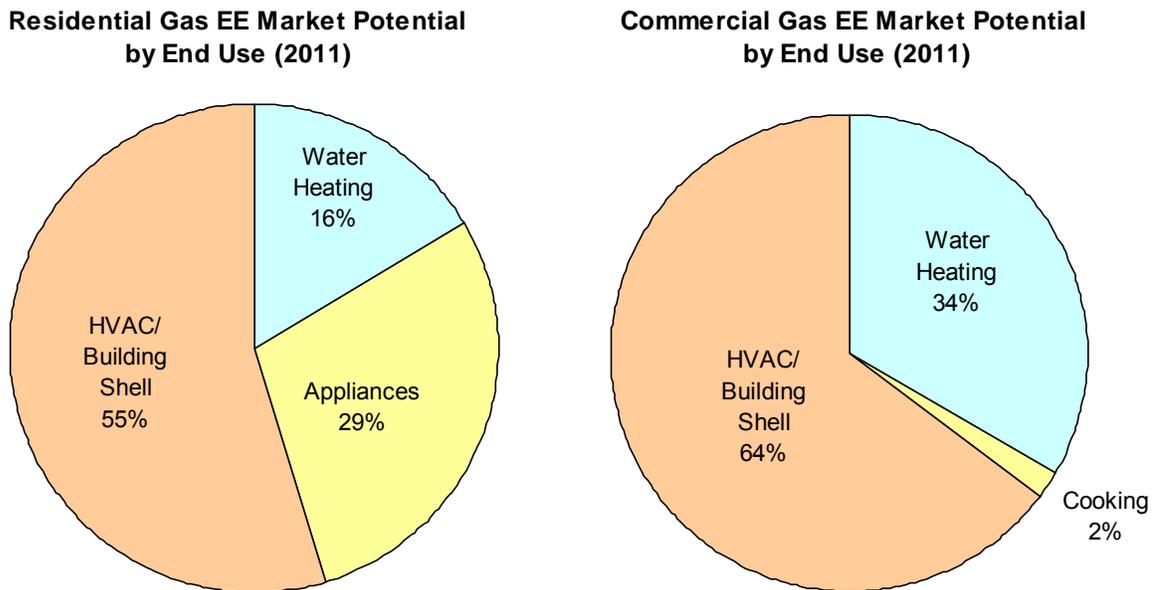
<b>Gas End Uses</b>	<b>Technical Potential (therms)</b>	<b>Economic Potential (therms)</b>	<b>Market Potential (therms)</b>
Clothes washer	108,321	108,321	97,526
Dishwasher	24,240	24,240	16,275
Space Heating/Building Shell	6,040,044	5,217,176	624,305
Water Heating	3,602,769	2,171,761	180,754
<b>TOTALS</b>	<b>9,775,375</b>	<b>7,521,495</b>	<b>918,860</b>

The potential gas savings for commercial customer end uses are shown in Table 4 below. More detail for individual measures is available in Appendix B.

**Table 4: Potential Commercial Gas Savings by End Use**

<b>Gas End Uses</b>	<b>Technical Potential (therms)</b>	<b>Economic Potential (therms)</b>	<b>Market Potential (therms)</b>
Cooking	773,088	673,743	13,034
Space Heating/Building Shell	2,391,079	1,773,852	506,849
Water Heating	898,861	547,602	288,930
<b>TOTALS</b>	<b>4,063,028</b>	<b>2,956,196</b>	<b>808,813</b>

Figure 6 shows the distribution of gas savings “market potential” by end use for the residential and commercial sectors. For both sectors, much of the cost-effective efficiency potential lies in the opportunity to upgrade building insulation and space heating equipment (HVAC/Building Shell). The expected gas savings from replacing residential water heaters with more efficient units is small compared to the economic potential because many residents replace their water heaters without getting a permit, a step that is required in order to receive a rebate. This does not mean that there will not be gas savings, just that the savings will not be counted in a Utilities program.

**Figure 6: Gas Savings Potential by End Uses**

#### Which Measures are Cost-Effective?

The model projects that the gas efficiency portfolio will have a societal benefit-to-cost ratio (or TRC ratio) of 1.3, indicating that the portfolio is cost-effective. In general, commercial gas efficiency measures are more cost-effective than residential measures.

Some residential gas efficiency measures, such as solar water heaters and tankless water heaters, are not cost-effective due to the high measure installation cost. Solar water heaters, while not cost-effective, are included in the program due to state law requirements. Other measures such as clothes washers are not cost-effective based on gas savings only, but are when gas, water and electric savings are included. Appendix B lists the gas efficiency measures included in the analysis and the TRC ratio for each measure based on its gas, water and electric savings. CPAU generally does not promote or provide rebates for measures that are not cost-effective unless mandated by law, as in the case of solar water heaters. In the case of tankless and condensing water heaters, due to customer interest in these technologies and the potential to reduce greenhouse gas emissions, these measures were added to the rebate program.

#### Solar Hot Water Heating Systems

The model assumes that the number of solar water heating systems installed by 2020 will not meet the goals in the City's Climate Protection Plan of 500 residential systems plus 100 solar pool heating systems. Instead, the model projects about 300 residential solar water heaters installed between 2010 and 2020. Per state law (AB1470), the total state goal is 200,000 by 2017, of which Palo Alto's share is 530. Since Palo Alto started its current solar water heating (SWH) program in 2008, the program has provided rebates for 19 systems. Despite a utility rebate of up to \$1,500 per household and a 30% federal tax credit (through 2016), the upfront investment cost of a residential SWH system remains a significant barrier to adoption. Currently, the capital cost for these systems ranges between \$7,000 and \$15,000. Unless the cost of SWH systems drops significantly or the program

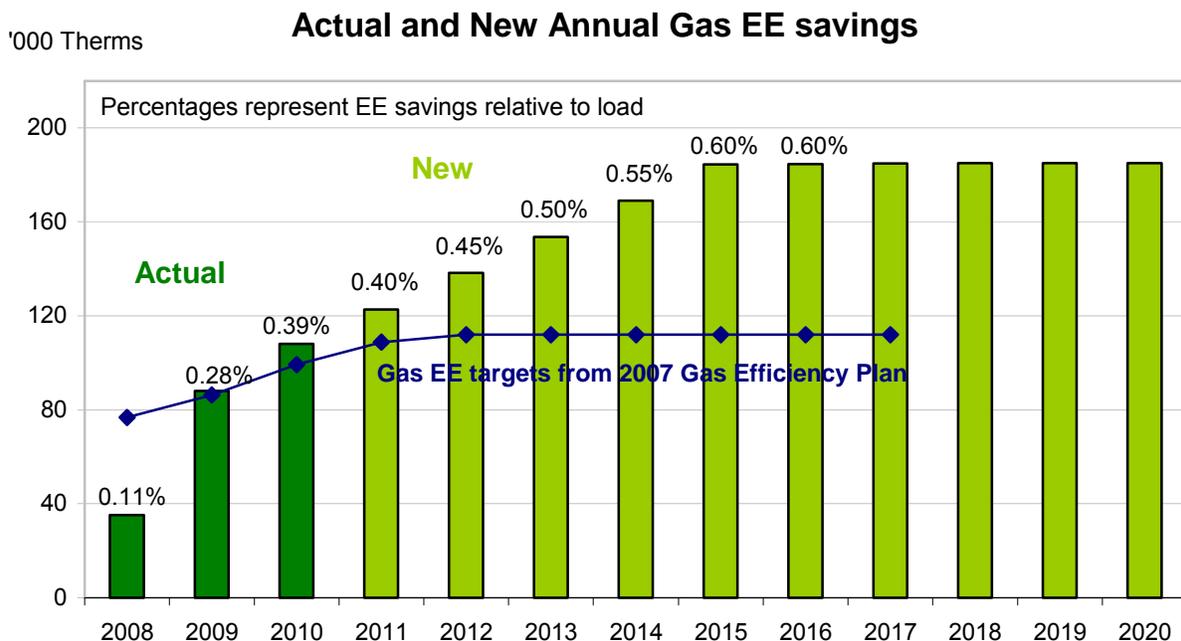
implementation approach is changed, Palo Alto is not likely to meet the goals for SWH installations by 2020. See Appendix F for a detailed discussion on the City’s solar water heating program.

## PROPOSED GAS SAVINGS GOALS

### Proposed Annual Gas Efficiency Goals

Based on the analysis results and the gas efficiency achievements between FY 2008 and FY 2010, the proposed annual incremental gas efficiency goals are 0.4%, 0.45%, and 0.5% of forecast gas load in FY 2011, FY 2012 and FY 2013, respectively. These goals are higher than the goals set in the 2007 EE Plan. Beyond the next three years, the proposed incremental gas efficiency goals climb to 0.55% in FY 2014 and then level off when the annual incremental goal reaches 0.6% in FY 2016 through FY 2020, as shown in Figure 7.

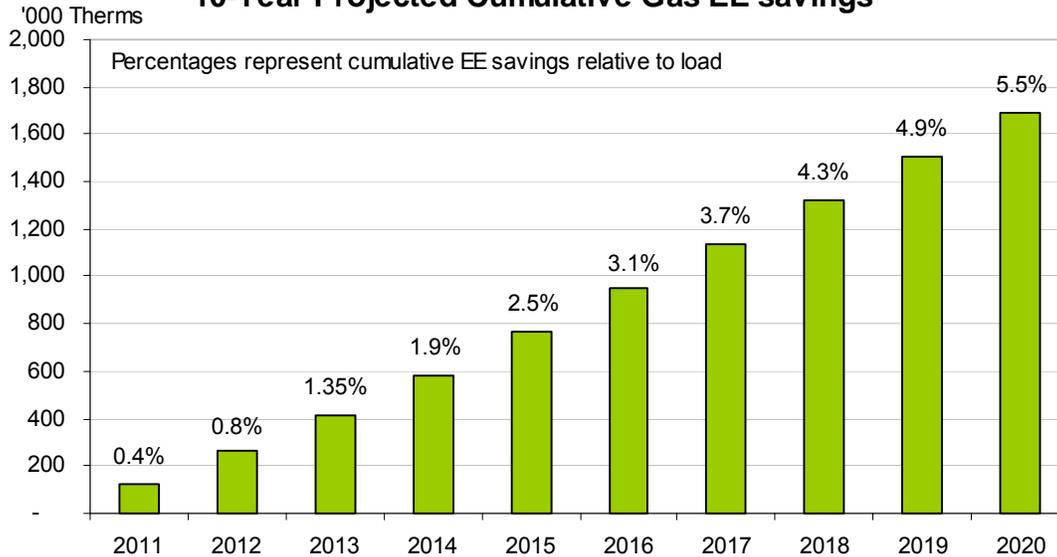
**Figure 7: Gas Savings – Historical Actual and Future Goals**



### Proposed Ten-Year Gas Savings Goal

Figure 8 shows that the proposed gas efficiency goals will reach a 5.5% cumulative load reduction by FY 2020. This is 50% more than the 10-year gas savings goal of 3.5% that was adopted in 2007. The proposed annual goals for FY 2011, FY 2012 and FY 2013 are 14%, 28% and 40% higher than the gas savings achieved in FY 2010. These aggressive targets are consistent with the City’s environmental goals and the goals of the Gas Utility Long-term Plan (GULP).

**Figure 8: Cumulative 10-year Gas Savings**  
**10-Year Projected Cumulative Gas EE savings**



Natural gas usage is primarily related to comfort end uses—space and water heating. In addition, the majority of new efficient technologies in development are for electric appliances and equipment and not for those fueled by natural gas. These two factors in addition to the high upfront cost of many natural gas efficiency measures, such as furnaces and hot water heaters, tend to result in lower gas saving achievements. As experienced by CPAU, actual electric efficiency achievements were higher than the actual gas efficiency achievements for the last three years. Likewise, future energy efficiency targets can be expected to be lower for natural gas than for electricity. Without a decline in upfront equipment and installation cost, the targets for the natural gas utility will be more difficult to reach in the future than for those of the electric utility. The goals in this report must be considered “stretch goals.” The 10-year goals are updated every three years. In three years, when the next study of the potential for gas savings is completed, an analysis of actual achievements will be included with the updated goals to further refine natural gas efficiency targets.

The impacts from the proposed ten-year gas efficiency targets will extend well beyond 2020. Some gas efficiency measures, such as boilers and furnaces, can last more than 20 years. The gas savings from EE measures installed in 2020 will degrade over time, but persist through 2039.

#### Greenhouse Gas Reductions

Based on the actual gas savings achievements between FY 2008 and FY 2010, and the proposed gas efficiency targets between FY 2011 and FY 2020, the reduction in carbon dioxide (CO<sub>2</sub>) in 2020 is projected to be 10,200 tonnes per year, of which 300 tonnes is attributed to residential solar water heater installations. This exceeds the annual combined reduction target for gas efficiency (7,300 tonnes) and solar water heating (1,500 tonnes) programs in the City’s 2007 Climate Protection Plan (CPP). Overall, the cost of CO<sub>2</sub> emissions reduction is around \$70 per tonne.

The CPP assumes that the number of solar water heating systems installed by 2020 will reach 600 (500 residential water heating systems plus 100 solar pool heating systems). However, the SWH program has been experiencing slow customer uptake since its launch in 2008. The proposed 10-year

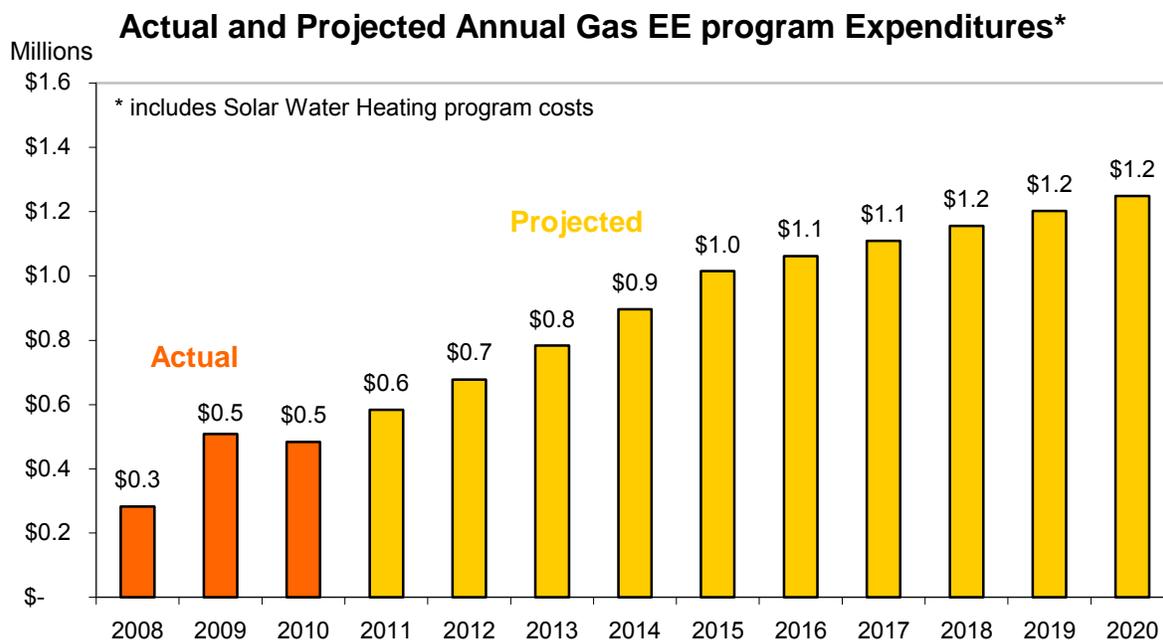
year gas efficiency targets assume that the number of solar water heating systems installed between 2010 and 2020 to be around 300. If the CPP target for the SWH program is met, a total of 10,800 annual tonnes of CO<sub>2</sub> reduction will be achieved.

## PROJECTED COSTS TO MEET THE PROPOSED GOALS

### Gas Efficiency Program Costs Are Projected to Rise

Commensurate with the higher gas savings goals, the implementation cost for gas efficiency programs will also increase. In FY 2010, gas efficiency program expenditures, including administrative cost and customer rebates, were approximately \$500,000. The projected gas efficiency program costs for FY 2013 are projected to be more than 60% higher than the program costs in FY 2010. Figure 9 shows the actual gas EE program expenditures for FY 2008 through FY 2010, and the projected program expenditures to achieve the proposed gas efficiency goals. Note that the total expenditures in FY 2009 included a one time set-up cost for the Solar Water Heating Program.

**Figure 9: Actual and Projected Gas EE Program Expenses**



The costs projected here are preliminary estimates and will be further refined in the Energy Efficiency Implementation Plan that will be presented in the Spring of 2011.

### Retail Rate and Bill Impacts

Gas efficiency program expenditures impact retail rates in two ways. First, the program budget increases the revenue requirements for the gas utility in the short term. For the cost-effective measures, the savings that accrue from not having to purchase gas supplies are greater than the gas efficiency program expenses over the lifetime of the measures since program and rebate costs occur early in the measure life. Second, lower gas usage means that fixed costs (capital and operating costs

to run the gas utility) must be distributed over a lower gas sales volume, which increases the gas retail rate in both the short- and long-term.

In 1996, despite no state mandated “public benefits” charge for gas efficiency programs, the City proactively adopted a funding target of between 0.75% and 1.25% of natural gas revenues for Demand Side Management (DSM) programs (CMR:209:96). In 2000, however, the California legislature mandated a new public benefits surcharge on all natural gas customers throughout the state, including customers of publicly owned utilities, to fund gas efficiency programs (AB 1002). The City meets the requirements of this mandate by locally providing efficiency, low income and other natural gas programs through natural gas rates. During the last several years, the City has spent an average of 1% of the natural gas utility’s revenues for efficiency programs, with additional funding for the solar water heating program (which reduces natural gas purchases) coming from the natural gas supply budget.

The retail rate impact in FY 2020 of the preliminary program budget is estimated to be between 4% and 5% higher than with no gas EE programs. Since 1% of the gas utility revenue has already been budgeted for gas DSM programs, which have achieved approximately 0.35% savings, the projected additional rate impact from the higher gas EE targets in FY 2020 is between 2% and 3%.

Energy efficiency is an investment that returns savings over a 10- to 20-year period, depending on the life of the equipment. The energy savings will result in lower average utility bills. The projected average bill savings is around 1% by 2020 based on the gas EE program costs and proposed gas EE savings targets. Participants in the gas efficiency programs will realize reduced gas bills, while non-participants will experience an increase in gas bills.

The retail rate impacts expected from the proposed gas savings targets and the program funding levels will be further refined in the EE Implementation Plan, which will be completed in the Spring of 2011.

## **LIST OF APPENDICES**

### **A. Cost-Effectiveness Tests for Energy Efficiency Programs**

This appendix contains explanations of the cost-effectiveness tests used to evaluate energy efficiency measures. It also includes a list of the criteria used to evaluate energy efficiency programs.

### **B. Gas Efficiency Measures**

Appendix B lists the gas efficiency measures that were evaluated to determine the potential for gas savings. It contains tables of residential and commercial gas savings measures and shows the results of the analysis, including the Total Resource Cost cost-effectiveness test ratio and the technical and market potential for each measure.

### **C. Modeling Assumptions**

This appendix lists the key assumptions that were used to evaluate the cost-effectiveness of each gas saving measure.

D. Fuel Switching Analysis

Appendix D contains an analysis of the cost-effectiveness of switching from gas-using appliances to electric-using appliances (and vice versa) for certain end uses (water heating and space heating). The analysis compares the costs to the customer and to the utility of using gas versus electricity for each of these end uses using a variety of different technologies.

E. Sensitivity Analysis

Several assumptions are made in the evaluation of the potential for gas savings and each of the assumptions about the future is uncertain. Appendix E contains an analysis of the potential for gas savings if some of the key assumptions are changed. For example, the sensitivity analysis shows how the potential for gas savings change when gas prices are lower or higher than the prices assumed in the base case analysis.

F. Solar Water Heating Program in Palo Alto

This appendix provides more detail on the evaluation of Palo Alto's solar water heating program. It includes an assessment of the cost of CO<sub>2</sub> emissions reductions by water heating technologies, including solar water heating systems.

G. Gas Efficiency Goals Comparison

This appendix compares the gas efficiency goals and achievement of CPAU with that of PG&E, SoCalGas and SDG&E.

## APPENDIX A: COST-EFFECTIVENESS TESTS FOR ENERGY EFFICIENCY PROGRAMS

The primary aim of cost-effective energy efficiency programs is to reduce utility cost and hence customer bills while improving the environment. Though customer bills for those who participate in programs will be reduced, the retail rate will tend to increase as distribution system related fixed cost are spread over a smaller volume of energy sales. Thus, those who do not increase their equipments efficiency will have higher utility bills. All customers have the option to participate in one or more of the efficiency incentives.

Cost-effectiveness can be measured in many ways. The four perspectives most commonly used in efficiency program cost-effectiveness testing are:

1. Participant: An energy efficiency measure that provides net savings to a customer is cost-effective for them as a “participant.” If a customer’s initial investment, after accounting for utility rebates and tax incentives, can be recouped with lower operating cost over the life of the measure, the measure is considered cost-effective from a participant’s perspective.
2. Utility: A measure that lowers overall cost for the utility is cost-effective for the utility (also referred to as “Program Administrator”). For CPAU, this could also be considered the “all ratepayers test” or “average utility bill test,” as it reflects the change in the utility bill to the average customer. To be cost-effective from the utility perspective, the cost of the program (administrative and rebate costs) must be less than the savings from not purchasing the energy supply.
3. Total Resource: If the combination of the utility and all customers together save money, it is cost-effective from a “Total Resource Cost (TRC)” or societal viewpoint. This is the cost-effectiveness criteria that is required by the CEC and is used in CPAU reporting. For Palo Alto, the cost savings include the cost of carbon emissions by the use of a “carbon adder” to the other supply cost savings.
4. Non-Participant: Even if the bill for the average customer shrinks significantly, retail rates could increase slightly, so that customers who do not reduce consumption could see a slight increase in rates and therefore bills. This effect is due to the portion of retail revenue that must be collected to pay for fixed costs. For this reason it is important to design diverse programs to be widely available in order to facilitate efficiency implementation in as broad a manner as possible. The Non-Participant perspective is also called the Rate Impact perspective.

The Total Resource Cost reflects the financial perspective of the Palo Alto community as a whole. The Utility Cost, Participant, and Rate Impact perspectives should be balanced to ensure lower average bills and sufficient incentives to achieve participation

The costs and benefits that are used to calculate the benefit-cost ratios for each of these different perspectives are illustrated below:

**Table A1: Cost-Effectiveness Perspectives and Associated Costs and Benefits**

<b>Cost Effectiveness Test</b>	<b>Costs</b>	<b>Benefits</b>
<b>Participant Cost Test (PCT)</b> <i>Does the participant save money?</i>	Measure Cost	Incentive to customer Bill Savings Tax Savings
<b>Utility Cost Test (UCT) – Average Bill</b> <i>Are utility revenue requirements lowered?</i>	Incentive to customer Program Delivery Cost	Avoided Supply Costs
<b>Total Resource Cost Test (TRC)</b> Sum of Participant + Non-participant <i>Are total community expenditures lowered?</i>	Measure Cost Program Delivery Cost	Avoided Supply Costs Tax Savings
<b>Rate Impact Measure (RIM)</b> Also known as non-participant test <i>Are utility rates lowered?</i>	Incentives to customer Lost Revenues (=Bill Savings) Program Delivery Cost	Avoided Supply Costs

### Efficiency Program Design and Screening Criteria

Staff will continue to use the following standards when evaluating specific efficiency programs:

- The Total Resource Cost (TRC) perspective for ranking energy efficiency measures and contrasting energy efficiency investments with supply alternatives from a community standpoint. This is the perspective that is required for reporting to the CEC and for comparing with other utilities.
- Avoided supply costs include energy, transmission and distribution costs, transmission and distribution line losses, the cost to maintain grid reliability with sufficient reserve capacity, and externality cost.
- The Utility Cost, Participant, and Rate Impact perspectives are reviewed to maintain lower average bills with sufficient incentives to achieve participation.
- Since there will be participants and non-participants for any program, CPAU will develop a portfolio of programs to allow as many people as possible opportunities to participate in programs.
- CPAU's Low Income Program serves customers who are least able to afford efficiency upgrades on their own. These customers receive free lighting upgrades, weatherization, and other energy saving measures. In addition, refrigerators and furnaces can be repaired or replaced, if needed. This reduces the total utility bill cost to these customers.
- Include a greenhouse gas adder when computing avoided supply cost. This adder is acknowledgment of the environmental cost of greenhouse gas emissions. An actual financial cost for greenhouse gas emissions may be levied in the future under potential "cap-and-trade" legislation. Using a greenhouse gas adder improves the cost-effectiveness of efficiency measures and energy savings reduce the likelihood of CPAU paying for greenhouse gas emissions allocations associated with the energy supplies delivered. CPAU currently uses the carbon adder stated in the Climate Protection Plan (\$20/tonne in 2007 increasing by 5% per year).

**APPENDIX B: GAS EFFICIENCY MEASURES**

The tables below list the gas efficiency measures included in the EE potential analysis, the calculated TRC ratio for each measure based on combined gas, electric and water savings, and whether CPAU currently offers rebate for the measure. Emerging technologies that have not yet been widely commercialized or do not have reliable energy savings estimates are excluded from the analysis.

Ground source heat pumps (GSHP) were not included in the analysis. While the installation of a GSHP system could deliver gas and electric savings by lowering the air conditioning load and possibly eliminating the space heating load, the applicability of this technology for the residential sector in Palo Alto is very low due to the moderate climate and high up-front investment (a typical installation of a GSHP system for a 2,000 square foot home costs \$14,000 more than a conventional air-conditioning system). There are other Northern California municipal utilities, including Redding Electric and Plumas Sierra Rural Co-op, which offer rebates for residential GSHP systems. Despite the higher summer temperatures and longer winter season in these utility service territories, payback for a GSHP system without a utility rebate in these other areas could exceed 20 years. For the commercial sector, the high investment cost is a major factor deterring the adoption of GSHP systems.

There are two GSHP systems installed at Palo Alto commercial buildings—one at the Children’s Library, and the other at the 2183 Park Blvd (McDonald Building) as a technology demonstration project. The installation at the McDonald Building had a total project cost of around \$140,000 in 2003, of which 50% was funded by the City (CMR:487:03). Based on the annual gas and electricity savings, the GSHP installation at the McDonald Building has a payback of 11 years without the City’s funding. The GSHP system at the Children’s Library costs around \$140,000 more than a conventional system and took almost two years to complete. Engineering staff involved in the project cited various potential barriers to installing GSHP systems, including the lack of qualified drillers and installers, and the high upfront cost of bore field construction.

**Table B1: Residential Gas Efficiency Measures**

Measure	End use category	TRC ratio	Rebate offered	Technical Potential in 2020 (therms/yr)	Market Potential in 2020 (therms/yr)
Clothes washer (Modified Energy Factor $\geq$ 2.4, Water Factor $\geq$ 4.0)	Appliances	1.12 if gas dryer 1.02 if elect dryer	Yes	108,321	97,526
Dishwasher	Appliances	1.07	Yes	24,240	16,275
Windows (U-factor 0.25)	HVAC/Shell	0.08	No	380,167	0
Duct Sealing/ Repair	HVAC/Shell	0.34	No	205,289	0
Wall Insulation (R0 to R13)	HVAC/Shell	0.65	Yes	1,303,074	95,685 <sup>(3)</sup>
Ceiling Insulation (R19 to R30)	HVAC/Shell	1.32	Yes	1,218,832	100,659
Furnace (AFUE 96)	HVAC/Shell	1.75	Yes	1,769,722	174,691
Infiltration Control	HVAC/Shell	1.76	Yes	1,162,960	95,995
Furnace (AFUE 92)	HVAC/Shell	2.08	Yes	0 <sup>(1)</sup>	157,275
Solar Water Heater	Water Heating	0.18	Yes <sup>(5)</sup>	1,675,901 <sup>(2)</sup>	31,714
Tankless Water Heater	Water Heating	0.58	Yes	0 <sup>(1)</sup>	48,065 <sup>(3)</sup>
Condensing Water Heater	Water Heating	0.96	Yes	957,714 <sup>(2)</sup>	0 <sup>(4)</sup>
Low Flow Shower	Water Heating	1.03	Yes	149,450	5,320
Boiler (AFUE 94) (multi-family only)	Water Heating	1.11	Yes	282,952	25,704
Water Heater (Energy Factor $\geq$ 0.8)	Water Heating	1.38	Yes	0 <sup>(1)</sup>	41,730
Water Recirculating Pump (multi-family only)	Water Heating	1.51	Yes	345,631	3,233
Faucet Aerator	Water Heating	1.76	Yes	82,350	3,271
Water Heater (Energy Factor $\geq$ 0.67)	Water Heating	3.21	Yes	0 <sup>(1)</sup>	18,131
Pipe Wrap	Water Heating	3.95	Yes	108,773	3,586
<b>Totals</b>				<b>9,775,375</b>	<b>918,860</b>

## Notes:

1. The technical potential for competing technologies, e.g. different water heaters, is based on the savings of the most efficient technology of the group, with less efficient technologies being assigned zero technical potential.
2. The technical potential assigned to solar water heaters is the total water heating potential from the residential single family sector, while the technical potential assigned to condensing water heaters is the total water heating potential from the residential multi-family sector. The model assumes no solar water heating installations in the residential multi-family sector.
3. These measures are assigned a market potential even though they are not cost-effective due to the popularity of the measures among customers and the fact that other utilities provide rebates for these measures.
4. Measures that have no customer rebate history are assigned a market potential of zero.
5. Solar water heaters are not cost-effective but are included in the Gas Efficiency portfolio in order to comply with state regulatory mandates.

**Table B2: Commercial Gas Efficiency Measures**

Measure	End use category	TRC ratio	Rebate offered	Technical Potential in 2020 (therms/yr)	Market Potential in 2020 (therms/yr)
Combination Oven	Cooking	0.56	Yes	17,024	350 <sup>(2)</sup>
Power Burner Conveyor Belt Oven	Cooking	0.57	No	138,346	0
Convection Gas Oven	Cooking	0.68	Yes	49,382	1,014 <sup>(2)</sup>
Efficient Griddle - Gas	Cooking	0.83	Yes	57,177	1,174 <sup>(2)</sup>
Catalytic Infrared Gas Fryer	Cooking	1.22	Yes	186,500	3,829
Rack/tray Oven	Cooking	1.45	Yes	197,054	4,046
Rotisserie Oven	Cooking	1.61	Yes	2,614	54
Vent Hood Controls	Cooking	1.74	Yes	42,813	879
Charbroiler	Cooking	1.80	Yes	39,101	803
Food Steamer	Cooking	2.82	Yes	39,167	804
Salamander Broiler	Cooking	2.95	Yes	3,295	68
Pizza Oven	Cooking	3.94	Yes	615	13
Gas Boiler Tuneup	HVAC/Shell	0.88	No	617,227	0
Space Heating Boiler (>= 95% efficient)	HVAC/Shell	1.09	Yes	897,744	295,021
Thermostat Controls on A/C Units	HVAC/Shell	3.93	Yes	765,628	186,785
Boiler Pipe Insulation	HVAC/Shell	6.60	Yes	110,480	25,043
Solar Water Heater	Water Heating	0.26	Yes <sup>(3)</sup>	468,360	4,349
Tankless Gas Water Heater	Water Heating	1.11	Yes	0 <sup>(1)</sup>	54,289
Com Horizontal Axis Clothes Washer	Water Heating	1.30	Yes	386,712	105,313
Hot Water Recirc Pump Time Clock	Water Heating	2.77	Yes	43,789	23,599
High Efficiency Gas Water Heater	Water Heating	4.14	Yes	0 <sup>(1)</sup>	101,380
<b>Totals</b>				<b>4,063,028</b>	<b>808,813</b>

## Notes:

1. The technical potential for competing technologies, e.g. different water heaters, is based on the savings of the most efficient technology of the group, with less efficient technologies being assigned zero technical potential.
2. Convection gas ovens, efficient gas griddles, and combination ovens are not cost-effective but are included in the Gas Efficiency portfolio to expand efficiency offerings to the hard-to-reach restaurant sector. These measures could be cost-effective if electric savings are included. PG&E also currently offers gas efficiency rebates for these measures.
3. Solar water heaters are not cost-effective but are included in the Gas Efficiency portfolio in order to comply with state regulatory mandate.

## APPENDIX C: MODELING ASSUMPTIONS

Key assumptions used in the Gas Efficiency Potential model are listed below:

- Palo Alto's avoided cost for natural gas supplies levelized over a 20-year period is around \$0.90/therm. This includes the cost of gas, local transportation, and a carbon adder in accordance with the City's Climate Protection Plan.
- The distribution of gas versus electric space heating, water heating and clothes dryers among residential customers are based on statewide survey results. Among single family homes, the share of gas space heating, gas water heating and gas clothes dryers are 98%, 99% and 55% respectively (electric space heating, electric water heating and electric clothes dryers represent 2%, 1% and 45% of single family homes). The share of gas space heating, water heating and clothes dryers are lower among multifamily homes: 75%, 71% and 11% respectively.
- Utilities programs which provide rebates for residential gas water heater replacements are paid for less than 10% of the annual water heater replacements. Part of the reason for this is the fact that most residential customers do not apply for a rebate when changing out water heaters to avoid the hassles and cost of getting a permit. The City issues about 275 permits for water heaters each year, but about 1000 residential water heaters are estimated to be replaced annually in Palo Alto (assuming one water heater per each of the 14,600 single-family homes in Palo Alto and an average useful life of 15 years per water heater). A total of 49 and 60 water heater rebates (excluding rebates for solar water heaters) were processed in FY 2010 and FY 2009 respectively.
- The penetration of energy efficient technologies is assumed to be similar to that of PG&E customers in the same climate zone. This benchmarking data is based on statewide surveys completed for both residential and commercial customers. These assumptions may not be fully accurate, but specific information about Palo Alto is not available at this time.
- Projected gas efficiency savings include savings from free-riders. Free riders are customers who would have purchased the energy efficient equipment without additional financial incentives and, therefore, the savings from these equipment purchases would have occurred without utility EE programs. For electric efficiency achievements, the California Energy Commission requires that municipal utilities establish goals that are net of free-riders. However, no such regulatory requirement exists for setting gas efficiency goals.
- Energy savings and cost assumptions for each gas savings measure reflect the most recent data available from Palo Alto's efficiency program tracking database and other gas efficiency potential studies. The model does not assume future price declines for any of the gas efficiency measures covered in the analysis.

## APPENDIX D: Fuel Switching Analysis

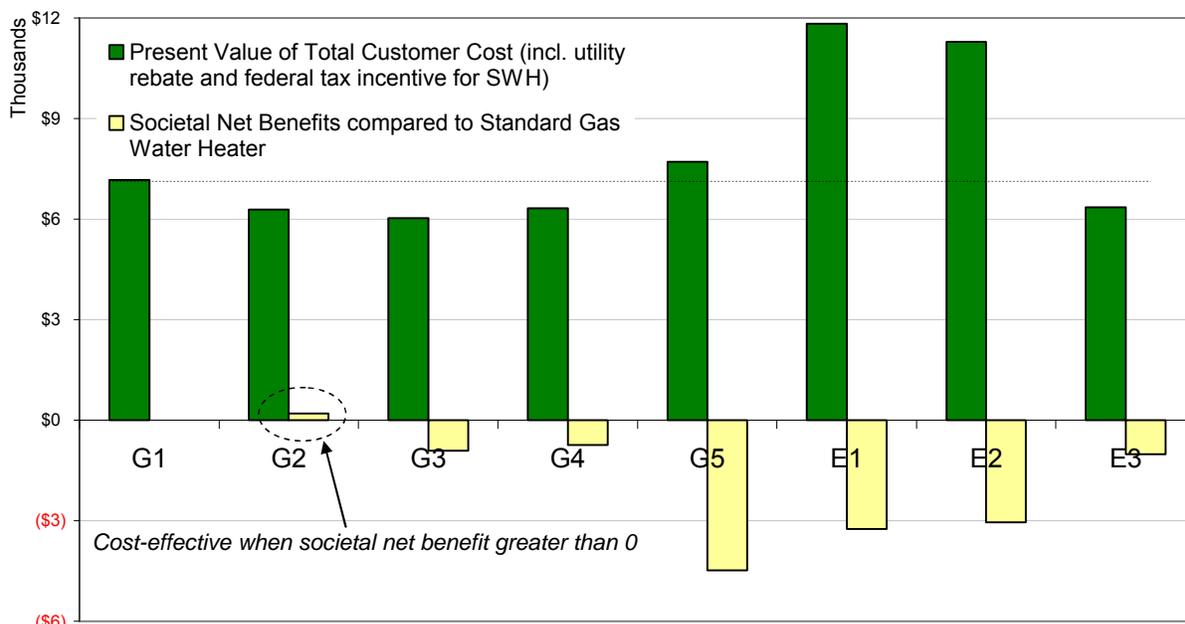
As directed in the proposed 2010 GULP Implementation Plan and the City Council Colleagues' Memo dated May 3, 2010, staff evaluated the cost-effectiveness of substituting gas-using appliances for electric-using appliances and vice versa. The two measures covered under this evaluation are residential water heaters and space heaters. The analysis found that currently there is no cost-effective fuel switching opportunity for residential water heating and space heating.

### Water Heating

Statewide, 99% of single family homes and 71% of multifamily homes have gas water heaters. Staff reviewed the available water heating technologies for residential homes and compared the present value of customer costs and the societal net benefits of switching from a standard gas water heater to an alternative water heater technology. Results are summarized in Figure D1. The present value of total customer cost includes the installed cost of the water heater, annual utility costs, minus utility rebate and the 30% Federal Tax Credit for solar water heaters. The Federal Tax Credit for other energy efficient water heaters is due to expire in December 31, 2010 and is, therefore, not included in the calculation. The societal net benefit is calculated relative to a standard gas water heater; a positive societal net benefit indicates that the measure is cost-effective compared to a standard gas water heater, whereas a negative societal net benefit indicates that it is not cost-effective compared to a standard gas water heater.

**Figure D1**

#### Replacing a Standard Gas Water Heater: Customer Costs & Net Benefits



G1 = Standard gas water heater (EF = 0.62)

G2 = High-efficiency gas water heater (EF = 0.67)

G3 = Tankless gas water heater

G4 = Condensing gas water heater (EF = 0.8 or higher)

G5 = solar water heating with gas backup

E1 = standard electric water heater (EF = 0.90)

E2 = High-efficiency electric water heater (EF = 0.95)

E3 = Heat Pump electric water heater (EF = 2.2)

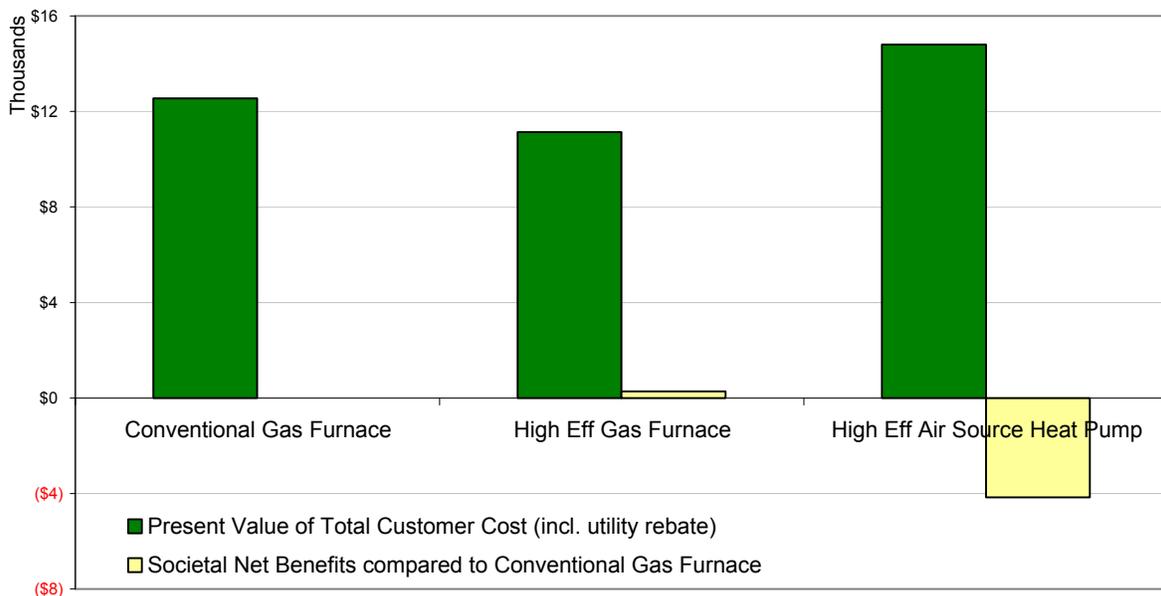
Figure D1 shows that after rebates and tax incentives, high-efficiency gas water heaters, tankless water heaters, condensing water heater, and heat pump electric water heaters all have lower total customer costs than a standard efficiency gas water heater. The only efficiency measure that is cost-effective from a societal perspective is the non-condensing, high-efficiency gas water heater. Solar water heating is the least cost-effective relative to other water heating technologies due to its high equipment installation and administration cost of a solar hot water heating incentive program.

The potential for cost-effective fuel switching is based on the societal net benefits of the three types of electric water heaters relative to the standard gas water heater. The analysis shows that none of the electric water heating technologies is cost-effective from a societal perspective compared to the standard gas water heater. It is also unlikely to be cost-effective to switch from electric water heating to gas water heating if a new gas line needs to be added.

Space Heating

Staff undertook a similar analysis for residential space heating. Based on statewide statistics, approximately 98% of the single-family homes and 75% of the multi-family homes have gas space heating systems (gas furnace or boilers). Staff compared the present value of customer costs and the societal net benefits of switching from a standard gas furnace to either a high efficiency gas furnace or an air-source heat pump. The results of the analysis are summarized in Figure D2. The analysis found that a high efficiency gas furnace has lower customer costs compared to a standard gas furnace and is cost-effective from the societal perspective. The high efficiency air source heat pump, on the other hand, is more expensive and not cost-effective compared to the conventional gas furnace. Based on this analysis, staff concludes that currently there is no cost-effective opportunity for switching from gas to electric residential space heating systems.

**Figure D2**  
**Replacing a Conventional Gas Furnace: Customer Costs & Net Benefits**



**APPENDIX E: SENSITIVITY ANALYSIS**

As part of the analysis, staff looked at other scenarios with different assumptions to compare the projected market potential and EE program budget with the base case results. The scenario descriptions and results are summarized below.

<b>Scenario</b>	<b>Results</b>
<p><b>Base Case:</b></p> <ul style="list-style-type: none"> <li>• Include carbon adder as directed in the 2007 Climate Protection Plan;</li> <li>• Slow adoption of solar water heating systems and do not meet SWH goals by 2020</li> </ul>	<ul style="list-style-type: none"> <li>• Economic potential of gas efficiency in 2020 represents around 34% of load.</li> <li>• Cumulative market potential of 5.5% by 2020.</li> <li>• Annual gas efficiency program budget increase of around \$100,000 to \$120,000 per year for FY 2011 through FY 2015.</li> <li>• Rate impact of between 2 to 3% by 2020 due to additional supply funds to pay for gas efficiency programs.</li> </ul>
<p><b>Scenario 1:</b></p> <ul style="list-style-type: none"> <li>• High gas prices (approx. 30% higher than base case)</li> <li>• Retail rates around 15% higher than base case</li> </ul>	<ul style="list-style-type: none"> <li>• Economic potential in 2020 increases to 36% of load.</li> <li>• Cumulative market potential increases to 6.2% by 2020.</li> <li>• Increased gas efficiency program budget, with estimated rate impact of around 4% by 2020.</li> </ul>
<p><b>Scenario 2:</b></p> <ul style="list-style-type: none"> <li>• Do not include carbon adder in gas cost</li> <li>• Retail rate remains unchanged</li> </ul>	<ul style="list-style-type: none"> <li>• Economic potential in 2020 decreases to 29% of load.</li> <li>• No change to market potential and program budget.</li> </ul>
<p><b>Scenario 3:</b></p> <ul style="list-style-type: none"> <li>• Aggressively market solar water heating systems to meet CPP target for the SWH program by 2020</li> </ul>	<ul style="list-style-type: none"> <li>• Cumulative market potential increase to 5.9% by 2020.</li> <li>• Program budget remains the same between 2011 and 2015, then starts to get higher beginning 2016 as the number of rebated SWH units begins to ramp up. Cumulative program budget between FY 2016 to FY 2020 is around \$700,000 higher than base case, with a 0.5% higher rate impact by 2020.</li> </ul>

## APPENDIX F: SOLAR WATER HEATING PROGRAM IN PALO ALTO

The Palo Alto's 2007 Climate Protection Plan (CPP) established City-wide CO<sub>2</sub> emission reduction goals of 15% of 2005 levels by 2020. This is equivalent to 119,140 metric tons (or tonnes) of CO<sub>2</sub> emissions reductions per year. Specific CO<sub>2</sub> emission reduction goals are assigned to Utilities energy efficiency and solar energy programs, as shown in Table F1.

**Table F1: CO<sub>2</sub> emission reduction goals for utility programs by 2020**

	Electric Metric Tons CO <sub>2</sub> per year	Gas Metric Tons CO <sub>2</sub> per year
Efficiency Programs	-15,800	-7,300
Solar	-3,800	-1,500
Mandatory Renewable Energy Supply	-91,500	TBD
Voluntary Renewable Energy Supply	-36,500	-16,400

Based on the gas and electric efficiency program achievements between FY 2008 and FY 2010, and the Council-adopted 2010 Ten-Year Electric Efficiency Plan and the proposed gas efficiency goals in this report, Utilities is on track to meet the CPP emission reduction goals for gas energy efficiency.

There is less certainty on whether the solar programs will be able to meet the goal for CO<sub>2</sub> emissions reductions. The CPP called for the implementation of a solar water heating program, with a target of 500 residential systems with estimated CO<sub>2</sub> emissions reductions of 500 metric tons per year, plus another 100 pool heating systems, with estimated CO<sub>2</sub> emissions reductions of 1,000 metric tons per year, for a combined CO<sub>2</sub> emissions reductions of 1,500 metric tons per year. The CPP made a number of assumptions in setting these targets, including:

- The cost of a residential solar water system was assumed to be around \$3,000 to \$6,000;
- The average gas savings for each solar hot water heating system was assumed to be 188 therms per year;
- The total number of pools in Palo Alto was assumed to be 4,000; and
- The average gas savings for each solar pool system was assumed to be 1,850 therms per year.

Since the launch of the Solar Water Heating (SWH) program in 2008, which is administered by the Center for Sustainable Energy California (CSEC), rebates have been paid for 19 systems, two of which have electric back-up water heating and do not provide gas savings. The SWH program offers a rebate of up to \$1,500 per residential solar water heating system. Due to state law requirements, no rebate is offered for solar pool systems. Based on the systems which received rebates to date, the average cost per system is \$8,800, with average annual gas savings of 125 therms per unit<sup>1</sup>.

CSEC has evaluated the feasibility of a solar pool heating system for the Rinconada swimming pool, the only city-owned swimming pool in Palo Alto. Annual gas savings based on a solar heating

<sup>1</sup> This amount of energy savings is less than the energy savings estimated in the Climate Protection Plan, which assumed gas savings of 188 therms per year for solar hot water heating. The cost for the systems is higher than the cost assumed in the CPP.

system for the 7,500 square feet lap pool is around 15,000 therms. Other year-round public swimming pools in Palo Alto are located at Palo Alto High School, Gunn High School, JLS Middle School, Terman Middle School and Jordan Middle School. While there are swimming pools in apartment and condominium complexes within Palo Alto, these pools are typically not heated.

The cost of CO<sub>2</sub> emissions reduction from a solar water heating system is far higher than other energy efficient gas water heaters. Table F2 compares the cost of CO<sub>2</sub> emissions reduction for various energy efficient water heating technologies including solar water heaters. Only the high efficiency gas water heater shows a negative cost of emissions reduction, which indicates that the measure (replacing standard efficiency gas water heater with a high efficiency gas water heater) has life-cycle cost savings even with no carbon adder.

**Table F2: Cost of CO<sub>2</sub> emission reduction by water heating technologies**

<b>Efficient water heating technology</b>	<b>\$ per tonne of CO<sub>2</sub> emission reduction</b>
High efficiency gas water heater (EF = 0.67)	(\$60)
Tankless gas water heater	\$90
Condensing gas water heater (EF > 0.8)	\$100
Solar water heaters	\$450
High efficiency air source heat pump water heater	\$20

The current SWH program will not likely reach the emissions reduction goal in the CPP. Staff will review other program approaches including bulk buy and customer financing to reduce costs and increase program participation.

**APPENDIX G: GAS EFFICIENCY GOALS COMPARISON**

The gas efficiency goals for PG&E, SoCalGas and SDG&E are adopted by the CPUC. These goals are developed in a similar process as the CPAU's gas efficiency goals. The recommended gas efficiency goals for CPAU are on par with the IOUs' gas efficiency goals. Also, the achieved gas savings as percentage of load in 2009 for CPAU is similar to that of the IOUs.

**Table G1: Gas Efficiency Goals Comparison**

	2006	2007	2008	2009	2010	2011	2012	2013
<b>CPAU Goals</b>	na	na	0.25%	0.28%	0.32%	0.40%	0.45%	0.50%
<b>Achievement</b>	na	na	0.11%	0.28%	0.39%	-----	-----	-----
			3-yr cumulative: 0.78%					
<b>PG&amp;E Goals</b>	0.26%	0.33%	0.40%	0.36%	0.39%	0.41%	0.59%	na
<b>Achievement</b>	3-yr cumulative: 1.02%			0.28%	-----	-----	-----	-----
<b>SoCalG Goals</b>	0.20%	0.25%	0.31%	0.37%	0.38%	0.40%	0.42%	na
<b>Achievement</b>	3-yr cumulative: 0.72%			0.28%	-----	-----	-----	-----
<b>SDG&amp;E Goals</b>	0.47%	0.57%	0.68%	0.63%	0.66%	0.71%	0.75%	na
<b>Achievement</b>	3-yr cumulative: 0.60%			0.28%	-----	-----	-----	-----

**FINAL**

## **UTILITIES ADVISORY COMMISSION – SPECIAL MEETING MINUTES OF JANUARY 12, 2011**

### **CALL TO ORDER**

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Chair Waldfogel called to order at 7:05 p.m. the meeting of the Utilities Advisory Commission (UAC).

Present: Commissioners Berry, Cook, Foster, Keller, Melton and Chair Waldfogel and Council Member Scharff.

Absent: Commissioner Eglash

### **ORAL COMMUNICATIONS**

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None.

### **APPROVAL OF THE MINUTES**

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The Minutes from the December 1, 2010, UAC meeting was approved as presented, with the motion moved by Commissioner Melton and seconded by Commissioner Cook.

### **AGENDA REVIEW**

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No changes to the agenda were requested.

### **REPORTS FROM COMMISSION MEETINGS/EVENTS**

No Commission Meeting Reports.

### **UTILITIES DIRECTOR REPORT**

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Utilities Director Valerie Fong delivered an oral report on the following items:

1. **Hydro Conditions:** So far, Sierra precipitation has been about 200% of normal to date and snowpack is above 150% of normal to date. Weather forecasts for three months out are for colder than average with about average precipitation. Reservoir levels are above average with Shasta and Folsom reservoirs at their maximum allowable levels with flood control storage reservations. Western forecasts its Base Resource volume to be about average for the coming 12 months. NCPA forecasts Calaveras generation to be above average.
2. **Ram Geopower:** In February 2008, Palo Alto agreed to participate in a Power Purchase Agreement (PPA) between NCPA and Western Geo for up to 5 average MW of renewable geothermal energy at a price of \$98/MWh. However, Western Geo was taken over by another company and the original price in the PPA cannot be maintained. NCPA has negotiated a replacement PPA with a new price of \$113/MWh. Silicon Valley Power (SVP) will subscribe to most of the output. We are working on a letter of intent with SVP to allow Palo Alto to come back in a few months to subscribe to up to 30% of the output at the same price and terms available to SVP. In exchange, Palo Alto will need to agree to execute a withdrawal agreement from the original agreement clearing the way for SVP to move forward. Staff hopes to bring this to UAC this summer with a recommendation and an update on our renewable portfolio standard.

3. **Anaerobic Digester Update:** In January the Public Works department will release its consultant's draft analysis of the feasibility of locating a compost-to-energy project at the City's landfill site. The project being studied would involve anaerobic digestion of yard waste, food waste, and possibly biosolids from the wastewater treatment plant. The resulting methane would be used to generate renewable power. The draft analysis will be released on the City's website on January 24. The initial results of the study will be presented to the community in February and in front of the City Council in late March. A presentation to the UAC is planned for March or April, and all comments will be included in the final report to Council to be delivered in September.
4. **LED Holiday Light Program:** Customers received a coupon in their November utility bills that allowed them to exchange a working strand of incandescent holiday lights for a strand of LED lights. We purchased 744 multi-colored and 96 white LED ENERGY STAR rated strands for the holiday exchange. The lights were displayed in the office along with a watt counter to show customers the electric usage of both old and new bulbs. We received a lot of positive feedback on our display and on our marketing piece, which included a graph showing the difference in electric use between the bulb types. A total of 502 strands were exchanged, equaling 12,077 kWh in savings. Approximately 300 strands remain in addition to the 100 in storage from last year. The excess strands will be placed in storage and used for next year's program. 330 pounds of old strands have been recycled as of January 12, 2011, costing \$165.
5. **UAC Calendar:** Rolling calendar of upcoming items for UAC meetings.

## UNFINISHED BUSINESS

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1. Utilities Advisory Commission Bylaws

The Commissioners reviewed the amendments to the UAC bylaws proposed by the UAC ad-hoc committee (comprised of Commissioners Foster, Berry and Melton). Commissioners Foster and Melton agreed that the amendments shown were in line with the discussion held at the meeting of the ad-hoc committee on January 4, 2011. Commissioner Berry noted his disagreement with the requirement that Council approve later amendments to the bylaws and also noted that the UAC would not have the discretion to appoint a standing budget committee at a later date without going back to Council for approval. After discussion, it was proposed to remove the sentence in Section 4.1 that stated "Standing committees may be appointed only with the approval of the Council". It was also proposed that Section 9.1 be amended to read "The Bylaws shall be amended or repealed in accordance with the Code", removing the reference to Council approval, so that if the Code allowed for UAC approval then the UAC Bylaws would also.

**ACTION:** Commissioner Foster made a motion to recommend Council approval of the bylaws with the proposed amendments. Commissioner Melton seconded the motion. The motion carried (5-1) with Commissioner Berry voting no.

## NEW BUSINESS

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### ITEM 1: DISCUSSION: Home Energy Reports Status Update

Utilities Marketing Services Manager, Joyce Kinnear, introduced three members of the vendor team from OPOWER who are helping to put together the Home Energy Reports program. She then provided a presentation on the history of the program development, a discussion of the first report roll-out in November, and a brief overview of the customer feedback and concerns. Of note is that 18,648 customers have received the report and only 34 have asked to opt-out. About twice as many customers as the opt-out number have requested more information on the program and about other ways that the utility can assist

them in reducing energy usage. Most of the questions about the program have been related to concerns about privacy and whether the neighbor comparisons are accurate. She explained that customer usage information is kept private and that no other person can identify an individual person's energy usage. The explanation for how the comparison is developed and that it provides useful information to customers was given.

Commissioner Foster raised the question about why customers who have solar electric (PV) systems can not receive the reports. Stephanie Berner of OPOWER said that the product works on usage information, so the modules do not work for customers who have zero usage. She pointed that that primarily due to Palo Alto's request, OPOWER is looking at potentially adding this capability in the future. Commissioner Keller asked if it would be possible to add water to the reports' energy (gas and electric) comparison. Kinnear said that Palo Alto has requested this capability. Berner added that many utilities in the west would like this capability, and that the addition of water to the reports is on the way.

Chair Waldfoegel appreciated the discussion about privacy issues, but he wanted to make sure that all questions were completely dealt with. He asked for specific details on the internal controls at OPOWER and in how data transfers were completed with appropriate security. Berner responded that OPOWER gets the customers and usage data from the City in a secure, encrypted process. OPOWER follows standards industry controls internally for the housing of the data. Also, no individual customer or personally identifiable information is presented to anyone other than that customer. Clayton Schloss of OPOWER added that the website portal is also gated, so that customers can only access their own information through the website. Chair Waldfoegel requested details on the ownership of the data and its usage. Berner responded that the data can only be used with the program and is the City's property.

Commissioner Cook asked whether the opt-out rate (about 0.18%) is typical for this type of program. Berner said that it is an unusually low rate. Schloss added that customers typically are the most likely to opt out and are the most vocal in the first mailing or two. Cook also asked for more details on how the tip module is developed for the customer reports. Berner said that the modules help to turn what is learned from the report into action. The tips vary by both individual report and by cycle. They can be targeted to a particular usage pattern.

Commissioner Keller wondered if customers who do reduce energy usage will receive a pat on the back. Commissioner Foster pointed out that the program contract allows for 10 reports, and that customers should get updates on their usage. He also mentioned that while OPOWER is serving many utilities, Palo Alto is one of the first to have nearly all customers in the program, and he is pleased that most customers can receive this benefit.

#### **ITEM 2: ACTION: Water Shortage Implementation Plan**

Senior Resource Planner Nico Procos provided a presentation, including the background, on the development of the proposed plan to split up the water available in a water shortage condition (drought) among the member agencies of the Bay Area Water Supply and Conservation Agency (BAWSCA). Under the plan, water is divided by a formula which is weighted one-third on the Individual Supply Guarantee (the long-term contractual entitlement) and two-thirds on a seasonal usage calculation that penalizes water use in the summer months. The formula is also bounded so that no agency is reduced less than 10% and no agency is reduced more than 20% more than the average reduction for all agencies. The formula also includes an adjustment for East Palo Alto to ensure that agency has enough water to meet basic health and safety requirements. The formula expires in 2018 and is only in effect for water shortages that require water use reductions of up to 20%. Procos stated that, for Palo Alto, the formula is not as beneficial as the expired formula, but results in a lower reduction than the average reduction for the BAWSCA agencies.

Procos stated that the representatives of all the BAWSCA agencies that were involved in the development and negotiation of the formula unanimously agreed to recommend the proposed formula to their governing boards. If any agency does not approve the proposed formula, then the BAWSCA Board would consider approval of a formula. If the BAWSCA Board were unable to approve a formula, then the San Francisco Public Utilities Commission (SFPUC) would decide on the formula.

Commissioner Cook asked what happens if there is a reduction of greater than 20%. Assistant Director Jane Ratchye replied that the SFPUC would determine the reduction formula in that event. However, Ratchye noted that the SFPUC has adopted level of service goals for its Water System Improvement Program such that the greatest water supply reduction is 20%. In addition, since the 1987 through 1992 drought, the SFPUC has adjusted its system operations to make water shortages less likely by preserving water in storage rather than producing electricity and by calling for water use reductions earlier in a multi-year drought event.

Chair Waldfogel asked if the formula would have been triggered in the past. Ratchye stated that she hadn't done the analysis, but said that she thinks it would have been triggered in the 1987 through 1992 drought.

Commissioner Berry inquired about the default process if any of the BAWSCA members did not approve the new formula. Specifically, did staff have a sense what the SFPUC might do if they had to make a decision on the process? Procos responded that the contract is clear that the BAWSCA Board of Director's would be given an opportunity to approve a new formula and the SFPUC would only act if the board did not. Procos added that it is likely that the BAWSCA Board would exercise its authority to resolve the issue. However, assuming the SFPUC was given the opportunity, Procos does not know what approach it may take.

**ACTION:** Commissioner Berry made a motion to recommend Council approval of the proposed Water Shortage Implementation Plan. Commissioner Melton seconded the motion. The motion carried unanimously (6-0).

**ITEM 3: DISCUSSION:** Draft 2011 Utilities Strategic Plan

Assistant Director Jane Ratchye stated that the Utilities Strategic Plan is close to final, but that she is soliciting additional feedback before bringing the plan back to the UAC for action at the next (February) meeting of the UAC. She provided a presentation of the highlights of the four themes of the strategic plan: safety and reliability, customer service excellence, cost management, and environmental sustainability. One strategy that was added was to ensure that the strategy itself was implemented as this will require resources to manage, track and report regularly so that the UAC and Council can follow the progress towards completion of the initiatives and whether the performance targets are met.

Commissioner Berry stated that he was very involved with staff in the development of the strategic plan and requested that the UAC use this opportunity tonight to provide staff feedback on the draft plan so that it can be finalized for consideration at the next meeting.

Commissioner Keller asked why objective BP1 (ensure a reliable supply of utility resources) did not include anything about back-up supplies and emergency preparedness. Ratchye said that not all Utilities activities are reflected in the Strategic Plan, but it is intended to capture those areas that need continued focus and, especially, those areas that need improvements, changes in focus, additional resources, or changes in practice or operations. Commissioner Keller asked if there needs to be a placeholder for important issues that may not be an issue now, but could be in the future. Ratchye stated that the strategic plan will

necessarily change as we move forward with implementation and that new initiatives will be added as others are completed. Since the plan will be reported on every six months, there will be opportunities to make adjustments to the strategic objectives and performance measures. Regarding objectives BP4 and BP6 relating to customer service, Commissioner Keller asked if there was a way to add outreach for new development. She is concerned that there are resource efficiency opportunities for new buildings that could be incorporated in the design phase. She suggested coordinating with the City's Economic Development Manager to determine any upcoming development plans. Regarding objective PT1 (be an attractive place to work), Commissioner Keller noted that the performance measure relates only to new employees and not to retaining valued existing employees.

Chair Waldfoegel stated the draft strategic plan omits the rate of return to the City provided by the Utilities Department and, since it is a key element of the City's revenues and the Utilities expenses, it should be captured in the strategic plan. He recommended the financial perspective as the location for an objective related to the City as a stakeholder.

Council Member Scharff commented that the stable rate objective is embedded in the strategic plan, but that is premature since the laddering strategy and rate stability issue will be reconsidered by the UAC and Council as a result of an added implementation task in the proposed Gas Utility Long-term Plan (GULP). He added that the performance measure for objective C3 (I expect to pay a reasonable bill) should not necessarily be the aggregate Utilities bill, but rather each fund separately. Otherwise, the information about the relative position of each fund is lost.

Commissioner Berry added that he did not think the performance measure for objective C3 related to the annual rate change should necessarily be the same for all Utilities funds. Ratchye acknowledged that, at least in the short term, rate increases for water are likely to be higher than 10% per year. Commissioner Berry stated that, if that was the case, it is not a good idea to include a performance measure that you know you are not likely to meet and suggested having different targets for each fund. This would signal to the Council and public what the direction of rate changes are likely to be. Commissioner Keller added that predictable rates are valuable if communicated to customers to allow them to make informed investment decisions regarding efficient appliances and other improvements.

Regarding objective C4 (care for our environment), Commissioner Cook stated that environmental sustainability should be across all operations. He indicated that he supported objective PT4 (investigate and adopt innovative technologies) and agreed with Chair Waldfoegel that the equity transfer should be added to the financial perspective. Minimizing financial risk should be incorporated into the financial perspective as well. Commissioner Cook also indicated that environmental sustainability should be included in the mission statement.

Commissioner Foster agreed that environmental sustainability should be included in the mission statement and that the last phrase "...in support of the vibrant community of Palo Alto" should be omitted. Commissioner Foster stated that objective C1 (I receive safe and reliable service) is about service interruptions, yet the performance measure was about response time after an interruption. He suggested that the measure should be related to the number of interruptions/outages. Regarding objective PT4 (investigate and adopt innovative technologies), Commissioner Foster recommended additional clarity on the performance measure target of three new technologies evaluated per year. He wanted to ensure that it was at least a somewhat extensive evaluation, perhaps including a trial or pilot program, rather than solely a paper economic evaluation. Commissioner Foster also stated that the performance measure and target for objective F3 regarding rate structures essentially is a policy change and this type of policy change should be debated and discussed prior to be incorporated into the strategic plan. Ratchye responded that

she agreed with Commissioner Foster's suggestion and will move the idea to a strategic initiative as something that should be addressed and a policy call made.

Commissioner Berry stated that the performance measure for objective PT1 (be an attractive place to work) should be employee satisfaction as determined by a regular, periodic survey. He suggested that this is the best way to determine if employees feel that they are working in an attractive place. It is also a way for management to address any issues that are raised. Regarding objective C1 (I receive safe and reliable service), Commissioner Berry advised that recovery time is important as well as number of outages.

**ITEM 4: ACTION: Proposed Ten-Year Gas Energy Efficiency Goals**

Resource Planner Christine Tam provided a presentation on the development of the ten-year gas energy efficiency (EE) goals. She showed that over 90% of residential gas use is for water and space heating. For commercial customers, about 75% of gas used is for water and space heating with about 20% for cooking. Tam stated that the goals were developed by first assessing 40 gas efficiency measures to determine how much gas could possibly be saved. This is the technical potential and is equal to about 45% of the total gas usage. The amount that can be saved with cost-effective energy efficiency measures is equal to about 34% of the total City gas usage. Tam indicated that there are many barriers to achieving the entire "economic potential" and that the achievable, or "market," potential is about 5.5% of the Citywide gas usage. This 5.5% is the proposed ten-year gas EE goal. Commissioner Keller asked whether the projected potential capture savings from new construction projects. Kinnear responded that only energy savings above the City's building code, or the CALGREEN requirements, which exceeds the Title 24 building code. UMS staff is working with the Building Planning department to offer rebates to new construction projects with energy savings that exceeds the City's building code.

Tam explained that the bulk of the savings potential is for space heating for both residential and commercial customers. The next biggest end use with the potential for saving gas is for water heating. For residential customers, barriers to achieving the full economic potential include: high upfront costs, long payback periods, long equipment life, the fact that contractors often do not have high efficiency alternatives in stock, and the fact that water heater permits are time consuming at a point of immediate need, thus reducing customer compliance with requirements. For commercial customers, the barriers include the lack of incentives for either tenants or landlords in multi-tenant, rented buildings and business uncertainty and cash flow issues for small businesses.

Tam noted that the proposed ten-year goals are similar to those of PG&E and other California utilities. Since the proposed annual goals are higher than in the past three years, costs for the programs – both for program administration and rebates and incentives – are expected to increase over the ten-year period. In summary, Tam advised that the goals are aggressive – 5.5% compared to the 3.2% ten-year goal set three years ago. She added that the proposed goals were developed using a comprehensive analysis and that the implementation plan – expected in the spring – will contain more details on programs and resource requirements. The plan is to seek all gas EE savings possible and that the goals should be achievable if the resources are increased.

Commissioner Foster asked if staff evaluated a dramatically ramped up program to capture a larger share of the economic potential. Tam stated that scenario analyses were performed concluding that the impact on retail rates goes up dramatically to capture a greater fraction of the potential. Commissioner Foster added that the triple net leases definitely remove the incentive for either party – the landlord or the tenant – to invest in improvements and equipment that would result in energy savings. He also noted the fact that solar hot water heating systems were so non cost-effective. He said that since the potential for savings is

so high for the water heating end use that we need to find a way to improve the economics of solar hot water heating installations.

Chair Waldfogel indicated that he and others on the UAC undoubtedly have many comments on how to achieve the gas EE savings goals most effectively, but that the implementation plan may be the most appropriate place to make those comments. At this time, the establishment of the goals is the issue.

Commissioner Berry questioned the economic incentive to save gas for the utility. He noted that for the electric utility, avoiding increased electric load or reducing load through energy efficiency can result in avoiding the cost of large, expensive generation and/or transmission equipment. On the gas side, this is less apparent until there is a real market for carbon emissions.

Commissioner Melton indicated that increasing the gas EE goal is not necessarily the right thing to do. He indicated that it may not be economic to do so and may not be the right economic environment to reduce gas sales. He indicated support for maintaining the current goals as we need to spend more money for a smaller result.

**ACTION:** Commissioner Foster made a motion to recommend Council approval of the proposed ten-year gas energy efficiency goals for the period 2011 to 2020. Commissioner Cook seconded the motion. The motion carried (5-1) with Commissioner Melton voting no.

**ITEM 5: ACTION:** Form an Ad Hoc Committee on Innovation, Technology and Projects

**ACTION:** Chair Waldfogel appointed Commissioners Foster, Keller and Cook to the Ad Hoc Committee on Innovation, Technology and Projects. By Section 4.1 of the UAC's proposed Bylaws, this Ad Hoc committee will be in place until June 30, 2011.

**ITEM 6: ACTION:** Potential Topic(s) for Discussion at Future UAC Meetings  
None

#### **COMMISSIONER COMMENTS**

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Commissioner Cook announced that on January 25, 2011 he would be attending the first session of the Northern California Power Agency's (NCPA) Strategic Issues Conference – NCPA 101 History and Introduction.

Meeting adjourned at 10:00 P.M.

Respectfully submitted,  
Marites Ward  
City of Palo Alto Utilities



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**FINANCE COMMITTEE**

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Regular Meeting  
March 1, 2011**EXCERPT**

## 5. Proposed Ten-Year Gas Energy Efficiency Goals

Resource Planner, Christine Tam presented the ten-year gas efficiency savings goals for 2011-2020. She overviewed the following topics: 1) natural gas usage and efficiency potential in Palo Alto; 2) barriers to achieving full gas efficiency potential; 3) proposed 2011-2020 gas energy efficiency (EE) goals; and 4) projected 2011-2020 gas efficiency program budget. She spoke on how gas EE goals were set, which included technical, economic and market potential factors. She spoke on the historic and projected annual gas usage in Palo Alto. The gas EE goals were aggressive and were much higher than goals set in 2007. Comprehensive analysis was performed when setting the gas EE goals. The implementation plan would provide more detail on programs to achieve goals, and on budget and resource requirements. Staff recommended that the Finance Committee recommend to the Council to approve the proposed ten-year gas EE goals for 2011-2020. Staff requested the Council approve the gas EE goals in March 2011. Staff would present the gas EE goals implementation plan to the Utilities Advisory Commission and Council in Spring 2011. The next update of the gas EE goals was scheduled in 2013.

Council Member Schmid said the City spent one percent of gas utility revenues. The Staff Report said program costs were expected to result in retail rates that were four to five percent higher by 2020, compared to retail rates if no gas EE programs were in place. He inquired whether the one percent was an additional expenditure.

Ms. Tam said the one percent expenditure was what Staff spent on gas revenues totaling approximately \$500,000. The Utilities Department spent approximately \$500,000 on gas efficiency programs.

Utilities Director, Valerie Fong said the expenditure was similar to how Staff organized electric efficiency programs.

Council Member Schmid inquired what the four to five percent expenditure referenced.

Ms. Tam said it was the retail rate impact.

Council Member Schmid said customers would be paying five percent higher rates. He inquired whether this increase would be parallel to the five percent rate increase on renewable energy.

Ms. Tam said that was correct. She spoke on how an average customer bill would reduce, in the long run, due to gas EE goals.

Ms. Fong said customers would be using less energy, therefore purchasing fewer energy units.

Council Member Schmid inquired whether a customer's average monthly bill would be five percent higher.

Ms. Fong said purchasing fewer units, at a higher rate, may contribute to a lower bill.

Council Member Schmid asked if Staff's expectation was customers would have a one percent increase on monthly energy bills.

Ms. Tam said the expectation was that the average bill would be one percent lower by 2020.

Chair Scharff said the replacement of water heaters appeared to be the largest factor in achieving lower energy bills. It was his belief customers, who replaced water heaters, would see a reduction in monthly bills.

Assistant Director of Utilities Customer Support Services, Tom Auzenne spoke on the various factors that would contribute to gas efficiency. Customers participating in rebates for more efficient units would save more; however, it would cost more initially.

Council Member Shepherd believed that Staff's recommendations were aggressive and possibly unachievable. The model assumed that the number of solar water heating systems installed by 2020 will not meet the goals in the City's Climate Protection Plan of 500 residential systems, plus 100 solar pool heating systems. Instead, the model projected about 300 residential solar water heaters installed between 2010 and 2020. She inquired what plans were in place to support this aggressive direction.

Ms. Fong said Staff would return in May 2011 with a plan on how to achieve gas EE goals.

Ms. Tam said the Utilities Marketing Services Department sent out a request for proposal (RFP) for third-party gas EE goal programs in November 2010. Staff was currently evaluating bids received.

Council Member Shepherd inquired whether marketing would include educating customers on when to perform certain utility functions, such as laundry.

Ms. Tam said many hotels and senior housing developments have started looking into ozone laundry systems. Staff was analyzing emerging technologies for the EE Communications Plan.

Mr. Auzenne said electric utility usage was 80 percent commercial and 20 percent residential. Gas and water utility usage was 50 percent commercial and 50 percent residential. Many received RFP proposals were commercially based.

Assistant Director of Utilities for Resource Management, Jane Ratchye indicated Staff was confident in achieving the entire "economic potential" and that the achievable, or "market" potential was about 5.5 percent of the Citywide gas usage.

Council Member Shepherd inquired whether Staff would return with strategies to support the gas EE goals.

Ms. Fong said that was correct.

Council Member Shepherd said Palo Alto was a leader in innovation. She wanted to ensure Staff was capturing the maximum leadership capacity on this initiative.

Ms. Fong said Staff would analyze the RFP's with a financial and innovative mindset.

Council Member Shepherd said Staff may be cutting out new technologies that have transpired. She felt Staff was working on the best attempt to incorporate both principles.

Ms. Fong said extremely expensive innovations would probably not be considered.

Council Member Yeh said the budget expenditures were linear. He inquired whether Staff was required to perform all gas EE goal work at this moment. It was his belief more pertinent information would be available in the next couple months.

Mr. Auzenne said every three years Staff performed a ten-year goal. Staff would have an opportunity to adjust gas EE goals.

Ms. Fong said the City would achieve, or not achieve, goals depending on the State's electrical program.

Ms. Tam said the State had a 10-year electrical program that the City voluntarily participated in.

Ms. Fong said the City would be required to give up funding if it chose not to participate in the State's electrical goal program.

Council Member Yeh said the initiative primarily relied on solar water heaters. He inquired whether there was a State deadline that was driving the Staff Report.

Mr. Auzenne spoke on the timing issues regarding the RFP and implementation plan.

Ms. Fong suggested that the Staff Report be adopted, and Staff could return with revisions if needed.

Chair Scharff said Staff was recommending the gas EE goal be changed from three percent to five percent. Staff would return with an implementation plan on the expenditure of funding.

Ms. Fong said that was correct. Staff would subsequently return annually with a budget request.

Chair Scharff inquired how much funding would go to the State if the City did not participate in its electrical program.

Ms. Fong said approximately one percent of revenue costs.

Chair Scharff inquired on State law regarding solar water heating.

Ms. Fong said State law required that the City implement a solar water heating program.

Chair Scharff said, if the City did nothing else, it would be required to implement a solar water heating program.

Ms. Fong said that was correct.

Chair Scharff inquired on the RFP bids received for gas utilities. He inquired what the bidders suggested the City implement.

Mr. Auzenne said he was uncomfortable disclosing this information because the City was currently in negotiation with bidders. He spoke on hard-to-reach customer segments in commercial and multi-family buildings.

Chair Scharff inquired on the gas EE goal recommendation process. He inquired whether bidders would suggest new technologies that the City would then establish a rebate for.

Mr. Auzenne said that was correct. He said some suggested programs were more cost effective than others.

Chair Scharff said the largest issue was on water and space heating. He said replacing a water heater before it failed was recommended. He inquired how much a water heater would cost to replace. He inquired what type of rebate the City offered.

Ms. Tam said a tank water heater cost approximately \$1000. The rebate was \$80.

Mr. Auzenne said a permit to replace a water heater was \$85.00.

Chair Scharff said lowering the permit fee for the replacement of water heaters may be beneficial.

Ms. Fong believed the permit fees were cost-based. She would follow up with the Planning and Environmental Services Department.

Ms. Tam said customers could replace old water heaters with high efficiency models, without pulling a permit. In this instance, the Utilities Department would not be able to count the energy savings.

Council Member Shepherd said Staff would be returning with the implementation plan. She inquired whether it would be useful to hold this conversation at that time.

Chair Scharff inquired on the types of strategies that Staff would be returning with. His understanding was that Staff would be returning with strategies on rebates.

Ms. Fong said Staff was evaluating the submitted RFP's and would make recommendations.

Chair Scharff spoke on his concern that Staff was not targeting efforts in the most efficient way to achieve gas EE goals.

Ms. Fong said Staff, as an obligation, followed the RFP process.

**MOTION:** Council Member Shepherd moved, seconded by Yeh, that the Finance Committee recommend that the City Council approve the proposed ten-year gas energy efficiency goals for the period of 2011-2020.

**MOTION PASSED 4-0.**