APPENDIX D:
COUNTY OPERATIONS GHG REDUCTION MEASURE TECHNICAL APPENDIX

E 1: Facility Energy Efficiency

Measure:
Continue to retrofit existing County facilities and implement energy conservation measures and efficiency programs.

2010 Reductions (MTCO2e):	-60
2020 Reductions (MTCO2e):	-370
2035 Reductions (MTCO2e):	-400

Indicator: Number of facilities retrofitted
Energy savings at County facilities

Assumptions:
The County's Energy Efficiency Conservation Strategy (EECS) was utilized to determine the annual average energy savings from lighting and HVAC retrofits already completed.

Sources:
Clew, Dave. 2011. Utilities Coordinator, San Luis Obispo County. E-mail correspondence.

Haq, Zahurul. n.d. Energy Savings through HVAC System Improvement. http://www.lged-rein.org/archive_file/books/ces/Energy_Sav_HVAC_System.pdf.

San Luis Obispo County. 2009. Energy Efficiency Conservation Strategy. San Luis Obispo, CA.

———. 2010.General Plan, Conservation and Open Space Element. San Luis Obispo, CA.

U.S. Environmental Protection Agency. n.d. EnergyStar Building Manual: Heating and Cooling System Upgrades. http://www.energystar.gov/ia/business/BUM_heat_cool.pdf.

E 2: Energy Conservation & Education

Measure:
Promote energy conservation through educational and competition-based programs.

2010 Reductions (MTCO2e):	0
2020 Reductions (MTCO2e):	-90
2035 Reductions (MTCO2e):	-80

Indicators: Participation in energy conservation programs
Energy savings at County facilities

Assumptions:
Increased education and awareness of energy used by County employees will reduce occupied building energy use by 2% by 2020.

Sources:
U.S. Environmental Protection Agency; U.S. Department of Energy. 2011. The Energy Star Challenge. http://www.energystar.gov/index.cfm?c=challenge.bus_challenge.

E 3: Computer Network Upgrades

Measure:
Reduce computer energy use through software, hardware, and network upgrades.

2010 Reductions (MTCO2e):	0
2020 Reductions (MTCO2e):	-10
2035 Reductions (MTCO2e):	-30

Indicators: Number of Energy Star certified computers, monitors, and pieces of office equipment

Assumptions:

Ensuring computers are turned off at the end of the workday and purchasing Energy Star rated office equipment will reduce energy use in County facilities. This measure assumes that as computers are replaced, they will use less energy.

Sources:

California Polytechnic State University Facilities Department. 2009. Energy Efficiency Program Partnership Best Practice Awards Application Form. http://www.afd.calpoly.edu/sustainability/docs /Awards/2009_BP_Award_GCP_Summary.pdf.

Savage, Guy. 2011. Deputy Director, General Services, Information Technology. San Luis Obispo County. E-mail correspondence, January 5.

U.S. Department of Energy. 2011. Estimating Appliance and Home Electronic Energy Use. http://www.energysavers.gov/your_home/appliances/index.cfm/mytopic=10040.

E 4: Operations & Maintenance

Measure:

Develop green building operation and maintenance guidelines to be followed by County employees and contractors.

2010 Reductions (MTCO2e):	Supporting Measure – Not Quantified
2020 Reductions (MTCO2e):	Supporting Measure – Not Quantified
2035 Reductions (MTCO2e):	Supporting Measure – Not Quantified

Indicators: None

Sources:

San Luis Obispo County. 2010. General Plan, Conservation and Open Space Element. San Luis Obispo, CA.

E 5: Tree Plantings

Measure:

Continue to plant trees for building shading and carbon sequestration purposes.

2010 Reductions (MTCO2e):	-30
2020 Reductions (MTCO2e):	-70
2035 Reductions (MTCO2e):	-120

Indicators: Number of trees planted

Assumptions:

Increased tree plantings at parks and nearby County facilities will not only offset energy use in

buildings through increased shading and climate cooling but will also sequester carbon. This measure estimates that the County will plant 100 trees by 2020 adjacent to buildings and an additional 1,000 trees in County parks and golf courses.

Sources:

McHale, Melissa R., E. Gregory McPherson, and Ingrid C. Burke. 2007. The potential of urban tree plantings to be cost effective in carbon credit markets. Fort Collins, CO: Elsevier.

E 6: Street Lighting & Traffic Signals

Measure:

Replace lighting and traffic signal fixtures with more efficient light-emitting diode (LED) lighting.

2010 Reductions (MTCO2e):	0
2020 Reductions (MTCO2e):	-20
2035 Reductions (MTCO2e):	-30

Indicators: Number of streetlights and traffic signals retrofitted

Assumptions:

The County will replace all existing streetlights and traffic signals with LED light bulbs. LED lighting will reduce energy use from streetlights and traffic signal equipment by approximately 60% from street lighting and by 28% from traffic signals.

Sources:

City of Little Rock. 2003. Conventional Vs LED Traffic Signals; Operational Characteristics and Economic Feasibility. Little Rock, AR.

U.S. Department of Energy, Pacific Gas & Electric. 2008. LED Street Lighting: U.S. DOE Solid-State Lighting Technology Demonstration Gateway Program and PG&E Emerging Technologies Program. http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/gateway_sf-streetlighting.pdf.

E 7: New Facilities

Measure:

Require new or renovated County facilities to meet or exceed CALGreen's Tier 1 or the intent of LEED Silver requirements.

2010 Reductions (MTCO2e):	0
2020 Reductions (MTCO2e):	-260
2035 Reductions (MTCO2e):	-700

Indicators: Number of facilities achieving Tier 1 or LEED Silver requirements

Assumptions:

Complying with Tier 1 requirements of CALGreen will reduce electricity and natural gas use at County facilities by 5.8% and 14.5%, respectively. These energy reductions are in addition to the energy savings that will occur by complying with the minimum requirements of the Title 24 Energy Efficiency Standards.

Sources:

California Building Standards Commission. 2010. 2010 California Green Building Standards Code.

Sacramento: California Building Standards Commission.

California Energy Commission. 2007. Impact Analysis: 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings. Sacramento: California Energy Commission.

Clew, Dave. 2011. Utilities Coordinator, San Luis Obispo County. E-mail correspondence.

RE 1: Renewable Energy

Measure:
Explore opportunities to install alternative energy and co-generation facilities.

2010 Reductions (MTCO2e):	-120
2020 Reductions (MTCO2e):	-700
2035 Reductions (MTCO2e):	-820

Indicators: Megawatts of renewable energy installed

Assumptions:
This measure anticipates that the County will install renewable energy equipment at County facilities totaling 1.5 megawatts by 2020 and 2 megawatts by 2035.

Sources:

Clew, Dave. 2011. Utilities Coordinator, San Luis Obispo County. E-mail correspondence.

W 1: Park & Golf Course Recycling

Measure:
Work with the Integrated Waste Management Authority (IWMA) to develop and implement a recycling program at the County's parks and golf courses.

2010 Reductions (MTCO2e):	0
2020 Reductions (MTCO2e):	-30
2035 Reductions (MTCO2e):	-40

Indicators: Percentage of parks and golf courses with recycling facilities

Assumptions:
This measure assumes that recyclable materials makes up 35% of park waste and that the County will install recycling receptacles at 75% of park and golf course facilities by 2020.

Sources:

Clew, Dave. 2011. Utilities Coordinator, San Luis Obispo County. E-mail correspondence.

Greater Vancouver Sewerage and Drainage District. 2008. Solid Waste Composition Study. http://www.metrovancouver.org/about/publications/Publications/SolidWasteCompositionStudyFinal-2007.pdf.

W 2: Paperless Records

Measure:
Continue to implement paperless records management and reduce the amount of paper purchased.

2010 Reductions (MTCO2e):	-10
2020 Reductions (MTCO2e):	-10
2035 Reductions (MTCO2e):	-10

Indicators: Annual print counts

Assumptions:

Over the last five years, the County has significantly reduced paper purchasing by transitioning to electronic file and document storage systems. The continued reduction in paper use will result in a smaller portion of paper being sent to local landfills.

Sources:

California Integrated Waste Management Board. 1999. Public Administration Waste Characterization Study. http://www.calrecycle.ca.gov/WasteChar/BizGrpCp.asp.

Perez, Katie. 2010. Deputy Director – General Services, San Luis Obispo County. E-mail correspondence, October 26.

W 3: Environmentally Preferable Purchasing

Measure:

Develop and implement an environmentally preferable purchasing (EPP) policy to purchase recycled content and toxic-free products for County supplies, equipment, and services and to promote recycling markets.

2010 Reductions (MTCO2e):	Supporting Action – Not Quantified
2020 Reductions (MTCO2e):	Supporting Action – Not Quantified
2035 Reductions (MTCO2e):	Supporting Action – Not Quantified

Indicators: none

Sources:

San Luis Obispo County. 2010. General Plan, Conservation and Open Space Element. San Luis Obispo, CA.

W 4: Compost Facilities

Measure:

Explore opportunities to compost food and yard waste at County facilities.

2010 Reductions (MTCO2e):	0
2020 Reductions (MTCO2e):	-80
2035 Reductions (MTCO2e):	-190

Indicators: Amount of food waste and green waste diverted at County facilities

Assumptions:

This measure anticipates that the County will install food waste and green waste equipment at facilities with high volumes of food and yard scraps. These facilities will reduce the waste sent to local landfills by approximately 7% by 2020 and by 13% by 2020.

Sources:
California Integrated Waste Management Board. 1999. Public Administration Waste Characterization Study. http://www.calrecycle.ca.gov/WasteChar/BizGrpCp.asp.

W 5: Construction & Demolition Waste

Measure:
Require a minimum of 75% of County non-hazardous construction and demolition waste to be salvaged or recycled.

2010 Reductions (MTCO2e):	0
2020 Reductions (MTCO2e):	-20
2035 Reductions (MTCO2e):	-30

Indicators: Percentage of construction and demolition waste diverted from County projects

Assumptions:
The County will recycle, at a minimum, 75% of the construction and demolition waste from construction and roadway projects at all County facilities.

Sources:
California Integrated Waste Management Board. 1999. Public Administration Waste Characterization Study. http://www.calrecycle.ca.gov/WasteChar/BizGrpCp.asp.

W 6: Vehicle Auctions

Measure:
Continue to auction off retired vehicles and equipment.

2010 Reductions (MTCO2e):	Supporting Measure – Not Quantified
2020 Reductions (MTCO2e):	Supporting Measure – Not Quantified
2035 Reductions (MTCO2e):	Supporting Measure – Not Quantified

Indicators: County fleet size
Number of vehicles auctioned

Assumptions:
By auctioning low-use or damaged vehicles and equipment, the County can extend the life of these vehicles and avoid sending these vehicles and equipment to a junkyard or landfill.

VF 1: Hybrid Vehicles

Measure:
Substantially increase the number and proportion of alternative fuel, high fuel economy, electric, and hybrid vehicles and use of these vehicles within the County fleet.

2010 Reductions (MTCO2e):	-3
2020 Reductions (MTCO2e):	-60

2035 Reductions (MTCO2e):	-110

Indicators: Number of hybrid vehicles
Reduction in fuel use

Assumptions:
In 2010, the County purchased 3 hybrid vehicles. The County will continue to purchase hybrid vehicles, as economically feasible, to total 15% of all non-police and fire vehicles by 2020 and 30% by 2035.

Sources:
U.S. Department of Energy. 2011. FuelEconomy.gov. http://fueleconomy.gov/.

VF 2: Car Sharing

Measure:
Increase participation in the County's car-sharing membership.

2010 Reductions (MTCO2e):	-2
2020 Reductions (MTCO2e):	-60
2035 Reductions (MTCO2e):	-110

Indicators: Number of participants in car-share membership
Annual VMT in car-share vehicles
VMT/fleet size of County vehicles

Assumptions:
The County's car-sharing membership allows staff to utilize alternative and fuel-efficient vehicles. The County's increased use of these vehicles will lead to a reduction in fuel use as the car-share vehicles are typically more fuel efficient that the County fleet. By 2020, the County will utilize car-share vehicles for 5% of total vehicle miles traveled.

Sources:
FunRide, Inc. 2011. Fun Ride Vehicles. http://www.myfunride.com/vehicles.html.

U.S. Department of Energy. 2011. FuelEconomy.gov. http://fueleconomy.gov/.

VF 3: Alternative Fuels

Measure:
Explore the use of alternative fuels in County vehicles and support the development of alternative fueling stations within the county through participation in the Central Coast Clean Cities Coalition (C5).

2010 Reductions (MTCO2e):	0
2020 Reductions (MTCO2e):	-3
2035 Reductions (MTCO2e):	-20

Indicators: Number of alternative-fuel vehicles

Assumptions:
As alternative fuels become more widely available, the County will retrofit existing or purchase new vehicles and equipment to run on alternative fuels. These alternative-fuel vehicles will replace 15% of all current diesel-fueled vehicles and equipment.

Sources:
U.S. Department of Energy. 2011. FuelEconomy.gov. http://fueleconomy.gov/.

EC 1: New Facility Location

Measure:
Take into consideration facility location, proximity to other facilities, access to transit, and ability to provide bike storage facilities when constructing or leasing new facilities.

2010 Reductions (MTCO2e):	0
2020 Reductions (MTCO2e):	-290
2035 Reductions (MTCO2e):	-510

Indicators: Number of new facilities within a 1/2 mile of transit
Employee commute mode share

Assumptions:
Expanding general government services into regional centers throughout the county will reduce the distance traveled for commuting purposes by County employees. By 2020, these new regional facilities will reduce employee commuting by 5%. This reduction in employee commuting will be increased to 10% by 2035.

Sources:
San Luis Obispo County. 2010. General Plan, Conservation and Open Space Element. San Luis Obispo, CA.

EC 2: Rideshare Participation

Measure:
Increase participation in Rideshare commuter programs.

2010 Reductions (MTCO2e):	-50
2020 Reductions (MTCO2e):	-80
2035 Reductions (MTCO2e):	-150

Indicators: Participation in SLO Regional Rideshare programs

Assumptions:
The number of employees currently participating in SLO Regional Rideshare programs totals 28% of all County employees. Through additional promotion and targeted marketing to departments with low participation rates, the County will reach a 35% participation rate by 2020 and 50% by 2035.

Sources:
Marshall, Morgen. 2010. Program Manager, SLO Regional Rideshare. E-mail correspondence, October 14.

EC 3: Alternative Work Schedule

Measure:
Standardize County telecommuting and alternative work schedule policies among departments to facilitate participation as appropriate to job classifications.

2010 Reductions (MTCO2e):	-240
2020 Reductions (MTCO2e):	-240
2035 Reductions (MTCO2e):	-290

Indicators: Number of employees telecommuting
Number of employees utilizing alternative work schedules

Assumptions:
Implementation of telecommuting and alternative work schedules for County employees resulted in a reduction of over 500,000 miles of employee commuting in 2010. The 2010 participation rate for alternative work schedules was approximately 20%. By 2020, participation in these work schedules and telecommuting will total 25% of all employees.

Sources:
Brown, Leslie. 2011. Administrative Analyst, San Luis Obispo County. E-mail correspondence, February 19.

California Air Pollution Control Officers Association. 2010. Quantifying Greenhouse Gas Mitigation Measures.

EC 4: Parking Passes

Measure:
Implement workplace parking pricing at County employment centers in Downtown San Luis Obispo. Charge employees wishing to utilize a parking space provided by the County a daily or monthly fee.

2010 Reductions (MTCO2e):	0
2020 Reductions (MTCO2e):	-40
2035 Reductions (MTCO2e):	-40

Indicators: Employee commute mode share

Assumptions:
Daily parking charges for employee parking spaces will encourage employees to seek alternative transportation options. Research has shown that daily parking passes will reduce VMT associated with commuting by approximately 12% depending on the rate charge and the location of the facility.

Sources:
California Air Pollution Control Officers Association. 2010. Quantifying Greenhouse Gas Mitigation Measures.

Cambridge Systematics. 2009. Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions. Technical Appendices.

Victoria Transportation Policy Institute, Todd Litman. n.d. Transportation Elasticities. http://www.vtpi.org/elasticities.pdf.

WC 1: Water Fixture Retrofits

Measure:
Retrofit facilities with water-efficient fixtures.

2010 Reductions (MTCO2e):	Supporting Measure – Not Quantified
2020 Reductions (MTCO2e):	Supporting Measure – Not Quantified
2035 Reductions (MTCO2e):	Supporting Measure – Not Quantified

Indicators: Number of fixtures replaced

Sources:

Clew, Dave. 2011. Utilities Coordinator, San Luis Obispo County. E-mail correspondence.

WC 2: Water-Efficient Landscape

Measure:

Replace County-maintained turf landscapes (not including park recreational fields or areas) with water-efficient landscapes and demonstration gardens.

2010 Reductions (MTCO2e):	Supporting Measure – Not Quantified
2020 Reductions (MTCO2e):	Supporting Measure – Not Quantified
2035 Reductions (MTCO2e):	Supporting Measure – Not Quantified

Indicators: Acres of turf replaced with native landscape

Sources:

Clew, Dave. 2011. Utilities Coordinator, San Luis Obispo County. E-mail correspondence.

WC 3: Golf Course Water Use

Measure:

Continue to reduce water use on County golf courses through participation in the Audubon International Cooperative Sanctuary Program.

2010 Reductions (MTCO2e):	Supporting Measure – Not Quantified
2020 Reductions (MTCO2e):	Supporting Measure – Not Quantified
2035 Reductions (MTCO2e):	Supporting Measure – Not Quantified

Indicators: Reduction in water use at County golf courses

Sources:

Clew, Dave. 2011. Utilities Coordinator, San Luis Obispo County. E-mail correspondence.

Heptig, Josh. 2011. Golf Course Superintendent, San Luis Obispo County. E-mail correspondence.