Assumptions and Calculations (MCAP Appendix B)

In the following lists, existing and planned measures are indicated by letter and potential measures by number. Existing measures are also indicated by their number from the County's November 2005 Climate Protection Report (or by a dash if they were assigned no number) in parentheses. Measures that are *not* followed by a description of methods were not included in calculations, but are still listed in order to present a full list of measures that may reduce GHG emissions.

While activity data could be obtained directly for some existing measures, many existing measures and all proposed measures required assumptions and calculations to extrapolate their associated reductions in activity data.

The detailed descriptions below are meant to aid other local governments in calculating the associated costs and GHG reductions for their own municipal GHG reduction measures. Whenever possible, an annual reduction metric is provided (and marked by an asterisk), in the form of a per-unit average that can be applied to the individual data of other local governments.

Energy Efficiency, Renewable Energy, and Green Building

Existing Measures

A. (6a) Performed seven facility-level and two county-wide energy assessments.

B. (3a) Installed direct digital control systems for HVAC systems in 33 major County facilities and new County buildings & remodels.

Based on electricity and natural gas reductions from DDC systems in County data, the average annual reduction is about 1.21 kWh per square foot and 0.116 therms per square foot.

** 1.21 kWh per square foot of building*
** 0.116 therms per square foot of building*

The sum of the total or partial square footage of all 33 buildings with DDC systems, depending on the extent of the system, is about 1,799,069 square feet. Based on the above metrics, this yields an annual reduction of 2,167,724 kWh and 208,143 therms.

Total annual reduction of 1,620 MTCO2e

C. (3b) Improved, retrofitted and replaced HVAC systems in 15 selected County buildings.

County data shows an annual reduction of 1,017,568 kWh and 45,004 therms.

** See Measure 1 for metrics*

Total annual reduction of 479 MTCO2e

D. (-) Implemented heat recovery projects for the Regional Medical Center and the Pittsburg Health Center.

County data shows that heat recovery projects at the Regional Medical Center, which has a total GSF of 228,000, resulted in an annual reduction of 44,351 kWh and 2,592 therms.

** 0.195 kWh per square foot of building*
** 0.011 therms per square foot of building*

The Pittsburg Health Center has a total GSF of 130,900. Using the above metrics, this yields a total annual reduction of 69,814 KWh and 4,080 therms for the two buildings.

Total annual reduction of 38 MTCO2e

E. (4a) Installed state-of-the-art lighting technology and systems in 7 selected County facilities.

County data shows an annual reduction of 1,271,421 kWh.

** See Measure R for metrics*

Total annual reduction of 298 MTCO2e

F. (13a) Participate in energy demand response programs for 20 selected County facilities.

This program covers 20 buildings and has the capability of reducing 1000 kW. The County's Energy Manager estimates that it actually reduces about 400 kW in each of 12 six-hour-long events each year. This yields an annual reduction of 28,800 kWh.

** 28.8 kWh per kW reduction capacity*

Total annual reduction of 7 MTCO2e

G. (5a) Installed variable frequency motor drive technology in 9 County (most possible) buildings.

County data shows an annual reduction of 245,421 kWh.

** 27,269 kWh per building*

Total annual reduction of 57 MTCO2e

H. (5b) Installed vending misers on 60 vending machines.

County data shows an annual reduction of 87,600 kWh.

** 1,460 kWh per vending machine*

Total annual reduction of 20 MTCO2e

I. (-) Install LEDs in about 50-percent of building exit signs.

County data shows an annual reduction of 404,615 kWh. Also, LEDs use 85-percent less energy than conventional alternatives (Kho 2008).

** 85-percent of sign electricity use*

Total annual reduction of 95 MTCO2e

J. (17/18) Use LEDs in traffic and pedestrian signals.

LEDs have been installed in almost all traffic signals and in 70-percent of pedestrian signals, with the remaining pedestrian signals being replaced with LEDs as they fail. In 2006, after most LED installation, the annual electricity use for signal accounts was about 421,028 kWh. LEDs use 85-percent less energy than conventional alternatives (Kho 2008). This yields an annual reduction of 2,385,825 kWh of electricity use (see calculations below).

** 85-percent of signal electricity use*

Current kWh represents the current electricity use for LED signals
Baseline kWh represents the electricity use for the same signals before LED replacement
An 85% reduction means that current kWh = 15% of baseline kWh
421,028 kWh = 0.15X where X is baseline kWh
X = 421,028/0.15 = 2,806,853 kWh
Annual reduction = baseline kWh – current kWh
Annual reduction = 2,806,853 – 421,028 = 2,385,825 kWh

Total annual reduction of 558 MTCO2e

K. (7a) Designed and installed cogeneration plants for the Martinez Detention Facility and the West County Detention Facility.

County data shows an annual reduction of 1,788,000 kWh.

** See Measure U for metrics*

Total annual reduction of 418 MTCO2e

L. (8a) Installed solar panels on the rooftops of the Martinez Detention Facility and 50 Douglas.

County data shows an annual reduction of 346,928 kWh.

** See Measure 5 for metrics*

Total annual reduction of 81 MTCO2e

M. (2a) Design energy usage in 3 new County buildings to be at least 10% below California's Title 24 requirements.

N. (10a) Use cool roofing systems for selected County buildings.

On average, cool roofing systems reduce building air conditioning electricity use by 10 to 30-percent, or total building electricity use by three to 10-percent (Stern 2006). The total electricity usage of the affected buildings (based on a building list from the County's General Services Department) in 2006 was 2,075,112 kWh. Assuming a seven percent reduction in building electricity use, this yields an annual reduction of 156,191 kWh of electricity use (see calculations below).

** Seven percent of total building electricity use*

Current kWh represents the current electricity use for the affected buildings with cool roofs
Baseline kWh represents the electricity use for the same buildings before cool roofing
A 7% reduction means that current kWh = 93% of baseline kWh
2,075,112 kWh = 0.93X where X is baseline kWh
X = 2,075,112/0.93 = 2,231,303 kWh
Annual reduction = baseline kWh – current kWh
Annual reduction = 2,231,303 – 2,075,112 = 156,191 kWh

Total annual reduction of 37 MTCO2e

O. (10b) Standard for cool roofing systems in new County buildings and remodels.

P. (12a) Install thermally resistant window films on selected County facilities.

Thermally resistant window films reduce total building energy use by 10 to15-percent (Piper 2004).

** 12-percent of total building energy use*

The total energy usage of the affected buildings (based on a building list from the County's General Services Department) in 2006 was 4,925,419 kWh and 196,213 therms. Assuming a 12-percent reduction in energy use, this yields an annual reduction of 671,648 kWh and 26,756 therms of energy use (see calculations below).

Current kWh represents the current electricity use for the affected buildings with window films
Baseline kWh represents the electricity use for the same buildings before window films
A 12% reduction means that current kWh = 88% of baseline kWh
4,925,419 kWh = 0.88X where X is baseline kWh
X = 4,925,419/0.88 = 5,597,067 kWh
Annual reduction = baseline kWh – current kWh
Annual reduction = 5,597,067 – 4,925,419 = 671,648 kWh

Current therms represents the current natural gas use for the affected buildings
Baseline therms represents the natural gas use for the same buildings before window films
A 12% reduction means that current therms = 88% of baseline therms
196,213 therms = 0.88X where X is baseline therms
X = 196,213/0.88 = 222,969 therms
Annual reduction = baseline therms – current therms
Annual reduction = 222,969 – 196,213 = 26,756 therms

Total annual reduction of 300 MTCO2e

Q. (25) Use water conserving landscaping and irrigation systems.

Planned Measures

R. Expanding lighting improvement program to 14 additional County facilities.

In Measure E, seven buildings with a total GSF of 1,076,616 experienced a total annual reduction of 1,271,421 kWh.

** 1.18 kWh per square foot of building*

This measure expands this program to another 14 buildings with a total GSF of 633,425.

Total annual reduction of 175 MTCO2e

S. Will install LEDs in the remaining 50% of building exit signs.

This is the same as the associated existing measure, resulting in an annual reduction of 404,615 kWh.

** See Measure I for metrics*

Total annual reduction of 95 MTCO2e

T. Conducting pilot studies on LED streetlight technology.

U. Designing and installing cogeneration plants for the Regional Medical Center and the Juvenile Hall, which operate 24-hours per day.

In Measure K, two buildings with a total GSF of 421,642 experienced a total annual reduction of 1,788,000 kWh.

** 4.24 kWh per square foot of building*

This measure expands this program to two additional facilities with a total GSF of 319,412. This metric yields an annual reduction of 1,354,487 kWh.

Total annual reduction of 317 MTCO2e.

Potential Measures

1. Expand HVAC improvement and retrofit program to 50 additional County buildings.

In Measure C, 15 buildings with a total GSF of 811,625 experienced an annual energy use reduction of 1,017,568 kWh and 45,004 therms.

** 1.25 kWh per square foot of building*
** 0.055 therms per square foot of building*

This measure would expand this program to 50 additional buildings, each with an assumed GSF of about 50,000 (based on the GSF of the buildings already included in the program), for a total of 2,500,000 GSF.

Potential annual reduction of 1,475 MTCO2e

Implementation cost: $0.185/SF x 50,000 SF/building x 50 buildings = $462,500

2. Expand lighting improvement program to 30 additional County buildings.

In Measure E, seven buildings with a total GSF of 1,076,616 experienced a total annual reduction of 1,271,421 kWh.

** 1.18 kWh per square foot of building*

This measure would expand this program to another 30 buildings with the average County building GSF of 25,000, yielding an annual reduction of 885,706 kWh.

Total annual reduction of 207 MTCO2e

Implementation cost: $0.40/SF x 25,000 SF/building X 30 buildings = $300,000

3. Create an employee energy awareness program to promote energy conservation and efficient use of County facilities.

Assume that this program could reduce building energy use by five percent.

** Five percent of total building energy use*
** Five percent of GHG emissions from building energy use*

Potential annual reduction of 951 MTCO2e

4. Install LEDs in all county-owned streetlights (if pilot studies are successful).

LEDs use 85-percent less energy than conventional alternatives (Kho 2008).

** 85-percent of lighting electricity use*
** 85-percent of GHG emissions from streetlight energy use*

Potential annual reduction of 704 MTCO2e

5. Install additional solar systems at the West County Detention Facility, the Buchanan Airport Field, the Pleasant Hill Library, and the Elections Office.

In Measure L, two buildings with a total installed capacity of 300 kW reduced annual electricity use by 346,928 kWh.

** 1,156 kWh per kW of installed capacity*

According to the County's Energy Manager, the appropriate installed capacity of these potential systems would be 300 kW for the West County Detention Facility and the Buchanan Airport

Field, 100 kW for the Pleasant Hill Library, and 85 kW for the Elections Office, for a total of 785 kW. This yields a potential annual reduction of 907,795 kWh.

Potential annual reduction of 212 MTCO2e

6. Install thermally resistant window films on 30 additional existing County facilities.

Thermally resistant window films reduce total building energy use by 10 to15-percent (Piper 2004).

** 12-percent of total building energy use.*

The average building energy use of County buildings is 288,068 kWh and 8690 therms. Reducing the energy use of 30 average buildings by 12-percent would yield an annual reduction of 1,037,043 kWh and 31,284 therms.

Potential annual reduction of 410 MTCO2e

Implementation cost: $7.25/SF x 6,250 SF/building x 0.6 x 30 buildings = $815,625 (see below)

According to the County's Energy Manager, installation of window film costs about $7-10/SF of window area with rebates of $1.25/SF, yielding a final price of about $7.25/SF of window area. Window film is usually only applied on sun-facing sides of building for about 60-percent of building window area. According to the County's Energy Manager, window area is usually about 15 to 30-percent of floor area (assume 25-percent), so an average County building with a floor area of 25,000 GSF would have about 6,250 SF of window area. This measure would affect 60-percent of this area on 30 buildings for a total of 112,500 SF of window area.

Environmentally Preferable Purchasing

As the GHG inventory does not include a lifecycle analysis of GHG emissions from procurement activities, it would be inconsistent to credit emissions reductions from the purchase of products with recycled-content materials or otherwise environmentally-friendly manufacturing processes. However, it should be noted that environmentally preferable purchasing holds great potential to reduce emissions from the manufacturing process. Emissions reductions from the purchase of products with the potential to reduce energy use are credited because energy use is included in the GHG inventory.

Existing Measures

V. (41) Include pricing for environmental specifications in the process of requiring bids for building materials.

W. (42a) Require contractors/vendors to provide recycled-content/recyclable products.

X. (38) Standard for Allsteel 50% recycled-content, 99% recyclable office furniture.

Y. (40) Purchased 100,000 square yards of 50% recycled-content, 100% recyclable carpeting for County buildings.

Z. (37c) More than 100 items on the county office supply contract have been replaced with recycled-content equivalents.

AB. (37b) Purchased recycled-content office paper (35% of paper).

AC. (37a) Purchased recycled-content toner cartridges (45% of cartridges).

AD. (36a) Require that all County business cards produced by General Services be printed on recycled-content paper.

AE. (-) Adopted an Environmentally Preferable Purchasing Policy.

Planned Measures

AF. Purchasing high efficiency motors, appliances, and equipment as they fail.

AG. All county copier contracts require the placement of Energy Star copiers.

According to County buyers, there are about 1500 copiers used in County buildings. The average large copier uses about 2800 kWh per year, assuming 10 hours of operation per day. According to the Energy Star website, Energy Star copiers use about 50-percent less electricity than standard models due to imaging efficiency and shut-off mode.

** 50-percent of copier electricity use*

This yields an annual reduction of 1500 * 2800 * 0.5 = 2,100,000 kWh.

Total annual reduction of 491 MTCO2e

AH. Standard for EPEAT certified Dell desktop computers.

According to the County's Purchasing Manager, there are about 7000 computers used in County buildings. Using the EPEAT Electronics Environmental Benefits Calculator, replacement of these computers with EPEAT alternatives reduces energy use by 5,350,000 kWh.

** Calculator available at http://www.epeat.net/FastBenefits.aspx*

Total annual reduction of 1,252 MTCO2e

Vehicle Fleet

Existing Measures

AI. (34) Minimize purchase of sport utility vehicles.

AJ. (35) Capture evacuated mobile air conditioning emissions.

The emissions factors used for vehicle transportation in ICLEI's tool do not include emissions from mobile air conditioning, so emissions from mobile air conditioning are not included in the GHG inventory. Thus, it would be inconsistent to include reductions from measures aimed to reduce mobile air conditioning emissions.

AK. (-) All 168 diesel fleet vehicles changed to B20 biodiesel fuel in September 2006.

Assume all 2006 diesel and B20 biodiesel consumption (98,233 gallons) changes from diesel to B20 biodiesel.

Total annual reduction of 247 MTCO2e

** 1.47 MTCO2e per diesel vehicle*

AL. (29) Purchased 12 electric vehicles

Dividing the total annual fleet gasoline consumption by the number of gasoline vehicles (991) yields an average of about 831.5 gallons per vehicle. Multiplying this by the 12 vehicles in this measure yields a total of 9,978 gallons of fuel switched from gasoline to electric. According to ICLEI, the energy equivalent of a gallon of gasoline is 35 kWh, so this is equivalent to 349,230 kWh of electricity.

** 832 gallons of gasoline reduced per electric vehicle*
** 35 kWh of electricity per gallon of gasoline*
** 29,103 kWh of electricity added per electric vehicle*

Total annual reduction of 9 MTCO2e

AM. (30a) Purchased 86 hybrid (gasoline and electric) fleet vehicles.

The County's Fleet Manager estimates that 22,722 gallons of gasoline fuel are avoided per year due to hybrid use, based on the exact hybrid models and the vehicles that they replaced.

** See Measure 7 for metrics*

Total annual reduction of 206 MTCO2e

AN. (32a) Install a "fast fill" CNG fueling facility.

AO. (31a) Purchased 39 compressed natural gas (CNG) vehicles.

A total of 17,561 gallons of fuel switched from diesel to CNG.

** See Measure 8 for metrics*

Total annual reduction of 50 MTCO2e

Planned Measures

AP. Purchased 29 FlexFuel vehicles, and 13-14 patrol cars will be replaced with FlexFuel equivalents each year.

Potential Measures

7. Purchase 100 more hybrid vehicles for the fleet.

In Measure AM, the purchase of 86 hybrid vehicles led to an annual reduction of 206 MTCO2e (based on an estimate by the County Fleet Manager of 22,722 gallons of gasoline fuel avoided).

** 2.40 MTCO2e per hybrid vehicle*

Potential annual reduction of 240 MTCO2e

Additional implementation cost: (90 sedans x $3,000/sedan) + (10 SUVs x $6,000/SUV) = $330,000

Assume a mixture of 90 hybrid sedans and 10 hybrid SUVs. Each hybrid sedan adds about $3,000 over the cost of a standard non-hybrid vehicle. Since the vehicles are being procured to replace older retired vehicles, the additional cost to add hybrids to the fleet may be estimated at $3,000 per vehicle. Each hybrid SUV adds about $6,000 over the cost of a comparable non-hybrid SUV.

8. Purchase 50 more CNG vehicles for the fleet.

In Measure AO, the purchase of 39 CNG vehicles led to an annual reduction of 50 MTCO2e. This yields an average annual reduction of 1.28 MTCO2e per CNG vehicle.

** 1.28 MTCO2e per CNG vehicle*

Potential annual reduction of 64 MTCO2e

Additional implementation cost: (30 sedans x $3,000/sedan) + (20 vans x $17,500/van) = $440,000

Assume a mixture of 30 dedicated CNG sedans and 20 dedicated CNG vans. CNG sedans add about $3,000 over a non-hybrid sedan. CNG vans add $17,500 over the purchase of a standard gasoline van.

9. Install an above-ground 5,000-gallon E85 ethanol fuel tank for the County's 70 FlexFuel vehicles as well as other users (CHP and CALTRANS).

Based on County fuel consumption and vehicle inventory data from baseline year 2006, the average County gasoline fleet vehicle consumes 832 gallons of gasoline each year. For each FlexFuel vehicle, this gasoline would be replaced with the 832 GGEs of E85 ethanol fuel.

** 7 MTCO2e per E85-fueled FlexFuel vehicle*

It is estimated that the County will have close to 70 E85 capable Flex Fuel Vehicles in service by the end of 2008.

Potential annual reduction of 490 MTCO2e (and growing with additional Flex Fuel vehicles)

Employee Commute

Analysis for the following measures is based on results from the 2003 Contra Costa County Employee Commute Survey, which was conducted by the Transportation Planning Section in conjunction with 511 Contra Costa. An additional survey was conducted in 2007, and the preliminary results available at the time of this report illustrated very similar results to the 2003 survey. Thus, the 2003 values are considered to be stable and accurate for current conditions. The potential reductions from many of these measures are based on assumptions which may differ from actual conditions and presume that all other variables remain the same.

Existing Measures

AQ. (51a) Offer financial incentives to County employees for using transit or forming a new carpool.

According to Table 1 of the 2003 Employee Commute Survey, 9% of employees carpool and 2% of employees take public transit to work. Assume that this will reduce the VMT of the participating employees by 75% (with an average carpool/transit size of 4 individuals as verified by Transportation Planning). Assume that all personal commuting uses gasoline fuel. In 2006, employee commute was responsible for a total of 47,818,925 VMT. This yields an annual reduction of 15,780,245 VMT (see calculations below).

This affects 11% of total employee VMT
Current affected VMT = 0.11*47,818,925 = 5,260,082 VMT
Current affected VMT represents the VMT for employees who use carpool or transit
Baseline affected VMT represents the VMT for the same employees before carpool or transit
A 75% reduction means that current affected VMT = 25% of baseline affected VMT
5,260,082 VMT = 0.25X where X is baseline affected VMT
X = 5,260,082/0.25 = 21,040,327 VMT
Annual reduction = baseline affected VMT – current affected VMT
Annual reduction = 21,040,327 – 5,260,082 = 15,780,245 VMT

* *See Measure 11 for metrics*

Total annual reduction of 7,764 MTCO2e

Note: The County also provides 30 free preferred parking stalls for County employees' vehicles used for carpooling (55a), which could also encourage the commute patterns described in the survey above.

AR. (50a) Provide financial incentives to County employees participating in a vanpool (25% off monthly costs).

According to Table 1 of the 2003 Employee Commute Survey, 1% of employees vanpool to work. Assume that this will reduce the VMT of the participating employees by 89% (with an average vanpool size of 9 individuals as verified by Transportation Planning). In 2006, employee commute was responsible for a total of 47,818,925 VMT. This yields an annual reduction of 3,868,986 VMT (see calculations below).

This affects 1% of total employee VMT

Current affected VMT = 0.01*47,818,925 = 478,189 VMT
Current affected VMT represents the VMT for employees who vanpool
Baseline affected VMT represents the VMT for the same employees before vanpool
An 89% reduction means that current affected VMT = 11% of baseline affected VMT
478,189 VMT = 0.11X where X is baseline affected VMT
X = 478,189/0.11 = 4,347,175 VMT
Annual reduction = baseline affected VMT – current affected VMT
Annual reduction = 4,347,175 – 478,189 = 3,868,986 VMT

Total annual reduction of 1,904 MTCO2e

** 1,904 MTCO2e per % of employees*
** 22.6 MTCO2e per employee*

AS. (56a) Provide bicycle lockers and/or racks at work sites to encourage County employees to bike to work.

According to Table 1 of the 2003 Employee Commute Survey, 0.5% of employees bike to work. Assume that this will reduce the VMT of the participating employees by 100%. In 2006, employee commute was responsible for a total of 47,818,925 VMT. This yields an annual reduction of 239,095 VMT (see calculations below).

Annual reduction = 0.005*47,818,925 VMT = 239,095 VMT

Total annual reduction of 118 MTCO2e

** 236 MTCO2e per % of employees*
** 2.80 MTCO2e per employee*

Note: The County also provides shower facilities at certain work sites to encourage County employees to bike, walk or run to work (57a), which could also encourage the commute patterns described in the survey above.

AT. (52a) Allow County employees to work using flex schedules and compressed work weeks.

According to Table 12 of the 2003 Employee Commute Survey, 54% of employees work flex schedules, most with 9-80 schedules. Assume that this will reduce the VMT of the participating employees by 10% (one day out of every ten work days). In 2006, employee commute was responsible for a total of 47,818,925 VMT. This yields an annual reduction of 2,869,136 VMT (see calculations below).

This affects 54% of total employee VMT
Current affected VMT = 0.54*47,818,925 = 25,822,220 VMT
Current affected VMT represents the VMT for employees who use flex schedules
Baseline affected VMT represents the VMT for the same employees before flex schedules
A 10% reduction means that current affected VMT = 90% of baseline affected VMT
25,822,220 VMT = 0.9X where X is baseline affected VMT
X = 25,822,220/0.9 = 28,691,355 VMT
Annual reduction = baseline affected VMT – current affected VMT
Annual reduction = 28,691,355 – 25,822,220 = 2,869,136 VMT

** See Measure 12 for metrics*

Total annual reduction of 1,412 MTCO2e

AU. (49a) Implement Telecommuting Program for employees to reduce vehicle trips.

According to Table 1 of the 2003 Employee Commute Survey, 0.2% of employees telecommute. Assume that this will reduce the VMT of the participating employees by 40% (two days out of every week or five work days). In 2006, employee commute was responsible for a total of 47,818,925 VMT. This yields an annual reduction of 63,759 VMT (see calculations below).

This affects 0.2% of total employee VMT
Current affected VMT = 0.002*47,818,925 = 95,638 VMT
Current affected VMT represents the VMT for employees who telecommute
Baseline affected VMT represents the VMT for the same employees before telecommuting
A 40% reduction means that current affected VMT = 60% of baseline affected VMT
95,638 VMT = 0.6X where X is baseline affected VMT
X = 95,638/0.6 = 159,396 VMT
Annual reduction = baseline affected VMT – current affected VMT
Annual reduction = 159,396 – 95,638 = 63,759 VMT

** See Measure 13 for metrics*

Total annual reduction of 31 MTCO2e

Potential Measures

Note that over sixty percent of County employees commute more than 10 miles to work, and thirty percent commute over 20 miles. This should be taken into consideration before the metrics for measures 10 - 13 are used by other local governments.

10. Institute a user fee for parking spaces owned or leased by the County and allocate the surplus revenue to incentives for use of commute alternatives.

Researchers who have analyzed case studies in the United States and Canada suggest that at least 20-percent of commuters who now drive alone would choose to carpool or use public transit if employers required them to pay market rates for parking they now receive free. Thus, assume that this measure would increase use of mass transit and carpooling by 20% of employees. In existing measure 51a, participation by 11% of employees led to an annual reduction of 5,254 MTCO2e.

** 478 MTCO2e per % of employees*
** 5.67 MTCO2e per employee*

An increase in use by 20% of employees would yield a potential annual reduction of 9,553 MTCO2e

Implementation Cost: $786,375

56 pay stations at $9,000 (including installation): $504,000

Painting numbers on parking stalls	50,000
100 Parking Signs @ $250 each	25,000
3 Handheld enforcement devices (two included)	3,500
Total Materials:	582,500
Program Design/Engineering @ 10%	58,250
Contingency @ 25%	145,625
Total Implementation Cost:	$786,375

Annual Operating Cost: $324,300

Software maintenance charge	$4,440
Wireless communication charge	36,960
Warranty	32,900
Maintenance Tech (1)	100,000
Enforcement/Collections Tech (2)	150,000
Total Operating Cost	$324,300

Annual Revenue: $1,981,980

In downtown Martinez, parking meters charge $0.25 per hour. The fee amounts to $2.25 per day for employees that work 8 to 5. This translates into monthly revenue of $48.75, or $585 annually for each parking space. Applying this fee structure to all County-owned or leased off-street parking spaces involves the following assumptions.

3,388 parking spaces x $585/space = $1,981,980 annual revenue

11. Allow County employees to use pre-tax dollars to pay for mass transit or carpool expenses.

Based on expressed employee willingness in the 2003 Employee Commute Survey to switch commute alternatives based on pre-tax payroll deductions, assume that this would increase use of mass transit and carpooling from 11% to 30% of employees, a difference of 19% of employees. In existing measure 51a, participation by 11% of employees led to an annual reduction of 5,254 MTCO2e.

** 478 MTCO2e per % of employees*
** 5.67 MTCO2e per employee*

An increase in use by 19% of employees would yield a potential annual reduction of 9,075 MTCO2e

Note that this reduction may not be additional to the reduction in Measure 10, as the same employees could be influenced by both measures. It should also be noted that expressed willingness to change behavior can be higher than actual behavior upon implementation.

12. Institute compressed work weeks in *all* County departments.

This would increase use of flex schedules from 54% to 100% of employees, a difference of 46% of employees. In existing measure 52a, participation by 54% of employees led to an annual reduction of 1,412 MTCO2e.

** 26.2 MTCO2e per % of employees*
** 0.310 MTCO2e per employee*

An increase in use by 46% of employees would yield a potential annual reduction of 1,203 MTCO2e

13. Expand the telecommuting program by identifying opportunities to increase employee participation to 30%.

Based on expressed willingness to telecommute in the 2003 commute survey, this could increase use of telecommuting from 0.2% to 30% of employees, a difference of 29.8% of employees. In existing measure 49a, participation by 0.2% of employees led to an annual reduction of 31 MTCO2e.

** 155 MTCO2e per % of employees*
** 1.84 MTCO2e per employee*

An increase in use by 29.8% of employees would yield a potential annual reduction of 4,619 MTCO2e

Note that expressed willingness to change behavior can be higher than actual behavior upon implementation.

Waste Reduction and Recycling

As the baseline GHG inventory only considers methane production from landfilled waste, for consistency, the reductions in the waste sector only include avoided methane. However, it should be noted that recycling and waste reduction also hold other reduction potentials, including the carbon sequestration of trees that are not consumed for paper production, the avoided energy use of new paper production, and the avoided transportation to landfill sites.

Existing Measures

Av. (47a) Recycle paper from about 200 County buildings.

County data shows an annual reduction of 1,634 tons in 2005.

** 8.17 tons per building*

Total annual reduction of 520 MTCO2e

AW. (47b) Collect and Recycle beverage containers from over 50 County buildings and parks.

County data shows an annual reduction of 3 tons in 2005. *Note that the program has grown significantly since 2005, so the actual reduction is probably higher.*

** 0.06 tons per park or building*

Total annual reduction of 1 MTCO2e

AX. (44a) Conduct an ongoing program to facilitate reuse and recycling of office furniture and equipment from County buildings.

County data shows an annual reduction of 41 tons in 2005.

Total annual reduction of 3 MTCO2e

AY. (48) Recycle municipal landscaping debris

Recyclers pick up 20 cubic yards of greenwaste three times per month. Based on a volume to weight conversion factor provided by ICLEI (one cubic yard = 600 pounds), this yields an annual reduction of 196 tons of waste.

Total annual reduction of 16 MTCO2e

AZ. (45b) Direct consulting architects and engineers to reuse as much of the existing structures and building materials as possible.

BA. (45a) Require contractors to recycle waste from building/remodeling projects whenever feasible.

Potential Measures

14. Set the default on all copying and printing machines to duplex (double-sided) mode.

This measure would decrease paper disposal by half. The County's Purchasing Manager estimates that the annual amount of white copy paper purchased for copying and printing machines exceeds 50 tons. Thus, this measure would reduce paper waste disposal by at least 25 tons.

According to County buyers, there are about 1500 copying and printing machines used in County buildings.

** 0.033 tons of paper per copying/printing machine*

Potential annual reduction of 87 MTCO2e

15. Divert organic waste from parks and landscaping to on-site compost.

Research conducted by CalRecovery, Inc. estimates that the generation of green waste from the grounds-keeping activities of GSD is approximately 170 tons per year.

StopWaste.Org's 2007 Climate Action Plan Template, which was developed for Alameda County, estimates that this type of measure could avoid twelve 50-mile trips by heavy diesel trucks or 600 VMT annually.

Potential annual reduction of 16 MTCO2e (avoided landfill) + 1 MTCO2e (avoided VMT)