TO: HONORABLE CITY COUNCIL
FROM: CITY MANAGER DEPARTMENT: City Manager’s Office
DATE: JULY 21, 2008 CMR: 308:08
SUBJECT: REVIEW OF RESULTS OF COST-BENEFIT ANALYSIS OF CLIMATE PROTECTION PLAN AND DIRECTION TO STAFF ON RECOMMENDED FOLLOW-UP ACTIONS

RECOMMENDATION
Staff recommends that Council review the results of the cost-benefit analysis conducted on Climate Protection Plan actions, as summarized below and in the attachments to this report. In addition, staff recommends that Council authorize staff to prepare a cash flow needs assessment as well as a proposed budget for implementing (a) the negative cost-per-ton items; (b) the low (less than $50) cost per ton items, and (c) the items showing a community cost per ton of well below zero. This analysis should be completed and brought back to Council before the end of the year.

BACKGROUND AND INTRODUCTION
At its December 3, 2007 meeting, Council approved staff’s request for funds to complete an analysis of costs and benefits of the recommendations in the Climate Protection Plan. This report presents the results of that analysis.

Out of the original 120 possible actions included in the Climate Protection Plan (CPP), 25 were analyzed by staff and presented as part of the CPP in December 2007 (CMR:435:07). Staff divided the remaining cost-benefit work as follows:

1. Requested the Rocky Mountain Institute, already under contract with Utilities, to recommend an overall methodology for conducting the cost-benefit analysis.

2. Contracted with URS Corporation, an experienced environmental consulting firm with expertise in greenhouse gas mitigation, to conduct analysis on green building, Zero Waste, and transportation-related actions.

3. Worked with Stanford Environmental Consultants (SEC), a team of Stanford student consultants, to analyze opportunities within Environmentally Preferable Purchasing.

4. Continued collaboration with the Utilities Department to work on the programs it presented as part of the CPP.
The results of each of these portions of the work are summarized below and included in the attachments.

**DISCUSSION**

**Summary**

The Cost-Benefit analysis shows that:

1. Two recommendations – replacing street lights with LED units and purchasing remanufactured toner cartridges – would save the City about $478,000 per year (average annual savings over 20 years, net present value) and reduce 1,350 metric tons of CO₂ per year.

2. An additional 24 measures could be funded by that savings, creating another 14,730 metric tons of CO₂ reductions per year, for a combined total of 16,080 metric tons, or 2.2% of 2005 community emissions.

3. Of the 36 measures analyzed, 14 have a net cost to the City of less than $50 per metric ton. These 14 measures would cost a combined total of $1.3 million in net City costs with a resulting 64,210 metric tons of CO₂ reductions. These measures include, in addition to the two measures listed in #1 above:
   - Allowing telecommuting for City employees 2 days per month
   - Replacing two high-mileage City fleet vehicles with hybrids
   - Purchase of carbon offsets for City employee business travel
   - Parking space cash-out for City employees
   - Adding community bike racks
   - Utilities investment in GHG-reducing projects
   - Implementing existing commercial green building ordinance
   - SMaRT station retooling
   - Increasing City participation in Palo Alto Green to 30% of City-only load
   - Expanding Utilities’ use of renewable energy
   - Implementing mandatory recycling

4. The 22 measures that cost above $50 per metric ton cost the City a combined $11.5 million and reduce CO₂ by 133,138 metric tons per year.

5. Certain measures have a net cost to the City greater than zero but produce significant net savings for the community. For example:
   - For the residential green building ordinance, net costs to the City are $78 per metric ton, but the community derives $569 of benefit (reduced costs) per metric ton
   - Offering VTA EcoPasses to all City employees would cost the City $2,088 per metric ton, but employees and the community would save $2,690 per metric ton.
   - Adding community bike racks would cost the City $36 per metric ton but produce $1,024 per metric ton of savings for the community.
A master list of all analyzed actions ranked by City net cost per metric ton is included in Attachment A.

Staff recommends that the City Council focus first on implementing the measures that save the City money over the short or long term. Second, staff recommends focusing on implementing measures that can be funded by the cost-saving actions, particularly measures that cost under $50 per metric ton. Third, the City should examine measures that produce large benefits or savings to the community with relatively low cost to the City, as well as measures that may cost over $50 per ton, but have a strong policy benefit.

The follow-up to the cost-benefit analysis would be for Sustainability Team staff to work with Administrative Services to prepare a cash flow needs assessment and proposed budget for implementing the measures described above. In addition, staff will need to work with the departments that would implement these measures, to ensure that all relevant expertise is incorporated into the financial and logistical planning of the measures.

Staff suggests that this analysis be a first step in evaluating these measures, rather than a final recommendation. There are inevitably details regarding specific programs which are left out of the analysis. For example, Planning and Transportation staff responsible for employee commute programs have significant knowledge about which incentives, and in what combinations, might work most effectively. Their detailed understanding could not be fully incorporated into this analysis, nor could details about how such programs would be implemented or enforced. Rather, this report presents an initial, theoretical cost/CO₂ reduction assessment for measures, were they to be implemented as stand-alone items.

Details of the Analysis

I. URS Analysis of Green Building, Zero Waste, and Transportation Measures

The first part of URS’s work was to review the list of actions from the Green Building, Zero Waste, and Transportation chapters of the CPP and develop a shorter list of actions that could be analyzed. Attachment C shows the results of this review, listing all the CPP recommendations for Green Building, Zero Waste, and Transportation, and indicating which were analyzed by URS, which were not, and reasons for each.

a) Green Building:
URS analyzed the following two Green Building measures, which are already in process:

- Implement existing City ordinance for LEED certification for commercial buildings (new construction or existing building) within the City of Palo Alto

- Implement existing City ordinance for Green Point Rated requirements for all new low-density residential buildings and/or upgrades within the City of Palo Alto

The analysis showed that the first measure will cost the City a net $16 per metric ton, but save the community $631 per metric ton. Similarly, the second measure will cost the City a net $78 per metric ton, but save $569 per metric ton in community expenditures.
The table below summarizes these results. Please note that column A presents the ranking of the action by net City cost per metric ton – from least cost to greatest cost. Column B describes the action being evaluated. Column C presents the number of metric tons of CO\textsubscript{2}e anticipated to be reduced annually as a result of the measure. Column D represents the average annual net cost to the City of implementing the measure (net present value). Column E represents the average cost to the community, and therefore includes all costs expended and benefits accrued. (In the URS report, the stakeholders listed at the bottom of each table indicate which costs and benefits are incorporated in the community analysis.) For example, for green building measures, City costs include staffing for training, implementation and enforcement of the ordinance; the City derives no direct benefit from these measures. The community’s costs include the increased cost of building to green standards (estimated at 2% on average), as well as the benefits, such as energy savings, water savings, and improved indoor air quality. Therefore, for the two measures below, City costs are greater than zero, but community benefits are considerably higher.

In most instances in this report, the Net Community Cost is not included, as this part of the analysis was done only by URS for the Green Building and Transportation measures it examined.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ranking</td>
<td>Action Description</td>
<td>Annualized CO\textsubscript{2}e metric tons reduction</td>
<td>Annualized Net City Cost (Benefit) $/metric ton</td>
</tr>
<tr>
<td>1</td>
<td>Implement City Ordinance for green building requirements for commercial new and upgraded buildings</td>
<td>2,263</td>
<td>$</td>
<td>16</td>
</tr>
<tr>
<td>2</td>
<td>Implement City Ordinance for green building requirements for all new low-density residential buildings</td>
<td>851</td>
<td>$</td>
<td>78</td>
</tr>
</tbody>
</table>

b) Zero Waste:
URS examined the following Zero Waste measures:

- SMaRT Station Retooling
- Mandatory Recycling Ordinance
- Public Area Recycling
- Landfill Ban
- Food Waste Rescue

The results of their analysis are shown in Table 2 below. Once again, items are ranked from least to highest net cost to the City per ton of CO\textsubscript{2} reduced.
Table 2: Zero Waste Actions

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranking</td>
<td>Action Description</td>
<td>Annualized CO$_2$e metric tons reduction</td>
<td>Annualized Net City Cost (Benefit) $/metric ton</td>
<td>Annualized Net Community Cost (Benefit) $/metric ton</td>
</tr>
<tr>
<td>1</td>
<td>SMaRT Station Retooling</td>
<td>9,126</td>
<td>$</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Mandatory Recycling Ordinance</td>
<td>8,169</td>
<td>$</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>Food Waste Rescue</td>
<td>233</td>
<td>$</td>
<td>73</td>
</tr>
<tr>
<td>4</td>
<td>Landfill Ban</td>
<td>1,155</td>
<td>$</td>
<td>179</td>
</tr>
<tr>
<td>5</td>
<td>Public Area Recycling</td>
<td>9</td>
<td>$</td>
<td>2,301</td>
</tr>
</tbody>
</table>

*Cost of these measures is expressed as a cost to the City, but will later be presented to refuse ratepayers for approval.

c) Transport-Related Measures:
As detailed in the CPP, transportation is a key source of greenhouse gas emissions. Considering actions to lower the emissions from City employees’ commuting is critical, given employees’ geographical dispersion. Appendix F provides three visual presentations of the distribution of City employees in the Bay Area and statewide, by residential zip code.

In designing an employee commute program, an array of incentives is generally offered as a package. Implementing a stand-alone incentive, such as parking space cash-out, would be unlikely, since employees accepting the cash-out would need to demonstrate that they were using alternative means of transportation. As is clear in the URS report, adding additional commute incentives to those currently offered by the City would require additional staff resources. Also, staff would need to work closely with the Human Resources department in implementing any change to the employee commute program.

URS examined the following employee commute measures:

- Go Pass (CalTrain pass) for City employees
- Parking Space Cashout for City employees
- Bicycle Racks/Showers & Lockers for City employees
- EcoPass (VTA pass) for City employees
- Carpooling website portal for City employees
- ZIPCAR for City employee private use

Of those measures, URS found that only one – parking space cash-out – showed a net cost to the City of under $50 per metric ton (specifically $16/metric ton). Staff’s cost/benefit analysis in the CPP had found an additional two transportation-related measures for under $50/metric ton: the replacement of two low-mileage vehicles with hybrids ($14/metric ton) and the purchase of carbon offsets for employee travel ($36/metric ton).

URS examined one general community transport-related measure (in addition to its look at several measures within the context of the Stanford expansion projects): the addition of
community bicycle racks. It found that this measure would cost the City $36 per metric ton, but save the community $1,024 per metric ton.

Table 3 combines the results of the URS analysis with the cost-benefit analysis done by staff in the CPP. All actions are ranked by net City cost per metric ton. Items analyzed by URS also include a net Community cost per metric ton.

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Action Description</th>
<th>Annualized CO₂e metric tons reduction</th>
<th>Annualized Net City Cost (Benefit) $/metric ton</th>
<th>Annualized Net Community Cost (Benefit) $/metric ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>City allow telecommuting to reduce emissions**</td>
<td>53</td>
<td>$ -</td>
<td>not analyzed</td>
</tr>
<tr>
<td>2</td>
<td>Purchase 2 Hybrids to replace high-mileage conventional vehicles**</td>
<td>3</td>
<td>$ 14</td>
<td>not analyzed</td>
</tr>
<tr>
<td>3</td>
<td>Parking Space Cash-out for City employees</td>
<td>95</td>
<td>$ 16</td>
<td>($1,348)</td>
</tr>
<tr>
<td>4</td>
<td>Additional Community Bicycle Racks</td>
<td>132</td>
<td>$ 36</td>
<td>($1,024)</td>
</tr>
<tr>
<td>5</td>
<td>Purchase Carbon Offsets for Employee Business Travel**</td>
<td>39</td>
<td>$ 33</td>
<td>not analyzed</td>
</tr>
<tr>
<td>6</td>
<td>Fleet optimization software**</td>
<td>285</td>
<td>$ 52</td>
<td>not analyzed</td>
</tr>
<tr>
<td>7</td>
<td>Fleet Accountability Programs**</td>
<td>95</td>
<td>$ 126</td>
<td>not analyzed</td>
</tr>
<tr>
<td>8</td>
<td>Limit Idling in City fleet**</td>
<td>136</td>
<td>$ 294</td>
<td>not analyzed</td>
</tr>
<tr>
<td>9</td>
<td>Purchase very low emission vehicles to serve as shuttle services between City facilities**</td>
<td>2</td>
<td>$ 510</td>
<td>not analyzed</td>
</tr>
<tr>
<td>10</td>
<td>Carpooling website portal for City employees</td>
<td>10</td>
<td>$ 618</td>
<td>($937)</td>
</tr>
<tr>
<td>11</td>
<td>Expand use of biodiesel**</td>
<td>19</td>
<td>$ 652</td>
<td>not analyzed</td>
</tr>
<tr>
<td>12</td>
<td>Purchase additional Cross town shuttles**</td>
<td>180</td>
<td>$ 694</td>
<td>not analyzed</td>
</tr>
<tr>
<td>13</td>
<td>Increase Employee Commute Incentives to max. allowable by federal law**</td>
<td>284</td>
<td>$ 1,062</td>
<td>not analyzed</td>
</tr>
<tr>
<td>14</td>
<td>Bicycle Racks, Showers, Lockers &amp; Pool Bicycles for City employees</td>
<td>17</td>
<td>$ 1,000</td>
<td>($10)</td>
</tr>
<tr>
<td>15</td>
<td>Go Pass for City employees</td>
<td>21</td>
<td>$ 1,801</td>
<td>($1,708)</td>
</tr>
<tr>
<td>16</td>
<td>EcoPass for City employees</td>
<td>15</td>
<td>$ 2,088</td>
<td>($2,690)</td>
</tr>
<tr>
<td>17</td>
<td>ZIPCAR for City employee private use</td>
<td>14</td>
<td>$ 2,325</td>
<td>$1,935</td>
</tr>
</tbody>
</table>

**Actions analyzed in CPP. Note that CPP analysis did not include community costs and benefits.

d) Stanford Shopping Center and Stanford Medical Center Expansions:
Since a number of community transportation-related measures are difficult to quantify outside the context of a specific project or projects, URS chose the Stanford expansion projects as a test case for analyzing the following measures:

- Develop Comprehensive Plan Programs to Support Increased Density near Transit
- Evaluate Pedestrian and Transit Oriented Development Zoning Intensity, Including Along El Camino Real
- Implement Pedestrian and Transit Oriented Zoning in Downtown
• Reduce Parking Needs for New Development
• Require Transportation Demand Management (TDM) Programs
• Zone for Mixed Use and Higher Density Around Transit Stations

This preliminary look showed that without any GHG emissions reduction measures, the expansions as planned are estimated to add a combined total of approximately 73,000 metric tons of CO$_2$e to the community’s emissions, or 10% of the 2005 community-wide emissions. However, these results are very preliminary, and the Environmental Impact Report currently being conducted by PBS&J will provide a more complete assessment of the base case as well as the impact of various mitigation measures.

The initial URS analysis showed that measures such as transit/pedestrian oriented development, transport demand management, bicycle and pedestrian initiatives, and transit initiatives could have a significant downward effect on this anticipated increase.

Staff is engaged in conversations with Stanford regarding environmental impacts of their planned expansions, and will continue to collaborate with Stanford, the Simon Group, and other stakeholders to include in their planning as many of these mitigation measures as possible.

Clearly, without implementing mitigation measures these projects could significantly hinder progress towards the reduction goals committed to by the Council in December 2007.

II. Stanford Environmental Consulting (SEC) and Staff Analysis of Environmentally Preferred Purchasing (EPP) Measures

In the last several months, it has become more evident that EPP will be implemented through successive contracts, purchase requests, and City credit card purchases. Staff education and annual reporting will be critical components of the program. Current contracts up for renewal that will contain EPP language include those for office supplies, copiers and printers. In addition, Utilities is seeking to incorporate into its rebate programs low mercury lighting alternatives as well as Extended Producer Responsibility, whereby manufacturers assume a large portion of the responsibility for safe and appropriate disposal of their products.

As part of the 2008-09 EPP work plan, staff is developing a purchase evaluation methodology incorporating environmental costs and benefits into the financial formulas. For example, a GHG “adder”$^1$ of $20 per metric ton is being proposed, and costs and benefits for other environmental impacts, such as pollution and hazardous waste disposal, are also being considered. In addition, life cycle analysis, already a policy of the City, has yet to be fully integrated into City purchasing practices. Training workshops are being scheduled for this fiscal year to educate staff responsible

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$^1$ "Climate Change: Action by States To Address Greenhouse Gas Emissions," CRS Report to Congress, January 18, 2007, page CRS-17: Greenhouse Gas “Adders”: ...In general, adders require utilities to weigh the future costs of greenhouse gas emissions when considering different energy investment options (e.g., fossil fuels, renewable energy supplies). For example, California’s Public Utilities Commission requires investor-owned-utilities to include an [adder] on carbon dioxide emissions when conducting long-term planning or procurement activities... [to] “serve to internalize the significant and under-recognized cost of [greenhouse gas] emissions, [and] help protect customers from the financial risk of future climate regulation...”
for CIP projects in how to use life cycle analysis to identify the best economic and environmental values for the City as they make purchases for their projects.

Staff worked with SEC, a team of Stanford students, to identify the most cost-effective opportunities for reducing GHG emissions via City purchases. After reviewing City purchases, SEC concentrated on LED street lights, office supply, and credit card purchases.

SEC’s analysis of LED street lights included current material and energy costs, hazardous waste disposal costs, labor for installation and maintenance (both in the product and upstream sources from energy used to run lights), and mercury generation. They concluded that purchasing LED street lights to replace the less-efficient 100W and 250W high pressure sodium (HPS) lamps currently used throughout the City would save the City $9.3 million over 20 years, reduce GHG emissions by 1,348 metric tons per year, and eliminate the mercury currently used in HPS lighting.

The down side to this significant cost-saving opportunity is its high up-front investment requirement. As of this writing, one LED fixture costs approximately $500 compared to an $11 HPS bulb. However, LED fixtures last five times longer than HPS bulbs with 40%-80% greater efficiency. The product switch has a payback period of approximately six years.

While staff in the Utilities and Public Works departments believe that the LED technology is not quite ready for widespread deployment, they are piloting the use of LED lights at three parking lots, and are encouraged by the results. Given the rapid evolution of this technology and price declines, staff will reassess this option in early 2009. In the interim, City departments will begin exploring financing options for LEDs.

Table 4 presents the combined results of staff’s CPP analysis and SEC’s analysis of EPP measures, ranked by net City cost per metric ton.

**Table 4: Environmentally Preferred Purchasing Actions**

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<tr>
<th>A</th>
<th>B</th>
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<tbody>
<tr>
<td>Ranking</td>
<td>Action Description</td>
<td>Annualized CO₂, e metric tons reduction</td>
<td>Annualized Net City Cost (Benefit) $/metric ton</td>
<td>Annualized Net Community Cost (Benefit) $/metric ton</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1</td>
<td>Purchase only remanufactured toner cartridges when available.</td>
<td>2</td>
<td>$ (6,690)</td>
<td>not analyzed</td>
</tr>
<tr>
<td>2</td>
<td>Replace all 75W, 100W and 250W high pressure sodium street lights currently in service with LED models.</td>
<td>1,348</td>
<td>$ (410)</td>
<td>not analyzed</td>
</tr>
<tr>
<td>3</td>
<td>Mandate Purchasing of only 100% recycled content paper when available.</td>
<td>33</td>
<td>$ 185</td>
<td>not analyzed</td>
</tr>
<tr>
<td>4</td>
<td>Implement full duplexing as default in all printers and copiers in City facilities when possible</td>
<td>29</td>
<td>$ 696</td>
<td>not analyzed</td>
</tr>
</tbody>
</table>
III. Utilities Measures

The CPP included (on pages 32-33) tables summarizing the estimated community-wide 2005 CO₂ emissions from electricity and natural gas use and projected 2020 emissions including the impact of each major utility program area: efficiency, solar, mandatory renewable supply, voluntary renewable supply, and low-carbon fossil-fuel supply. Since then, the price premium for renewable energy (non solar based supply) supply increased from a range of $30 to $40 per metric ton to $30 to $60 per metric ton.

Staff continues to evaluate GHG reduction scenarios, as well as the cost and retail rate impact of implementing additional programs.

The emissions generated by electricity use in 2007 are estimated at 285 lbs/MWh (170 lbs per month per average home). This is expected to decrease by 65% to 100 lbs/MWh by 2020 as the utility increases the renewable supply portfolio and other programs. For customers of the Palo Alto Green program, the household’s electric consumption related emissions are zero. Natural gas consumption-based emissions may decrease through an upcoming Utilities biogas program and through energy efficiency measures.

In 2007, the Council increased the 2003 Council mandate that Utilities attain 20% renewable power sources (RPS) to a higher 33% target to be achieved by 2015. Approximately 15% of the 2008 supply is expected to come from renewable sources by December 2008. To achieve the 33% target, the Utility expects to pay a cost premium of between $30 and $60 per metric ton of CO₂ reductions. However, the retail impact of that premium is estimated to be less than the 0.5 cents/kWh cap imposed by the Council.

Staff is in the process of implementing a Solar Hot Water Heating program, as well as exploring Biogas based natural gas supplies to reduce the carbon intensity of natural gas supplies. The amount of greenhouse gas reduction as a result of these programs will depend upon the level of customer participation.

In addition, Council has approved Utilities’ pursuit of discussions to co-develop an ultra clean natural gas-fired cogeneration plan within the City. These combined heat and power applications would increase City-generated CO₂ emissions (as approximately 15% of our electric supply could be produced locally), but reduce overall California-wide emissions, through increased efficiency of supply and reduced transmission losses. These units also have the potential of increasing supply reliability to the City and reducing overall supply procurement costs.

Table 5 summarizes the CO₂ and cost impact of the Utilities programs.
Table 5: Utilities Actions

<table>
<thead>
<tr>
<th>Rank</th>
<th>Action Description</th>
<th>Annualized CO₂e metric tons reduction</th>
<th>Annualized Net City Cost (Benefit) $/metric ton</th>
<th>Annualized Net Community Cost (Benefit) $/metric ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Invest in GHG-Reducing Projects or Offsets to Balance Remaining Emissions</td>
<td>1,000</td>
<td>$25</td>
<td>not analyzed*</td>
</tr>
<tr>
<td>2a</td>
<td>Achieve participation in Palo Alto Green to meet 5% of load</td>
<td>17,700</td>
<td>$30 - $40</td>
<td>not analyzed*</td>
</tr>
<tr>
<td>2b</td>
<td>Achieve participation in Palo Alto Green to meet 10% of load</td>
<td>35,400</td>
<td>$30 - $40</td>
<td>not analyzed*</td>
</tr>
<tr>
<td>3</td>
<td>City increase its participation level in Palo Alto Green to 30% (in 2008-09 budget)</td>
<td>3,300</td>
<td>$40</td>
<td>not analyzed</td>
</tr>
<tr>
<td>4</td>
<td>Expand Use of Renewable Energy Installed or Purchased Directly By Customers</td>
<td>3,280</td>
<td>$41</td>
<td>not analyzed*</td>
</tr>
<tr>
<td>5</td>
<td>Further reduce Carbon Intensity of Energy Supply Provided by CPAU</td>
<td>91,000</td>
<td>$55</td>
<td>not analyzed*</td>
</tr>
<tr>
<td>6</td>
<td>Develop voluntary CO₂ reductions for Gas</td>
<td>16,400</td>
<td>$57</td>
<td>not analyzed*</td>
</tr>
<tr>
<td>7</td>
<td>Promote Solar Initiatives</td>
<td>250</td>
<td>$100</td>
<td>not analyzed*</td>
</tr>
<tr>
<td>7</td>
<td>Reduce electricity and natural gas use through conservation and energy efficiency. Extrapolated from 10 year efficiency plan.</td>
<td>22,100</td>
<td>$207</td>
<td>not analyzed*</td>
</tr>
</tbody>
</table>

* Immediate (City) costs passed on to ratepayers, with approval. Additional costs and benefits to the community have not been analyzed.

IV. Carbon Pricing and Investment Decision-Making

The cost benefit analysis discussed in this report is expressed in dollars per metric ton of CO₂ equivalent reductions. The “market cost” of carbon emissions is a moving target, varying over time and depending upon the party evaluating the action. Therefore a dollars-per-metric-ton methodology allows the stakeholders in the City to consider the report’s recommendations in comparison to their threshold cost of carbon-related emissions, thereby informing their decisions on projects for reaching short, medium and long term climate protection goals.

Currently, in the US, the environmental costs associated with creating a product or service are not embedded in its price. In Europe, some of those costs are embedded through a “cap and trade” system that requires industries to purchase sufficient emission credits to cover their carbon emissions.

Under California’s Global Warming Solutions Act (AB32), the Market Mechanisms Subcommittee to the California Air Resources Board is developing a cap and trade system for California. A similar national trading scheme was proposed in the US Senate this year, under the Lieberman-Warner Climate Security Act (S.2191). Many observers expect that a trading scheme similar to that in the European Union will be developed in the US within the next few years.

Many economists predict that the price of carbon, as realized through emissions trading credit pricing, will increase from the current price of approximately $5 per metric ton. The City is
currently participating in a project with the Electric Power Research Institute which utilizes a price range of $30-$60 per metric ton of carbon emitted in 2010 and beyond. This price range is based on US EPA estimates of the costs associated with capturing one metric ton of CO₂ from a coal fired power plant and storing it underground, a process known as sequestration.

These trends, as noted in 2007 by the respected Stern Review of the Economics of Climate Change from the UK, strongly suggest that early reductions of carbon will be far cheaper than later reductions. This implies that municipalities ought to consider the following principles in developing a CO₂ reduction portfolio:

1. In California, industry sectors targeted in AB32, such as electricity and energy providers, will be impacted first by regulation and might be willing to pay a higher price for carbon reductions. Correspondingly, different departments in the City will have different expectations or thresholds for their CO₂-reduction costs.

2. Utility and industrial impacts of AB32 will likely provide the impetus for a small increase ($0-$5 per metric ton) in current carbon prices because of the constrained nature of a California-only market. However, should these measures be adopted on a regional basis, for example through the Western States Climate Initiative, or on a national level, then carbon prices are likely to rise to a more significant level ($30-$60 per metric ton).

3. Actions to meet the City’s short term reduction goals should be comparatively inexpensive because the City has chosen initially to pursue low cost reductions.

4. Longer term actions will require greater resources, but initiating those actions as soon as possible will have lesser cost implications than waiting to initiate them.

Conclusions

The cost benefit analysis discussed above and in the attachments to this report shows a range of possible City-initiated climate protection efforts, and in some cases, provides a strong fiscal incentive for pursuing these actions. Other actions offer a relatively low-cost way to reduce the City’s carbon footprint. However, many will require an up-front investment to realize longer-term benefits. Therefore staff recommends that Council authorize staff to prepare a cash flow needs assessment as well as a proposed budget for implementing (a) the negative cost-per-ton items; (b) the low (less than $50) cost per ton items, and (c) the items showing a community cost per ton of well below zero. This analysis should be completed and brought back to Council before the end of the year.

RESOURCE IMPACT

This report has no direct resource impacts. When staff returns to Council for direction on the financing plans, a resource impact section will be included with that report.

POLICY IMPLICATIONS

All of the above programs are in line with the City’s Sustainability Policy, Council’s adoption of the Climate Protection Plan, and other existing City policies.

ENVIRONMENTAL REVIEW

The actions described in this report are exempt from the California Environmental Quality Act (CEQA), pursuant to California Code of Regulations, Title 14 §15061(b)(3), because it can be
seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, and pursuant to §15308, since these are actions taken by regulatory agencies for protection of the environment.

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ATTACHMENTS
Attachment A: Complete List of Possible Actions Ranked by City Cost/Metric Ton of CO$_2$e Reduction  
Attachment B: Rocky Mountain Institute Memorandum  
Attachment C: CPP Recommendations v. URS Study  
Attachment E: Stanford Environmental Consulting: Analysis of LED Street Lighting  
Attachment F: Environmental Purchasing Policy Plan  
Attachment G: Mapping of Employee Commutes – Bay Area and Statewide Employee Residence Maps, Employee Distribution by Zip Code