ATTACHMENT 2

Municipal Climate Action Plan

Measures to Reduce Municipal Greenhouse Gas Emissions

DECEMBER 2008

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1. Introduction

Greenhouse gas (GHG) emissions—the major contributors to climate change—result from almost every human activity, from lighting and heating buildings to driving cars to disposing of waste. The decisions that we make as individuals and governments determine the extent of our impact. Thus, Contra Costa County hopes to mitigate its own contribution to climate change by identifying and analyzing opportunities to reduce the GHG emissions generated by its municipal buildings and operations.

1.1 Climate Change Policy and Local Government

California's *Assembly Bill No. 32: the Global Warming Solutions Act of 2006* (AB32) requires California to reduce its GHG emissions to 1990 levels by 2020. Meeting this target will require that the state government inventory California's GHG emissions and identify and implement measures to reduce these emissions. Voluntarily and in anticipation of potential future regulation, many local governments are also monitoring their own GHG emissions and identifying opportunities for reduction.

1.2 Contra Costa County's Climate Protection Efforts

Contra Costa County's commitment to mitigating climate change began in May 2005, when the Board of Supervisors convened department heads in a Climate Change Working Group (CCWG) to identify existing County activities and policies that potentially reduced GHG emissions. The CCWG is comprised of the Agricultural Commissioner, the Deputy Director of Building Inspection, and the Directors of Conservation and Development, General Services, Health Services, and Public Works. In November 2005, the CCWG presented its Climate Protection Report to the Board of Supervisors, which included a list of existing and potential GHG reduction measures. To quantify Contra Costa County's current GHG emissions and to evaluate the impact of these GHG reduction measures, the Board of Supervisors approved a resolution in February 2007 to join ICLEI – Local Governments for Sustainability (formerly known as the International Council for Local Environmental Initiatives) and to conduct a GHG emissions inventory of Contra Costa County's countywide and municipal emissions. Upon completion of the inventory and associated report, the Board of Supervisors approved a resolution in October 2007 to complete a climate action plan for the County's municipal facilities and operations, funded by a grant from the Bay Area Air Quality Management District, which resulted in this report.

1.3 Promoting Community Actions

According to the County's GHG emissions inventory, emissions from County municipal operations represent less than one percent of total Contra Costa countywide emissions. Thus, mitigation of GHG emissions in Contra Costa County will require GHG reductions in both municipal operations and the greater community. However, while countywide GHG reduction measures may result in greater overall GHG reductions, the County government has greater control over its municipal emissions. Additionally, the County can take this opportunity to really lead by example and inspire changes in the greater community by first focusing on development and implementation of a Municipal Climate Action Plan consisting of reduction measures that target emissions generated by municipal operations.

2. 2006 Municipal GHG Emissions Inventory

The County completed its GHG emissions inventory in August of 2007 and revised this inventory in June of 2008. The results of the municipal inventory are illustrated below.

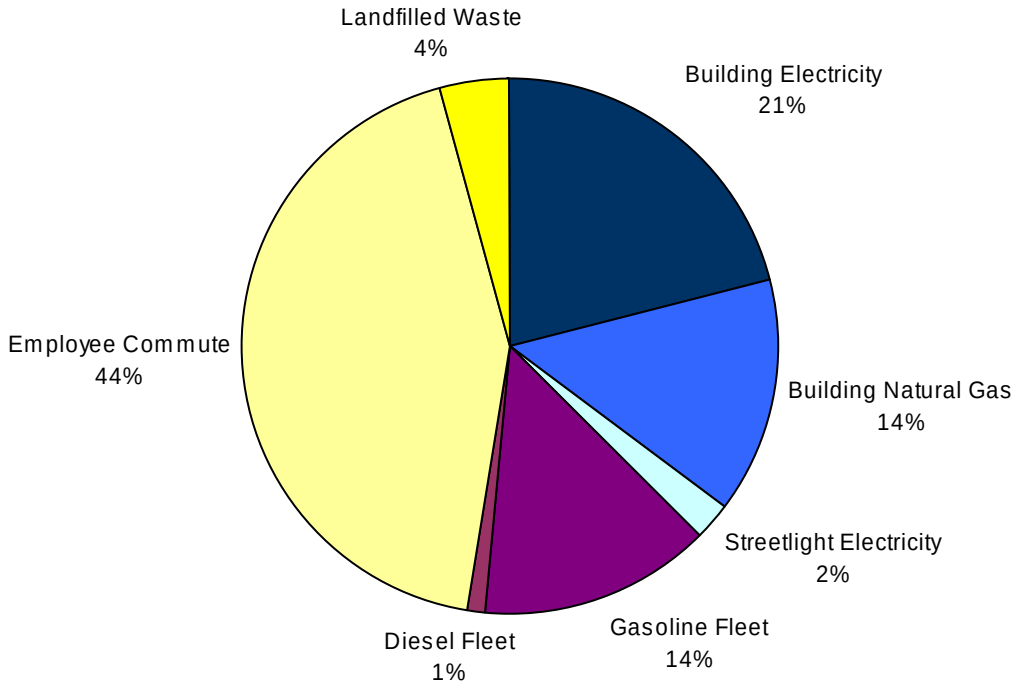

Figure 2.1 Municipal GHG emissions by source in 2006

Municipal GHG emissions in 2006 totaled 54,133 *metric tons of carbon dioxide equivalent* (MTCO2e). MTCO2e describes the amount of carbon dioxide that would have the same climate change impact as the actual variety of greenhouse gases. Employee commute was the largest source of municipal GHG emissions in 2006, followed by building electricity use, building natural gas consumption, fleet gasoline consumption, waste disposal, streetlight electricity use, and fleet diesel consumption. In addition to the sources represented in Figure 2.1, building propane and stationary diesel consumption, water and sewage electricity use, and fleet biodiesel and compressed natural gas (CNG) consumption represented less than one percent of total emissions. This inventory does not include GHG emissions generated by customers of County services, such as additional transportation emissions when customers visit County facilities.

To most effectively reduce its GHG emissions, the County could focus its efforts on its largest emissions sources. However, the County should aim to reduce emissions across all sources according to the following goals:

Employee commute – reduce vehicle miles traveled by County employees
County buildings – reduce energy consumption and utilize renewable energy
County fleet – utilize cleaner fuels and fuel efficient vehicles
Waste – reduce generation of waste and increase diversion
Streetlights – reduce electricity use with energy efficient technologies

3. GHG Reduction Targets

Contra Costa County has joined over 30 counties in adopting the long-term GHG reduction target set by the US Cool Counties Climate Stabilization Declaration (see Appendix A). This declaration calls on the County to work with local, state, and federal governments and other local leaders to develop a regional plan to reduce *countywide* GHG emissions to 80% below baseline levels by 2050. The first step in inspiring these countywide reductions is to set interim targets that would bring the County closer to meeting this target for its *municipal* operations.

AB32 requires a *statewide* greenhouse gas reduction to 1990 levels by 2020. According to the proposed AB32 Scoping Plan, this is understood to be equivalent to a reduction of 15% below current levels by 2020. While there are currently no requirements for local governments, the County should anticipate potential future regulation and analyze its ability to meet this target for its *municipal* operations, in order to set an example for the county and the state. Data in this report (which will be presented in Section 5) shows that the County has exceeded this target for its municipal operations through programs that have already been planned or implemented.

The California Air Resources Board (ARB), in its proposed AB32 Scoping Plan, recommends the establishment of reduction targets for years 2020, 2030, and 2050. As the County has exceeded AB32's 2020 target for its municipal operations, and the 2050 target is far in the future, the County should establish an interim target for year 2030. A reduction target of **50% below baseline levels by 2030** for County municipal operations would keep the County on track toward the long-term target of 80% by 2050.

4. Meeting the Targets

Contra Costa County can achieve these targets by evaluating its existing and planned GHG reduction measures as well as additional measures for implementation. As time progresses, the County may exhaust the most cost-effective measures, but opportunities will develop as technologies improve, mass transit systems expand, and growing demand for environmentally-friendly products lowers costs.

Contra Costa County has already implemented many measures that have reduced its municipal GHG emissions. This report will analyze the GHG reductions achieved by these measures as well as those that could be achieved with the implementation of additional measures. The GHG reductions from these measures are analyzed below, and the measures themselves will be explained in detail in Sections 5 and 6. In accordance with the GHG inventory, GHG reductions are also measured in MTCO2e, or metric tons of carbon dioxide equivalent.

For the purposes of this report, *existing measures* are those that were implemented prior to the 2006 inventory. *Planned measures* are those that will be implemented in the near future without further consideration. *Potential measures* are additional measures that are suggested in this report to further reduce GHG emissions.

4.1 Baseline, Projection, and Target Emissions Levels

The first step in reducing emissions toward the target levels is to determine the County's baseline emissions level, or the emissions level before anything had been done to reduce

emissions. This baseline is used to determine business-as-usual (BAU) forecast projections and target emissions levels for the target years.

In some cases, the initial GHG inventory will represent the baseline emissions level. However, the County inventoried its emissions for year 2006, at which time many measures had *already* been planned or implemented with resulting emissions reductions. Thus, the County's 2006 inventory is much lower than its actual baseline, and using the 2006 inventory as the baseline would penalize the County for acting early.

In order to give the County credit for its past efforts, a year 2000 backcast level will be used as the baseline, because most of the County's existing GHG reduction efforts were implemented after year 2000. This backcast is derived by quantifying emissions growth between years 2000 and 2006 and emissions reductions from measures implemented or planned prior to the 2006 inventory. Emissions growth 2000-2006 is subtracted from the 2006 inventory level, and avoided emissions due to existing and planned measures are added back to generate the baseline (see below).

2006 inventoried emissions level = 54,133 MTCO2e
Emissions growth 2000 to 2006 = 646 MTCO2e
Reduction achieved from existing and planned measures = 18,619 MTCO2e
2000 baseline emissions level = 72,106 MTCO2e

This baseline is used to calculate BAU projections and target emissions levels. BAU projections account for future growth and are based on an average annual employment growth since year 2000 of 0.2% per year. Target emissions levels represent the levels needed in the target years and are measured as a percent reduction from the baseline emissions level (see below).

2020 BAU projected emissions = 75,046 MTCO2e
2020 AB32 target emissions (15% reduction from baseline level) = 61,290 MTCO2e
Total reduction needed by 2020 = 13,756 MTCO2e

2030 BAU projected emissions = 76,560 MTCO2e
2030 proposed target emissions (50% reduction from baseline level) = 36,053 MTCO2e
Total reduction needed by 2030 = 40,507 MTCO2e

4.2 Target Analysis

The next step is to analyze the ability of reduction measures to meet these targets. These reduction measures will be explained in detail in Sections 5 and 6.

Reduction achieved from existing and planned measures = 18,619 MTCO2e = 26%

Additional reduction needed by 2020 = 0 (target achieved and exceeded)
Additional reduction needed by 2030 = 21,888 MTCO2e

Total possible reduction from potential measures = 26,919 MTCO2e = 37%
Total reduction from existing, planned, and potential measures = 45,538 MTCO2e = 63%

The potential reductions from the measures proposed in this report would allow the County to meet and surpass the proposed target of 50% by 2030 and would bring the County even closer to its long-term goal of 80% by 2050.

Figure 4.1 illustrates past and future paths for municipal emissions, including BAU projections based on average employment growth, existing and possible reductions from implementation of the existing, planned, and potential reduction measures, and the additional reductions needed to meet the 2020 target required statewide by AB32 and the proposed 2030 target.

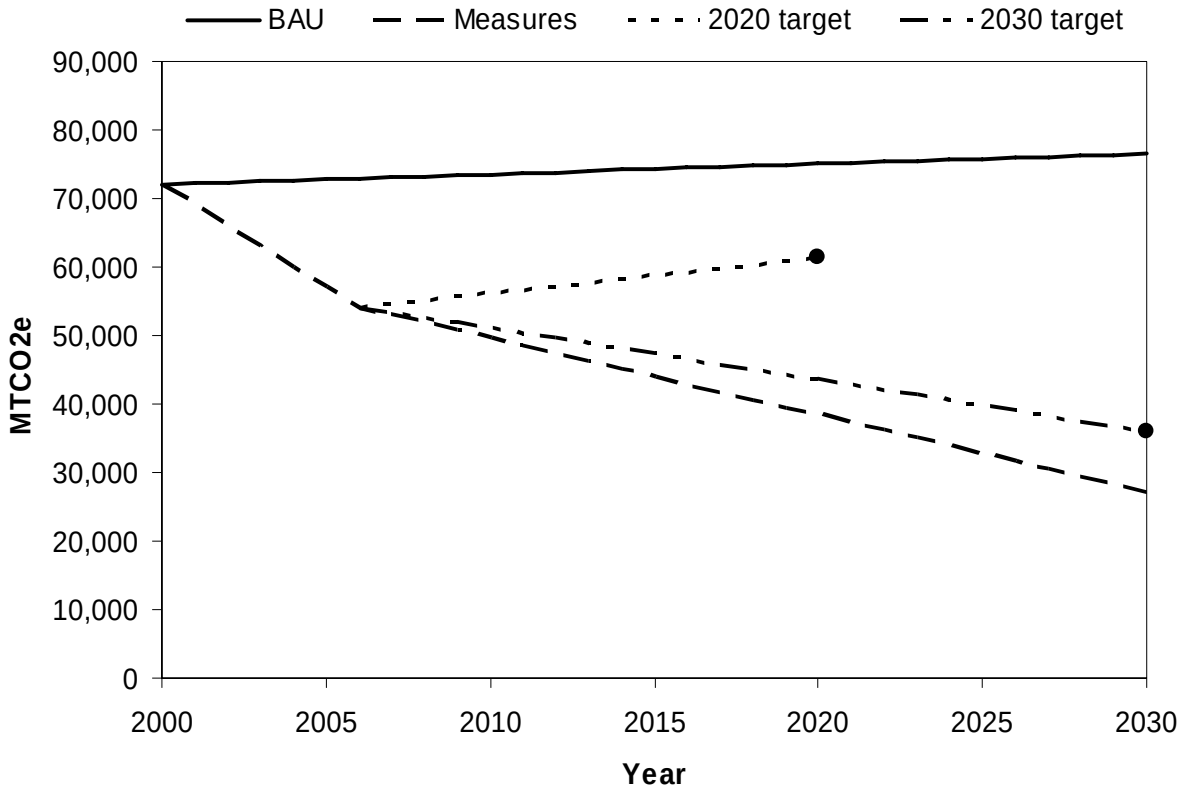

Figure 4.1 Municipal GHG emissions through 2030

Figure 4.1 illustrates that existing and planned measures have already exceeded the statewide target required by AB32, and that the potential measures identified in this report can exceed the proposed target of 50% by 2030 to achieve a total reduction of 63% below baseline levels. Further reductions to meet the long-term target of 80% by 2050 can be achieved with the identification of additional measures that will become more feasible with new technology and funding opportunities.

As the 2030 target is over 20 years away, the County can stay on track by striving for the following **milestones** along the path toward the 2030 target:

- 26% reduction already achieved with existing and planned measures
- 29% by 2010 – an additional reduction of about 3,000 MTCO2e
- 34% by 2015 – an additional reduction of about 3,800 MTCO2e
- 40% by 2020 – an additional reduction of about 3,800 MTCO2e
- 45% by 2025 – an additional reduction of about 3,800 MTCO2e
- 50% by 2030 – an additional reduction of about 3,800 MTCO2e

By following these milestones, the County can meet the proposed 2030 target with reductions of only 3,800 MTCO2e every 5 years.

5. Existing and Planned GHG Reduction Measures

Many of the following measures were originally identified in the November 2005 Climate Protection Report and were updated by the CCWG staff designees for this report. Appendix B lists existing and planned measures and their associated annual GHG reductions, where activity data (such as kilowatt hours of electricity reduced) was available or could be extrapolated. Appendix B also includes a detailed description of the calculations and assumptions used to extrapolate activity data. The annual GHG reductions associated with these reductions in activity data were modeled using ICLEI's Clean Air and Climate Protection (CACP) software.

This analysis has demonstrated that Contra Costa County's existing and planned municipal GHG reduction measures result in an annual reduction of 18,600 MTCO2e, about 26% below a business-as-usual scenario. Of this reduction, 23% has already been achieved through existing measures, while the remaining 3% will result from planned measures.

This means that the County has exceeded the statewide target required by AB32 (equivalent to a 15% reduction) for its municipal operations through existing and planned measures. While this is a significant accomplishment and puts the County well on its way to achieving the additional reduction targets, many of these existing and planned measures can be feasibly expanded to further reduce emissions, such as increasing employee participation in commute programs, purchasing additional clean fleet vehicles, or expanding energy efficiency efforts to additional buildings.

Analysis of existing measures also provides an opportunity to investigate the relative success of different reduction measures. *Of the total reduction, 60% results from measures that target employee commute, 25% from building energy use, 9% from environmentally preferable purchasing, 3% from vehicle fleet, and 3% from waste reduction and recycling.* Commute measures showed the single greatest impact, and the County has a great opportunity to expand its commute programs because actual employee participation is much lower than expressed willingness in the County's commute survey.

Additionally, the County found particular success in reducing its municipal emissions from the following measures (as described by County staff), listed in order of greatest reduction:

Employee carpool and vanpool programs (*9,668 MTCO2e or 52% of the total reduction from existing and planned measures*) – The County's support for employee carpools and vanpools was initiated in response to the energy crises of the 1970's and expanded to help reduce traffic congestion in the 1980's. The County currently offers a subsidy to County employees who participate in the Enterprise Rideshare Program. Employees who lease a vehicle from Enterprise Rideshare for carpooling or vanpooling are eligible for a 25-percent subsidy of the monthly lease payments, up to a maximum of $75 per employee. This subsidy is funded by proceeds from the sale of the County's vanpool fleet which occurred in 2005. The County also provides preferential parking for employees that carpool to the downtown Martinez offices. Participating employees must apply for a parking permit from the Community Development Division to be eligible to use 30 parking stalls in the lot located on Pine Street between Marina Vista and Escobar Street in Martinez.

Direct digital control for HVAC systems in 33 buildings (*1,620 MTCO2e or 9%*) – Direct digital control (DDC) on HVAC systems provides precise control over heating and cooling

systems, which optimizes operation and reduces simultaneous heating and cooling while maintaining comfort. Initially, DDC was targeted in the largest County buildings. DDC is now a County building standard and is installed in all new, remodeled, or improved buildings.

Flexible employee work schedules (*1,412 MTCO2e or 8%*) – In 1991, the Board of Supervisors authorized all County Departments to implement flexible work schedules, including compressed work weeks, flextime, and staggered work schedules. It is up to each Department to determine how to implement these schedules, as long as public service is not compromised. GHG emissions are reduced when employees work more hours per day but fewer days per week, thereby eliminating commute trips.

Purchase of energy efficient computers (*1,252 MTCO2e or 7%*) – The selection of Dell computers was achieved through an evaluation process in 2008. Cost reduction was the main motivating factor, as energy efficiency promotes cost savings to the General Services Department. The County preferred a manufacturer that sold Energy Star compliant products, as these standards are overseen by the Environmental Protection Agency.

Cogeneration plants for 4 buildings that operate 24 hours per day (*735 MTCO2e or 4%*) – Cogeneration is on-site power generation that also utilizes waste heat to reduce energy required for heating and hot water systems. These systems are most economical in facilities that operate 24 hours per day and have year-round heat and hot water needs for laundry, kitchen, and bathing. These systems were installed using a combination of funding sources, including low-interest loans from the California Energy Commission, lease purchases, and County Energy Settlement funds from a 2000-2001 statewide lawsuit against energy companies.

Contra Costa County has also met with a third party that will implement the installation of cogeneration units at the Regional Medical Center and Juvenile Hall. There will be no upfront funding by the County for these projects, and the third party will handle permitting, contracting, procurement, and construction management for the projects. The annual utility savings will exceed the annual debt service payments resulting in a net annual savings.

LED traffic signals (*558 MTCO2e or 3%*) – LED traffic lights are 85-percent more efficient than those with incandescent lamps. Ten and 25-watt LEDs replace 69 and 150-watt incandescent lamps and last five times longer, thereby reducing replacement costs as well as maintenance labor. This project was implemented as a maintenance project funded through the maintenance program.

Paper recycling program (*520 MTCO2e or 3%*) – The County's paper recycling program was initiated in 1981 in the County's Administration Building and currently operates in about 200 County facilities. The program was developed in an effort to reduce waste sent to the County's landfills, thereby reducing the County's impact on natural resources and also generating revenue. The County's Department of Conservation and Development was tasked with publicizing and support of the program, while the General Services Department is responsible for collection of office recycling containers and consolidation in the main container for pick-up by private hauler. The early program was designed for white paper only, but the current program accepts a wider range of paper types and sorts by grade to maximize return.

Purchase of energy efficient copiers (*491 MTCO2e or 3%*) – The process leading to the selection of the copiers was similar to that of the computers, but the copier decision was made earlier.

HVAC re-commissioning in 15 buildings (*479 MTCO2e or 3%*) – Re-commissioning tests system operation and calibrates control sensors to ensure that the systems are operating as efficiently as possible. This measure was part of an overall state-funded program which offers "Public Goods" funds (generated by a small fee on utility bills) to implement re-commission projects to reduce energy use, so there was no cost to the County.

Installation of thermally resistant window films on select buildings *(300 MTCO2e or 2%)* – Thermally resistant window films reduce heat gain and balance HVAC, thereby reducing energy use and increasing comfort for occupants. This program is more effective for existing buildings that do not have other built-in mechanisms for efficiency. Film specifications have been accepted and will be funded through maintenance at the request of building occupants.

Lighting improvement projects in 21 buildings (*298 MTCO2e or 2%*) – The County commissioned a lighting consultant to develop lighting improvement strategies that apply to over 95-percent of County-owned lighting systems. Improvements were initially done at the 21 largest County buildings, implementing the latest in fluorescent lighting technologies. Projects were funded with internal funds, rebates, incentives, and various financing vehicles.

Change to B20 biodiesel fuel for diesel fleet (*247 MTCO2e or 1%*) – The County implemented the change to B20 biodiesel in September 2006. The change was motivated by a desire to pursue clean air and environmentally responsible fleet operations. The use of B20 displaces petroleum fuel consumption by 20-percent versus standard diesel. In 2007/2008, the General Services Department dispensed approximately 80,000 gallons of B20 biodiesel, displacing consumption of 16,000 gallons of diesel fuel. The change to B20 biodiesel was accomplished by drawing down the existing diesel in the underground storage tank, washing and evacuating any remaining residue, and refilling the tank with B20 biodiesel. All filters were changed at this time, and filter changes for fuel dispensing equipment and diesel vehicles were changed twice as frequently for six months to eliminate any possible fuel delivery issues.

Purchase of 86 hybrid vehicles for fleet (*206 MTCO2e or 1%*) – The purchase of the 86 hybrid vehicles currently in use with the County fleet has taken place over the past eight years and was intended to reduce County vehicle emissions and fuel expenditures. Vehicle use applications that are compatible with the capabilities of hybrid vehicles were identified, and hybrids were assigned as appropriate. The hybrid vehicles were purchased incrementally as equipment was replaced and also as additional vehicle requests where new vehicles were added to the fleet. With fuel prices at record highs, fuel savings now rapidly offset the additional procurement costs very early in the equipment lifecycle. The hybrid vehicles in use (Toyota Prius, Honda Civic, and Ford Escape) were selected based upon superior fuel economy and minimal tailpipe emissions. The selected hybrids were then placed on County procurement contracts following development of specifications and passage through the County's bid process. As of Summer 2008, the County has operated hybrid vehicles over 3,700,000 miles while saving an estimated 95,000 gallons of fuel.

Currently, the County's Fleet Department strives to purchase clean vehicles in all possible vehicle replacements. The County's fleet was recently recognized as the #5 Best Green Government Fleet in North America by the 100 Best Fleets organization.

The measures listed above represent 98% of the total reduction achieved from existing and planned measures. The additional measures that represent the remaining 2% of the total reduction are listed in Appendix B, which includes a full list of measures.

6. Potential GHG Reduction Measures

To further reduce emissions toward the recommended reduction targets, the County can expand upon existing measures and identify additional measures for implementation.

Many of the potential measures included below were initially identified in the November 2005 Climate Protection Report and were originally selected by looking to climate action plans from other local governments and selecting measures that fit Contra Costa County conditions. The subset of these measures that is highlighted in this report represent those measures that were identified by County staff to be the most operationally feasible and expected to have the greatest GHG reductions based on information available. Additional measures were identified based on further examination of climate action plans from other local governments.

GHG reductions were modeled using the CACP software, and anticipated implementation costs and processes were provided by County staff and consultants. GHG reductions and costs were derived when direct data was not available. See Appendix B for a detailed description of the calculations and assumptions used to derive GHG reductions and costs, including general metrics that can be used by other local governments.

It should be noted that this analysis does not consider qualitative criteria, such as educational value or ability to generate awareness. Additionally, this report does not analyze lifecycle emissions in the evaluation of measures—as this would be inconsistent with the inventory and CACP software—but lifecycle analysis may be an important factor in prioritization for implementation.

The following symbols are used to compare the GHG reduction potentials of the measures:

 - Potential reduction less than or equal to 100 MTCO2e

 - Potential reduction between 101 and 500 MTCO2e

 - Potential reduction between 501 and 1,000 MTCO2e

 - Potential reduction between 1,001 and 5,000 MTCO2e

 - Potential reduction greater than 5,000 MTCO2e

Table 6.1 presents evaluation criteria for the potential measures, including GHG reduction potential, implementation cost, and payback period in years.

Table 6.1 Evaluation criteria for potential measures

	Measure # and name	MTCO2e reduction	Rating	Imp. Cost	Payback (years)	Add'l. $ needed
Energy	1 HVAC re-commissioning	1,475		$500,000	1	
	2 Lighting improvement	207		$300,000	5	X
	3 Energy awareness	951		Low	-	
	4 LED streetlights	704		Unknown	-	X
	5 Solar PPA	212		None	-	
	6 Window films	410		$800,000	3-5	
Fleet	7 Hybrid fleet	240		$300,000	4-5, resale	
	8 CNG fleet	64		$400,000	3-12, resale	
	9 E85 tank	490+		$100,000	-	X
Commute	10 Parking fee	9,553		Revenue	-	X
	11 Pre-tax transit	6,687		$50,000	-	X
	12 Compressed weeks	1,203		Low	-	
	13 Telecommuting	4,619		Low	-	
Waste	14 Duplex printing	87		None	-	
	15 Compost	17		$35,000	2 years	X

The total GHG reduction potential of these measures is about 27,000 MTCO2e or 37% of baseline levels. The total cost to the County for implementing these measures would be about $3 million, not accounting for the revenue that could be generated by implementing a user fee for parking.

The last column indicates whether the measures would definitely require funding beyond existing departmental and maintenance budgets. The measures that are marked in this column should *not* be expected to be funded within existing budgets, and additional funding will be required. However, funding opportunities are available for most measures and are described in the following sections.

The following sections provide elaboration of the information in Table 6.1.