CITY OF Fremont

City of Fremont

Climate Action Plan Appendices A-C

November 2012

City of Fremont

Climate Action Plan Appendices A-C

Adopted by the City Council, November 13, 2012

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Appendix A:
Names and Terms Used in the Climate Action Plan

City of Fremont Buildings

City Hall	3300 Capitol Avenue
Development Services Center	39550 Liberty Street
Family Resource Center	39155 Liberty Street
Fire Station #2	37299 Niles Boulevard
Fire Station #6	4355 Central Avenue
Fire Station #11	47200 Lakeview Boulevard
Fremont Main Library	2400 Stevenson Boulevard
Fremont Senior Center	40086 Paseo Padre Parkway
Leon J. Mezzetti Maintenance Center	42551 Osgood Road
Police Building	2000 Stevenson Boulevard
Wally Pond Irvington Community Center	41885 Blacow Road

Other Locations and Facilities

Altamont Landfill and Resource Recovery Facility	10840 Altamont Pass Road, Livermore
Centerville Train Depot	37250 Fremont Boulevard
Fremont BART Station	2000 BART Way
Irvington Presbyterian Church	4181 Irvington Avenue
Mission San Jose Community Park	41403 Mission Boulevard
Tri-Cities Recycling and Disposal Facility	7010 Auto Mall Parkway

Agencies and Organizations

ACE Altamont Commuter Express runs trains between Stockton and San Jose.

ACWD Alameda County Water District is the public agency providing water service to the cities of Fremont, Newark and Union City.

ABAG Association of Bay Area Governments is the metropolitan planning organization for the nine-county San Francisco Bay Region.

ARB The California Air Resources Board is a part of the California Environmental Protection Agency, an organization which reports directly to the Governor's Office in the Executive Branch of California State Government. Reducing California's emission of greenhouse gases is one of the major goals of ARB.

BAAQMD Bay Area Air Quality Management District is the regional government agency that regulates sources of air pollution within the nine-county San Francisco Bay Area.

BCDC Bay Conservation and Development Commission is a 27-member commission with certain regulatory responsibilities over the waters and specified land areas of the greater San Francisco Bay.

BART Bay Area Rapid Transit is the rail system providing rapid transit and commuter rail to the San Francisco Bay Area.

BACC The Bay Area Climate Collaborative brings together leaders from government, the business community, academia, and not-for-profit advocacy groups to address the challenge of climate change across the region.

BRT Bus rapid transit is a variety of public transport system that uses modernized, high-capacity buses to provide faster, more efficient service than an ordinary bus line.

CEC The California Energy Commission is the state's primary agency for addressing energy policy and planning.

CPUC The California Public Utilities Commission (CPUC or PUC) is a State agency which regulates California's privately owned public utilities (such as PG&E), including electric power, natural gas, telecommunications, and water companies.

CALMAX California Materials Exchange Portal is CalRecycle's web portal connecting businesses, organizations, manufacturers, schools, and individuals with the online resources for exchanging materials such as electronics, textiles, and building supplies.

CalRecycle Officially known as the Department of Resources Recycling and Recovery, CalRecycle is the state's leading authority on recycling, waste reduction, and product reuse.

Caltrans The California Department of Transportation is involved with many aspects of the state's public transportation system, including management of the State's highways.

CYES California Youth Energy Services is a program offered by the Rising Sun Energy Center. The CYES program trains young people to conduct "Green House Calls", during which they check homes for energy efficiency, install free energy and water-saving equipment, and provide personalized recommendations for further energy and water savings.

DOE The U.S. Department of Energy is a Cabinet-level federal department whose mission is to ensure America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions.

DOT The U.S. Department of Transportation is a Cabinet-level federal department concerned with the nation's transportation systems.

EECGB Energy Efficiency and Conservation Block Grant Program was funded by the American Recovery and Reinvestment Act of 2009. The program provided funding through formula and competitive grants to cities, counties, states, territories and Indian tribes for energy efficiency and conservation projects.

EPA The United States Environmental Protection Agency is a federal agency which writes and enforces regulations, based on laws passed by Congress, to protect human health and the environment.

ICLEI Local Governments for Sustainability is an international association of local governments, regional and national government organizations committed to sustainable development. ICLEI stands for "International Council for Local Environmental Initiatives."

IPCC The Intergovernmental Panel on Climate Change is the leading international scientific body for the assessment of climate change. The IPCC reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. It does not conduct research nor does it monitor climate related data or parameters.

MTC The Metropolitan Transportation Commission is the transportation planning, coordinating and financing agency for the nine-county San Francisco Bay Area.

NHTSA The National Highway Traffic Safety Administration sets fuel economy standards. The NHTSA also sets and enforces safety performance standards for motor vehicles and motor vehicle equipment, and provides grants to state and local governments to enable them to conduct effective local highway safety programs.

PG&E Pacific Gas and Electric Company is an investor-owned utility providing electricity and natural gas to northern and central California, including the City of Fremont.

PPIC The Public Policy Institute of California is a nonprofit, nonpartisan think tank that conducts nonpartisan research in a variety of topical areas intended to inform and improve public policy in California.

SPUR San Francisco Planning and Urban Research Association is a member supported, non-profit organization which seeks, through research, education and advocacy, to promote good planning and good government in the San Francisco Bay Area.

StopWaste.Org The common name for the Alameda County Waste Management Authority and the Source Reduction and Recycling Board, which form an integrated agency dedicated to achieving the most environmentally sound solid waste management and resource conservation program for the people of Alameda County.

USD Union Sanitary District is an independent special district providing wastewater collection, treatment and disposal to the cities of Fremont, Newark, and Union City.

EIA The U.S. Energy Information Administration is the agency within the U.S. Department of Energy that collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment. EIA is the nation's premier source of energy information and, by law, its data, analyses, and forecasts are independent of approval by any other officer or employee of the United States Government.

VTA The Santa Clara Valley Transportation Authority is an independent special district that provides bus, light rail, and paratransit services to Santa Clara County. VTA also participates as a funding partner in regional rail service, and is responsible for countywide transportation planning, design and construction.

WMI Waste Management, Inc. is a national publicly traded waste management company that owns the Tri-Cities Recycling and Disposal Facility in Fremont and the Altamont Landfill near Livermore, where Fremont garbage is ultimately disposed. WMI is a holding company and all operations are conducted by its subsidiaries.

Definition of Terms

Adaptation: Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which minimizes harm or takes advantage of beneficial opportunities.

Alternative fuel vehicle: A vehicle that is primarily powered by an energy source other than the conventional sources of petroleum and diesel. Under this definition, hybrid vehicles which utilize both petroleum and electricity to power the vehicle would be considered alternative fuel vehicles. Some definitions exclude vehicles using any petroleum or diesel as a power source.

Baseline inventory: An accounting of the greenhouse gas emissions emitted to and/or removed from the atmosphere over a specified period of time, usually one year. The data collected in the baseline inventory provides a benchmark for assessing progress in reducing emissions and tracking trends.

Capital Improvement Program Plan: The City of Fremont's biennial plan for identifying, prioritizing and funding capital projects.

Carbon dioxide equivalent ($C0_2e$): A measurement that allows for the direct comparison of the impacts of different greenhouse gas emissions.

Carbon intensity: The amount of carbon (in terms of weight) emitted per unit of energy consumed. A common measure of carbon intensity is the weight of carbon per British thermal unit (BTU).

Certified Green Business: A business receiving certification by the *Bay Area Green Business Program*, a partnership of business, government and utilities that verifies businesses meet higher standards of environmental performance. The program, coordinated by the Association of Bay Area Governments, helps local businesses comply with environmental regulations and take actions to conserve resources, prevent pollution, minimize waste, and reduce their carbon footprint.

CEQA: The California Environmental Quality Act is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. Climate change: Long-term variation in the average weather patterns in a place or region, over time frames ranging from decades to millions of years, whether due to natural causes or as a result of human activity.

Cool roof: Cool roofs stay at or near the ambient air temperature due to the characteristics of their outer layer. Benefits of keeping a roof's surface cooler include air-conditioning energy and demand savings, monetary savings, and increased human comfort.

Distributed energy resource: Small-scale power generation technologies located close to where the electricity will be used. Examples of distributed energy resources include solar photovoltaic systems, wind turbines, and small fuel cells.

Extended Producer Responsibility: EPR is an approach to materials management that places shared responsibility for end-of-life product management on the producers, and all entities involved in the product lifecycle, instead of the general public. Examples of EPR strategies are buy-back or corporate recycling programs (other than municipal programs) that shift the responsibility for dealing with waste from government to private industry.

Global warming: The progressive gradual rise of the Earth's average surface temperature.

Greenhouse gas: A natural or human-made gas which exhibits the 'greenhouse' property of allowing sunlight to enter Earth's atmosphere, absorbing the infrared radiation (heat) which results when sunlight is reflected off the Earth's surface, and trapping this heat in the atmosphere.

GreenPoint Rating: A rating system for homes developed by the non-profit organization BuildItGreen that aims to achieve energy efficiency above the minimum required by State law.

Kilowatt hour (kWh): A unit of measure equal to 1,000 watts of power expended for one hour. The kWh is the unit used by power companies to determine the amount of energy used by a home or business for billing purposes.

LEED™: Leadership in Energy and Environmental Design is a third-party certification program and the nationally accepted benchmark for the design, construction and operation of high-performance residential and non-residential green buildings. LEED was developed by the non-profit *U.S. Green Building Council*.

Metric tons of carbon dioxide (MTC02): The international reporting standard for carbon dioxide emissions. Operating Budget: The City of Fremont's annual budget that describes how the City will incur obligations, pay operating expenses, and allocate resources among departments.

Pavement condition index: MTC and local jurisdictions use a pavement condition index (PCI) score that rates segments of paved roadways on a scale from 0 to 100. MTC established a 75-point score as a target for roadway quality in its long-range *Transportation 2035 Plan*, adopted in 2009. This score describes pavements in good condition requiring mostly preventive maintenance. In 2009, Fremont's roads were rated at 66, a 'fair' rating indicating the likely need for rehabilitation and preventive maintenance to prevent further degradation.

Renewable energy resource: Energy sources that are naturally replenishing but flow limited. They are inexhaustible in duration but limited in the amount of energy that is available per unit of time. Examples include wind, solar, and ocean waves.

Useful life of transit asset: This is a performance measure used by MTC to assess the state of good repair of the region's transit capital assets. A brand new asset such as a new bus has an asset age of 0%, whereas a 30-year-old bus with an expected useful life of 40 years has an asset age of 75%. The regional target is to reduce the average age to 50% of the useful life, which essentially means that asset replacement is occurring on a regular, sustainable basis.

Zero net energy building: A building that will consume no net energy in a typical year since the energy used by the building's systems is equal to the amount provided by on-site or nearby renewable energy sources.

Appendix B: Emissions Reduction Quantification Methodology

Introduction

This appendix summarizes the assumptions and parameters used to calculate greenhouse gas (GHG) emission reduction performance of the short-term, medium-term, and long-term actions of the Climate Action Plan.

Chapter Three: Energy		
Actions		***GHG Reductions in 2020 ($MTCO_2e$)***
Energy Efficiency Improvements-Existing, Residential		
E-A1	Work towards utilizing existing programs offered by Pacific Gas and Electric for weatherizing the homes of all qualifying low-income households in Fremont.	1,874
Quantification Methodology		***Sources***
This action estimates the reduction in energy-related emissions (i.e., electricity and natural gas) resulting from retrofitting existing low income residential units. Based on the City's 2007 Housing Element, approximately 23% of Citywide households are extremely low-income, very low income, or low income (herein referred to as lower income). This action assumes that 100% of these households would participate in a building weatherization program by 2020, which is consistent with PG&E's Goal 2.2 of the CPUC Long-Term Energy Efficiency Strategic Plan, which states, "By 2020, 100 percent of eligible and willing customers will have received all cost-effective Low Income Energy Efficiency measures." In lieu of household income data broken down by housing type (e.g., single family, 2-4 unit apartment), it was assumed that 50% of the City's lower-income households live in single-family housing units and 50% live in multi- family housing units. The weatherization package would include retrofitting both single- and multi-family units based on a predefined package of energy efficiency retrofits that includes the installation of gas water heater upgrades, installation of high-efficiency light bulbs, duct sealing, foundation insulation, and building envelope sealing/weatherization. Baseline electricity and natural gas consumption levels per unit type were identified using CEC's Residential Appliance Saturation Survey data for Forecast Climate Zone 5. Mitigated energy savings estimates were based on outputs from Lawrence Berkeley Laboratory's Home Energy Saver™ building energy modeling software. Total energy savings were calculated by subtracting the mitigated electricity and natural gas consumption levels from baseline levels. See Table B-1 for data used to calculate emissions reductions.		Baseline Energy Consumption: Commercial End Use Survey, CEC, 2006 Energy Savings from Retrofit Packages: AECOM SSIMe™ Building Energy Analysis Baseline Energy Consumption: Residential Appliance Saturation Survey, CEC, 2010 Energy Savings from Retrofit Packages: SSIMe Building Energy Model, AECOM 2011 Participation Rates: City of Fremont, 2012

Table B-1 Residential Retrofits-Low Income Weatherization						
Baseline Energy Consumption						
	Total Units	**Participation Rate**	**kWh/unit/year**	**therms/unit/ year**	**Total kWhr/year**	**Total therms/ year**
Single Family	42,182	11%	6,138	691	28,480,443	3,206,311
Townhouse	7,181	11%	3,815	402	3,013,507	317,649
2-4 unit apartment	2,983	11%	3,418	376	1,121,548	123,335
5+ unit apartment	18,135	11%	3,466	245	6,914,150	487,866
Total	70,481	-	-	-	39,529,648	4,135,160
Mitigated Energy Consumption						
	Total Units	**Participation Rate**	**kWh/unit/year**	**therms/unit/ year**	**Total kWhr/year**	**Total therms/ year**
Single Family	42,182	11%	6,125	639	28,422,422	2,965,267
Townhouse	7,181	11%	3,807	349	3,007,304	275,588
2-4 unit apartment	2,983	11%	3,412	356	1,119,488	116,692
5+ unit apartment	18,135	11%	3,380	220	6,742,903	439,441
Total	70,481	-	-	-	39,292,116	3,796,987
Energy Savings					237,532	338,173

Chapter Three: Energy

	Actions	*GHG Reductions in 2020 ($MTCO_2e$)*
Energy Efficiency Improvements-Existing, Residential		
E-A2	Utilize existing funding programs, such as Community Development Block Grant programs, to achieve energy efficiency improvements in existing and new buildings.	168
E-C1	Participate in the California Comprehensive Residential Building Retrofit Program, known as "Energy Upgrade California in Alameda County" and funded by the federal America Recovery and Reinvestment Act, to promote residential building retrofits.	
E-A3	Encourage the installation of energy efficiency retrofits by creating a Property Assessed Clean Energy (PACE) program, which allows qualified residential and non-residential property owners to repay the cost of installing energy efficiency retrofits on their property tax bill.	
E-C6	Work with Pacific Gas and Electric to increase awareness and use of financial incentives to assist residential and commercial customers to improve energy efficiency.	
E-P7	Provide support and incentives to increase energy efficiencies and partner with others to create tools and incentives to achieve this goal.	

Quantification Methodology

These actions estimate the reduction in energy-related emissions (i.e., electricity and natural gas) resulting from retrofitting existing residential units and commercial properties. The actions include retrofitting both single and multi-family units based on a predefined package of energy efficiency retrofits that include installation of programmable thermostats, gas water heater upgrades, installation of high-efficiency light bulbs, gas furnace upgrades, duct sealing, foundation insulation, and building envelope sealing/weatherization.

Baseline electricity and natural gas consumption levels per unit type were identified using CEC's Residential Appliance Saturation Survey data for Forecast Climate Zone 5. Mitigated energy savings estimates were based on outputs from Lawrence Berkeley Laboratory's Home Energy Saver™ building energy modeling software. Total energy savings were calculated by subtracting the mitigated electricity and natural gas consumption levels from baseline levels. See Table B-2 for data used to calculate emissions reductions.

Building Data: Department of Finance (DOF) 2012

Baseline Energy Consumption: Commercial End Use Survey, CEC, 2006

Energy Savings from Retrofit Packages: AECOM SSIMe™ Building Energy Analysis

Baseline Energy Consumption: Residential Appliance Saturation Survey, CEC, 2010

Energy Savings from Retrofit Packages: SSIMe Building Energy Model, AECOM 2011

Participation Rates: City of Fremont, 2012

Table B-2
Residential Retrofits

Baseline Energy Consumption						
	Total Units	**Participation Rate**	**kWh/unit/year**	**therms/unit/ year**	**Total kWhr/year**	**Total therms/ year**
Single Family	42,182	1%	6,138	691	2,589,131	291,483
Townhouse	7,181	1%	3,815	402	273,955	28,877
2-4 unit apartment	2,983	1%	3,418	376	101,959	11,212
5+ unit apartment	18,135	1%	3,466	245	628,559	44,351
Total	70,481	-	-	-	3,593,604	375,924
Mitigated Energy Consumption						
	Total Units	Participation Rate	kWh/unit/year	therms/unit/year	Total kWhr/year	Total therms/year
Single Family	42,182	1%	6,125	639	2,583,857	269,570
Townhouse	7,181	1%	3,807	349	273,391	25,053
2-4 unit apartment	2,983	1%	3,412	356	101,772	10,608
5+ unit apartment	18,135	1%	3,380	220	612,991	39,949
Total	70,481	-	-	-	3,572,011	345,181
Energy Savings					21,594	30,743

Chapter Three: Energy

Actions		*GHG Reductions in 2020 ($MTCO_2e$)*
Energy Efficiency Improvements-Existing, Residential		
E-C2	Continue the annual collaboration with the California Youth Energy Services (CYES) program to conduct residential energy audits and to distribute compact fluorescent light bulbs and compact fluorescent lamp torchieres as replacements for halogen torchieres in Fremont households.	447
E-C3	Continue the annual collaboration with the California Youth Energy Services program to conduct residential energy and water audits and to distribute water-saving shower heads and faucet aerators to Fremont households, to replace less efficient fixtures. (This action is also listed in the "Water" Chapter).	
Quantification Methodology		***Sources***
These actions estimate the reduction in energy-related emissions (i.e., electricity and natural gas) resulting from retrofitting the existing residential units, which participated in the California Youth Energy Services Program. Energy efficiency retrofits include the installation of compact fluorescent lamps,retractable clotheslines, CFL torchiere lamps, powerstrips and water heater pipe insulation. Participation information for 2009 to 2011 was provided by the Rising Sun Energy Center, including the number of households that participated, estimated electricity savings, estimated natural gas savings and the estimated CO_2 reduction in metric tons. Participation assumptions for the years 2012 to 2020 were based on an average of the program participation rates for the years 2009 to 2011. Electricity and natural gas savings for all years between 2009 and 2020 were each multiplied by the PG&E specific emissions factors and the result was added together to estimate the amount of CO_2 reductions in metric tons in 2020. See Table B-3 for data used to calculate emissions reductions.		Energy Savings from Retrofit Packages: California Youth Energy Services, Fremont CYES Summary, Rising Sun Energy Center 2009-2011

Table B-3
California Youth Energy Services Retrofits

Energy Savings and GHG Reductions				
	Total Households	**Electricity Savings (kWh)**	**Natural Gas Savings (Therms)**	**GHG Reduction (MT CO_2e)**
Completed Retrofits 2010-2012	993	588,628	9,300	149
Anticipated Retrofits 2012-2020	1,986	1,177,256	18,600	298
Total Retrofits 2010-2020	2,979	1,765,884	27,900	447

Chapter Three: Energy

Actions		*GHG Reductions in 2020 ($MTCO_2e$)*
ENERGY STAR Appliances		
E-C5	Work with Pacific Gas and Electric in a public information and education campaign to encourage every household and business to reduce their energy consumption and to utilize more energy efficient lighting and appliances.	655
Quantification Methodology		***Sources***
This action focuses on installation of energy-efficient refrigerators, clothes washers, and dishwashers. The CAPCOA report "Quantifying Greenhouse Gas Mitigation Measures" provides a methodology for calculating the electricity reductions associated with the installation of energy-efficient refrigerators, clothes washers, and dishwashers. Baseline market share values from a Northwestern Energy Efficiency Alliance study indicate that approximately 42% of consumers purchase ENERGY STAR refrigerators, 97% purchase ENERGY STAR dishwashers, and 61% purchase ENERGY STAR clothes washers. The study shows a strong trend of increasing ENERGY STAR Appliance market share over the past decade. The action assumes adoption of energy-efficient appliances in new construction at these levels. For existing residential units, the action assumes replacement of appliances at the same rates used for new units. It also assumes a replacement cycle of 22 years for refrigerators, 14 years for clothes washers, and 9 years for dishwashers. It was assumed that once a household purchases an ENERGY STAR unit, they will continue to purchase ENERGY STAR replacements in the future. The calculations also assume that the three appliances are present at varying rates per housing type, according to information collected from the US Energy Information Administration.		Quantification Methodology: Energy Efficient Appliance Reduction, CAPCOA, 2010 Participation Rates: ENERGY STAR Consumer Products Program: Market Progress Evaluation Report, KEMA, Inc. 2007 Appliance Saturation Assumptions: Residential Energy Consumption Survey, US Energy Information Administration, 2009
Energy Efficiency Improvements-Existing Buildings, Non-Residential		
E-A2	Utilize existing funding programs, such as Community Development Block Grant programs, to achieve energy efficiency improvements in existing and new buildings.	395
E-C4	Continue to partner with Pacific Gas and Electric to offer energy efficiency programs for commercial buildings.	
E-C6	Work with Pacific Gas and Electric to increase awareness and use of financial incentives to assist residential and commercial customers to improve energy efficiency.	
E-P7	Provide support and incentives to increase energy efficiencies and partner with others to create tools and incentives to achieve this goal.	
Quantification Methodology		***Sources***
These actions estimate the reduction in energy-related emissions (i.e., electricity and natural gas) resulting from retrofitting existing commercial properties. The actions include retrofitting commercial properties based on a pre-defined package of energy efficiency retrofits that include installation of programmable thermostats, gas water heater upgrades, installation of high-efficiency light bulbs, gas furnace upgrades, duct sealing, foundation insulation, and building envelope sealing/weatherization. Baseline electricity and natural gas consumption levels per unit type were identified using CEC's Commercial End Use Survey data for Forecast Climate Zone 5. Mitigated energy savings estimates were based on outputs from AECOM's SSIMe™ building energy model. The model-derived energy savings estimates were downscaled in order to be conservative in emissions reduction calculations. Total energy savings were calculated by subtracting the mitigated electricity and natural gas consumption levels from baseline levels. See Table B-4 for data used to calculate emissions reductions.		Building Data: CO-STAR Baseline Energy Consumption: Commercial End Use Survey, CEC, 2006 Energy Savings from Retrofit Packages: AECOM SSIMe™ Building Energy Analysis Baseline Energy Consumption: Residential Appliance Saturation Survey, CEC, 2010 Participation Rates: City of Fremont, 2012

Table B-4 Commercial Retrofits						
Baseline 2005	**Total SQFT**	**Participation Rate**	**kWh/sqft/year**	**kBTU/sqft/year**	**Total kWhr/year**	**Total kBTU/year**
Low Commercial Retrofit Package						
All Office	14,329,145	3%	15.14	24.26	6,507,326	10,428,891
All Warehouse	29,288,641	3%	7.71	0.00	6,776,372	0
Retail	13,223,342	3%	12.65	5.51	5,017,432	2,186,735
Medium Commercial Retrofit Package						
All Office	14,329,145	2%	15.14	24.26	4,338,218	6,952,594
All Warehouse	29,288,641	2%	7.71	0.00	4,517,581	0
Retail	13,223,342	2%	12.65	5.51	3,344,955	1,457,823
Total	113,682,256	-	-	-	30,501,885	21,026,043
Mitigated 2020	**Total SQFT**	**Participation Rate**	**kWh/sqft/year**	**kBTU/sqft/year**	**Total kWhr/year**	**Total kBTU/year**
Low Commercial Retrofit Package						
All Office	14,329,145	3%	14.13	24.26	6,074,975	10,428,891
All Warehouse	29,288,641	3%	7.61	0.00	6,684,659	0
Retail	13,223,342	3%	11.83	5.51	4,691,048	2,186,735
Medium Commercial Retrofit Package						
All Office	14,329,145	2%	13.91	20.69	3,987,296	5,928,922
All Warehouse	29,288,641	2%	7.60	0.00	4,454,238	0
Retail	13,223,342	2%	11.75	5.05	3,108,282	1,335,195
Total	113,682,256	-	-	-	29,000,496	19,879,742
Energy Savings					1,501,389	1,146,301

Chapter Three: Energy

Actions		*GHG Reductions in 2020 ($MTCO_2e$)*
Energy Efficiency Improvements-Public Lighting		
E-P1	Encourage the replacement of high-pressure sodium and mercury vapor lights used in existing private streets and private parking lots with energy-efficient alternatives, such as light-emitting diodes (LEDs).	1,049
E-R2	Develop and enforce performance standards for exterior lighting of commercial and industrial buildings and parking lots, which will include minimum and maximum lighting levels while providing a safe environment.	
Quantification Methodology		***Sources***
These actions assume 10% of the baseline commercial building stock will retrofit the lighting in their parking lots with LEDs, or more efficient lighting technologies by 2020. Baseline energy use for commercial parking lots was determined using data from the City of Fremont's Municipal Code, as well as the EPA report ENERGY STAR® Performance Ratings Technical Methodology for Parking, which provided a lighting density factor for parking lots. The mitigated scenario reduces the lighting density factor by 60% to determine the total electricity use in 2020. GHG reductions are calculated using a PG&E-specific emissions factor. The GHG reduction is determined by taking the difference between the total emissions in 2005 and 2020.		ENERGY STAR® Performance Ratings Technical Methodology for Parking City of Fremont Municipal Code, 2012 Participation Rates: City of Fremont, 2012
Renewable Energy - Existing & New, Residential & Non-Residential		
E-P3	Promote existing solar thermal programs, such as PG&E's Solar Water Heating Rebate and the California Solar Initiative's Thermal Program, to encourage the installation of solar hot water systems in existing and new residential and commercial buildings.	433
Quantification Methodology		***Sources***
This action calculates natural gas-related emissions reductions resulting from the installation of solar hot water heaters in residential and commercial buildings. Baseline water heating-related natural gas consumption levels per building type were identified using CEC's Residential Appliance Saturation Survey and Commercial End Use Survey data for Forecast Climate Zone 5. In addition, CEC data identifies the energy savings potential of solar hot water heaters for specific climates in California. The action assumes that 66-75% of water-heating natural gas can be reduced through the use of solar hot water heaters. The action assumes that 540 single-family residential units and 230 multi-family residential units will install solar hot water heaters to meet their hot water demands by 2020. It also assumes that 600,000 square feet of nonresidential uses will install solar hot water heaters by 2020. Table B-5 provides the assumptions used to quantify reductions from the solar water heater portion of this action.		Baseline Hot Water Natural Gas Consumption: Residential Appliance Saturation Survey, CEC, 2010 Solar Fraction: Solar Water Heating CEC 2013 Title 24 Pre-rulemaking Workshop, California Energy Commission, June 9, 2011

Table B-5 Solar Water Heaters – 2020						
Residential Units						
	Units (2020)	**Hot Water Heater Energy per Unit (therms/year)**	**Solar Water Heater Effectiveness**	**Energy Savings per Unit (therms/year)**	**Participation Rate (% of units)**	**Total Savings (therms/year)**
Single Family	46,317	169	75%	126	1%	58,579
Townhouse	7,885	146	75%	110	1%	8,654
2-4 unit apartment	3,278	116	66%	77	1%	2,509
5+ unit apartment	19,916	72	66%	47	1%	9,443
Total	77,396	-	-	-	-	79,176
Commercial Buildings						
	SQFT (2020)	**Hot Water Heater Energy per SQFT (therms/year)**	**Solar Water Heater Effectiveness**	**Energy Savings per SQFT (therms/year)**	**Participation Rate (% of units)**	**Total Savings (therms/year)**
Office	15,412,000	1.8	40%	0.72	1%	111,682
Warehouse	31,502,000	-	40%	-	1%	-
Retail	14,223,000	1.0	40%	0.42	1%	59,176
Total	61,137,000	-	-	-	-	170,858

Chapter Three: Energy

Actions		*GHG Reductions in 2020 ($MTCO_2e$)*
Renewable Energy - Existing & New, Residential & Non-Residential		
E-P5	Consider requirements to provide pre-wiring for future solar photovoltaics and other renewable on-site power generation systems in new home construction as part of a Green Building program.	5,738
E-R1	Eliminate local regulatory barriers to installation of distributed renewable energy systems, such as wind and solar, through revisions to the zoning code and other relevant city policies.	

Quantification Methodology	*Sources*
These actions describe electricity-related emissions reductions resulting from the installation of grid-connected solar photovoltaic (PV) systems in residential and commercial uses. The actions use National Renewable Energy Laboratory solar insolation data specific to Fremont's geographic location and climate (5.1 kWh/m^2/year) to calculate electricity-related emissions reductions resulting from installation of grid-connected PV systems. The actions assume a 2020 installed capacity of 5.3 MW on residential buildings. This includes 1.7 MW of existing capacity (2005-2011) and estimates an additional 3.6 MW of installation by 2020. The actions also assume a 2020 installed capacity of 8.8 MW on nonresidential buildings. This includes 3.9 MW of existing capacity (2005-2011) and estimates an additional 4.9 MW of installation by 2020. Municipal solar output values were collected from a solar feasibility study prepared for the City of Fremont. Based on the feasibility study, it was estimated that four municipal PV sites would generate 2,406 MWh/yr by 2020. The estimated PV capacities were converted into kWh/yr and then multiplied by PG&E's emissions factor in the 2005 baseline year to calculate associated GHG reductions in MT CO_2e/yr, as shown in Table B-6.	Solar Insolation: National Renewable Energy Laboratory Renewable Resource Data Center, 2011 Participation rates: PG&E Energy Summary for Fremont 2005-2011, 2012

Table B-6
Solar PV Systems – 2020

	kW	hrs/day	kWh/day	kWh/yr	Emissions Factor	Total Savings (kWh/year)
Residential						
Existing Capacity	1,731	5	8,657	3,159,839	0.0002222	702
Estimated New Capacity	3,613	5	18,067	6,594,447	0.0002222	1,465
Total	5,345	5	26,724	9,754,285	0.0002222	2,167
Nonresidential						
Existing Capacity	3,852	5	19,260	7,029,789	0.0002222	1,562
Estimated New Capacity	4,952	5	24,762	9,038,301	0.0002222	2,008
Total	8,804	5	44,022	16,068,090	0.0002222	3,570
Municipal						
Estimated New Capacity	1,318	5	6,592	2,406,164	0.0002222	534

Chapter Three: Energy

Actions		*GHG Reductions in 2020 ($MTCO_2e$)*
Energy Efficiency Improvements & Peak Load Reduction-Smart Grid		
E-P4	Facilitate the adoption of smart grid and other peak load reduction technologies, such as building energy management systems and smart appliances, within new and existing buildings.	3,785
Quantification Methodology		***Sources***
This action estimates the reduction in electricity-related emissions resulting from integration of Smart Grid technologies in new and existing residential and commercial land uses. Literature indicates that integration of Smart Grid technologies reduces electricity use by more than 5% in existing residential and commercial buildings and more than 6% in new residential and commercial buildings. For 2020, the action assumes that 30% of all new residential and commercial buildings and 15% of existing residential and commercial buildings will integrate Smart Grid technologies.		Smart Grid Reduction: SMART 2020: Enabling the low carbon economy in the information age, The Climate Group Participation Rates: Estimating the Benefits of the GridWise Initiative Phase I Report, Pacific Northwest National Laboratory, 2004
Building Shade Trees		
E-P2	Promote tree planting throughout the City, to provide shade on buildings which reduces demand for air conditioning and helps reduce the 'urban heat island' effect.	70
Quantification Methodology		***Sources***
This action is based on estimates of the energy savings associated with building shade trees planted next to single-family residential units. Building energy savings were calculated using outputs from the Center for Urban Forest Research (CUFR) Tree Carbon Calculator. The action assumes shade trees will be planted on the southwest side of buildings within 20 feet of the structure. The action assumes that a variety of locally-common landscape tree species will be utilized. Tree age (and thus size) is factored into the action and related to the assumed rate of development. Total single-family development is assumed to be distributed evenly per year between 2005 and 2020. For purposes of the calculation the action assumes 1 tree will be planted in 100% of new single-family units and 1 tree will be planted at every 20 existing residences.		Building Energy Savings: The Center for Urban Forest Research (CUFR) Tree Carbon Calculator. Participation Rates: City of Fremont, 2012

Chapter Four: Solid Waste

Actions		*GHG Reductions in 2020 ($MTCO_2e$)*
Methane Capture		
SW-C1	Work with Waste Management, Inc. to capture and recover methane gas to use as an energy source at the Tri-Cities Recycling and Disposal Facility and the Altamont Landfill and Resource Recovery Facility.	32,222

Quantification Methodology	***Sources***
This action estimates the reductions in methane emissions resulting from A) transitioning disposal of community waste from the Tri-Cities to the Altamont landfill and B) increase of methane capture rate at the Tri-Cities landfill. Prior to 2010, the majority of the community's non-diverted waste was deposited in the Tri-Cities landfill. During development of the GHG emissions inventory and business-as-usual projections, the City assumed that the methane capture rate at Tri-Cities was 60%. In 2010, the City began to transition the majority of its non-diverted waste to the Altamont landfill which has a 95% methane capture rate. By 2012, 100% of waste is deposited in the Altamont landfill. The action assumes that this will continue through 2020. The action also assumes that the Tri-Cities landfill will increase its methane capture rate from 60% to 75% in order to comply with the State's Landfill Methane Capture Strategy, described as a discrete early action GHG emissions reduction action in the AB 32 Climate Change Scoping Plan. This increase will reduce waste-in-place methane emissions from Fremont community waste deposited prior to 2012. Table B-7 shows the percentage of total waste sent to each landfill that is attributed to Fremont. It also shows the baseline and mitigated methane capture rate scenarios upon which emissions reductions were calculated. This action would apply to GHG emissions associated with new waste generated and waste-in-place disposed prior to CAP implementation.	CalRecycle Waste Characterization Data, 2012 IPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5 Chapter 3

Table B-7
Waste Contributions per Landfill and Methane Capture Rates

Landfill	Proportion of Total Refuse Received at Landfill from City of Fremont	BAU Scenario – Methane Capture Rates	Mitigated Scenario – Methane Capture Rates
Tri-Cities Landfill	Prior to 2010: ~100% 2010: ~75% 2011: ~75% After 2011: 0%	60%	75%
Altamont Landfill	Prior to 2010: ~0% 2010: ~25% 2011: ~25% After 2011: 100%	NA	90%

Chapter Four: Solid Waste

Actions		*GHG Reductions in 2020 ($MTCO_2e$)*
Waste Diversion-Recycled Paper, Residential & Non-Residential		
SW-A4	Encourage large waste-generating businesses to get a free waste audit from the City of Fremont.	4,129
SW-A6	Develop policies and support new technologies to improve waste reduction, recycling and resource recovery programs for materials.	
SW-A9	Increase recovery of recyclable materials from the commercial and residential sectors to 75%.	
SW-A11	Increase recovery of recyclable materials from the commercial and residential sectors to 90%.	
SW-C2	Partner with California Youth Energy Services staff to provide information on recycling and composting that can be distributed to residents when CYES performs their energy audits.	
SW-R1	Implement mandatory commercial recycling by July 1, 2012, as required by the State of California and Alameda County.	
SW-R3	Require recycling as a condition of permit issuance for special events that must secure city-issued permits.	
Quantification Methodology		***Sources***
An inventory of the community's organic waste was created using StopWaste.org waste volume and characterization data. Using the first-order decay methodology from the 2006 IPCC guidelines, fugitive methane emissions from the organic landfill waste were calculated for base-case and mitigated scenarios (see Table B-8, Table B-9, and Table B-10). These actions assumes a 50% increase in the diversion of residential and non-residential recyclable paper (newspaper, office paper, corrugated cardboard) over baseline 2005 levels from 2012 to 2020.		IPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5 Chapter 3 2008 Alameda County Waste Characterization Study, Final Report. June 2009. StopWaste.org

Chapter Four: Solid Waste

Actions		*GHG Reductions in 2020 ($MTCO_2e$)*
Waste Diversion-Food & Compostable Paper		
SW-A8	Increase recovery of organic materials from the commercial and residential sectors to 75%.	4,650
SW-A10	Increase recovery of organic materials from the commercial and residential sectors to 90%.	
Quantification Methodology		***Sources***
An inventory of the community's organic waste was created using StopWaste.org waste volume and characterization data. Using the first-order decay methodology from the 2006 IPCC guidelines, fugitive methane emissions from the organic landfill waste were calculated for base-case and mitigated scenarios (see Table B-8, Table B-9, and Table B-10). These calculations assume that 90% of food scraps and compostable paper generated from residential and non-residential uses will be diverted from landfills by 2020.		IPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5 Chapter 3 After this source add: 2008 Alameda County Waste Characterization Study, Final Report. June 2009. StopWaste.org
Waste Diversion-Food & Compostable Paper, Residential & Non-Residential		
SW-A7	Institute programs for multi-family units to allow for the collection and composting of food waste and compostable paper where feasible.	1,185
Quantification Methodology		***Sources***
Using the first-order decay methodology from the 2006 IPCC guidelines, fugitive methane emissions from the organic landfill waste were calculated for base-case and mitigated scenarios (see Table B-8, Table B-9, and Table B-10). These calculations assume that 90% of food scraps and compostable paper generated from multi-family residential uses will be diverted from landfills by 2020.		CIPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5 Chapter 3 After this source add: 2008 Alameda County Waste Characterization Study, Final Report. June 2009. StopWaste.org
Waste Diversion-Construction & Demolition		
SW-A5	Increase the amount of construction and demolition debris recycled from private-sector projects.	193
SW-R2	Comply with the California Green Building Code, effective January 1, 2011, which requires all new residential buildings to recycle 65% of the material generated from the project.	
Quantification Methodology		***Sources***
An inventory of the community's organic waste was created using StopWaste.org waste volume and characterization data. Using the first-order decay methodology from the 2006 IPCC guidelines, fugitive methane emissions from the organic landfill waste were calculated for base-case and mitigated scenarios (see Table B-8, Table B-9, and Table B-10). This calculation assumes that 50% of all construction and demolition projects will divert 65% of all lumber waste from landfills between 2012 and 2020.		IPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5 Chapter 3 After this source add: 2008 Alameda County Waste Characterization Study, Final Report. June 2009. StopWaste.org

Table B-8
Single Family Degradable Organic Carbon Disposed

Single Family Waste – Baseline Mass of Degradable Organic Carbon Disposed (DDOC mdt) in Metric Tons

	Enhanced Recycled Paper Diversion			Food and Compostable Paper Waste Diversion					Construction and Demolition Waste Diversion					
Year	Newspaper	Office Paper	Corrugated Boxes	Coated Paper	Food	Grass	Leaves	Branches	Lumber	Textiles	Diapers	Medical Waste	Sludge/ Manure	Total
2005	63.9	741.6	46.4	984.2	3,248.2	12.2	22.8	18.1	40.3	387.8	62.0	3.3	55.5	5,686.4
2006	64.3	746.3	46.7	990.4	3,268.5	12.3	23.0	18.2	40.6	390.2	62.4	3.3	55.9	5,722.0
2007	64.7	750.9	47.0	996.6	3,288.9	12.3	23.1	18.3	40.8	392.7	62.8	3.3	56.2	5,757.8
2008	65.1	755.6	47.3	1,002.8	3,309.5	12.4	23.3	18.5	41.1	395.1	63.2	3.3	56.6	5,793.8
2009	65.5	760.4	47.6	1,009.1	3,330.2	12.5	23.4	18.6	41.3	397.6	63.6	3.4	56.9	5,830.1
2010	65.9	765.1	47.9	1,015.4	3,351.1	12.6	23.5	18.7	41.6	400.1	64.0	3.4	57.3	5,866.6
2011	66.3	769.9	48.2	1,021.8	3,372.0	12.6	23.7	18.8	41.8	402.6	64.4	3.4	57.6	5,903.3
2012	66.7	774.7	48.5	1,028.2	3,393.1	12.7	23.8	18.9	42.1	405.1	64.8	3.4	58.0	5,940.2
2013	67.1	779.6	48.8	1,034.6	3,414.4	12.8	24.0	19.0	42.4	407.7	65.2	3.4	58.4	5,977.4
2014	67.6	784.5	49.1	1,041.1	3,435.7	12.9	24.1	19.2	42.6	410.2	65.6	3.5	58.7	6,014.8
2015	68.0	789.4	49.4	1,047.6	3,457.2	13.0	24.3	19.3	42.9	412.8	66.0	3.5	59.1	6,052.5
2016	68.4	794.3	49.7	1,054.1	3,478.9	13.0	24.4	19.4	43.2	415.4	66.5	3.5	59.5	6,090.3
2017	68.8	799.3	50.1	1,060.7	3,500.7	13.1	24.6	19.5	43.4	418.0	66.9	3.5	59.8	6,128.4
2018	69.3	804.3	50.4	1,067.4	3,522.6	13.2	24.8	19.6	43.7	420.6	67.3	3.6	60.2	6,166.8
2019	69.7	809.3	50.7	1,074.1	3,544.6	13.3	24.9	19.8	44.0	423.2	67.7	3.6	60.6	6,205.4
2020	70.1	814.4	51.0	1,080.8	3,566.8	13.4	25.1	19.9	44.3	425.8	68.1	3.6	61.0	6,244.2

Single Family Waste – Mitigated Mass of Degradable Organic Carbon Disposed (DDOC mdt) in Metric Tons

Year	Newspaper	Office Paper	Corrugated Boxes	Coated Paper	Food	Grass	Leaves	Branches	Lumber	Textiles	Diapers	Medical Waste	Sludge/ Manure	Total
2005	31.9	370.8	23.2	718.1	2,369.9	12.2	22.8	18.1	27.2	387.8	62.0	3.3	55.5	4,102.9
2006	32.1	373.1	23.4	722.6	2,384.7	12.3	23.0	18.2	27.4	390.2	62.4	3.3	55.9	4,128.6
2007	32.3	375.5	23.5	727.1	2,399.6	12.3	23.1	18.3	27.5	392.7	62.8	3.3	56.2	4,154.4
2008	32.5	377.8	23.7	731.7	2,414.6	12.4	23.3	18.5	27.7	395.1	63.2	3.3	56.6	4,180.4
2009	32.7	380.2	23.8	736.2	2,429.7	12.5	23.4	18.6	27.9	397.6	63.6	3.4	56.9	4,206.6
2010	32.9	382.6	24.0	740.8	2,444.9	12.6	23.5	18.7	28.1	400.1	64.0	3.4	57.3	4,232.9
2011	33.2	385.0	24.1	745.5	2,460.2	12.6	23.7	18.8	28.2	402.6	64.4	3.4	57.6	4,259.4
2012	33.4	387.4	24.3	750.1	2,475.6	12.7	23.8	18.9	28.4	405.1	64.8	3.4	58.0	4,286.0
2013	33.6	389.8	24.4	754.8	2,491.1	12.8	24.0	19.0	28.6	407.7	65.2	3.4	58.4	4,312.9
2014	33.8	392.2	24.6	759.6	2,506.7	12.9	24.1	19.2	28.8	410.2	65.6	3.5	58.7	4,339.9
2015	34.0	394.7	24.7	764.3	2,522.4	13.0	24.3	19.3	29.0	412.8	66.0	3.5	59.1	4,367.0
2016	34.2	397.2	24.9	769.1	2,538.2	13.0	24.4	19.4	29.1	415.4	66.5	3.5	59.5	4,394.3
2017	34.4	399.6	25.0	773.9	2,554.1	13.1	24.6	19.5	29.3	418.0	66.9	3.5	59.8	4,421.8
2018	34.6	402.1	25.2	778.8	2,570.1	13.2	24.8	19.6	29.5	420.6	67.3	3.6	60.2	4,449.5
2019	34.9	404.7	25.3	783.6	2,586.1	13.3	24.9	19.8	29.7	423.2	67.7	3.6	60.6	4,477.4
2020	35.1	407.2	25.5	788.5	2,602.3	13.4	25.1	19.9	29.9	425.8	68.1	3.6	61.0	4,505.4

Table B-9
Multi-Family Degradable Organic Carbon Disposed

Multi-Family Waste – Baseline Mass of Degradable Organic Carbon Disposed (DDOC mdt) in Metric Tons

	Enhanced Recycled Paper Diversion			Food and Compostable Paper Waste Diversion					Construction and Demolition Waste Diversion					
Year	Newspaper	Office Paper	Corrugated Boxes	Coated Paper	Food	Grass	Leaves	Branches	Lumber	Textiles	Diapers	Medical Waste	Sludge/ Manure	Total
2005	33.6	574.4	125.6	473.5	1,144.9	26.8	50.2	45.4	33.3	314.4	54.0	0.3	9.2	2,885.5
2006	33.8	578.0	126.4	476.5	1,152.1	27.0	50.5	45.7	33.5	316.3	54.3	0.3	9.2	2,903.6
2007	34.0	581.6	127.2	479.5	1,159.3	27.1	50.8	46.0	33.7	318.3	54.6	0.3	9.3	2,921.8
2008	34.2	585.3	128.0	482.5	1,166.5	27.3	51.2	46.3	33.9	320.3	55.0	0.3	9.4	2,940.0
2009	34.4	588.9	128.8	485.5	1,173.8	27.5	51.5	46.6	34.1	322.3	55.3	0.3	9.4	2,958.4
2010	34.6	592.6	129.6	488.5	1,181.2	27.7	51.8	46.9	34.3	324.3	55.7	0.3	9.5	2,977.0
2011	34.8	596.3	130.4	491.6	1,188.6	27.8	52.1	47.2	34.5	326.3	56.0	0.3	9.5	2,995.6
2012	35.0	600.1	131.2	494.7	1,196.0	28.0	52.5	47.5	34.7	328.4	56.4	0.3	9.6	3,014.3
2013	35.3	603.8	132.0	497.8	1,203.5	28.2	52.8	47.8	35.0	330.4	56.7	0.3	9.7	3,033.2
2014	35.5	607.6	132.8	500.9	1,211.0	28.4	53.1	48.1	35.2	332.5	57.1	0.3	9.7	3,052.2
2015	35.7	611.4	133.7	504.0	1,218.6	28.5	53.4	48.4	35.4	334.6	57.4	0.3	9.8	3,071.3
2016	35.9	615.2	134.5	507.2	1,226.2	28.7	53.8	48.7	35.6	336.7	57.8	0.3	9.8	3,090.5
2017	36.2	619.1	135.4	510.3	1,233.9	28.9	54.1	49.0	35.8	338.8	58.1	0.3	9.9	3,109.8
2018	36.4	622.9	136.2	513.5	1,241.6	29.1	54.5	49.3	36.1	340.9	58.5	0.3	10.0	3,129.3
2019	36.6	626.8	137.1	516.8	1,249.4	29.3	54.8	49.6	36.3	343.0	58.9	0.3	10.0	3,148.9
2020	36.8	630.8	137.9	520.0	1,257.2	29.4	55.1	49.9	36.5	345.2	59.2	0.3	10.1	3,168.6

Multi-Family Waste Waste – Mitigated Mass of Degradable Organic Carbon Disposed (DDOC mdt) in Metric Tons

Year	Newspaper	Office Paper	Corrugated Boxes	Coated Paper	Food	Grass	Leaves	Branches	Lumber	Textiles	Diapers	Medical Waste	Sludge/ Manure	Total
2005	16.8	287.2	62.8	345.5	835.3	26.8	50.2	45.4	22.4	314.4	54.0	0.3	9.2	2,070.3
2006	16.9	289.0	63.2	347.7	840.6	27.0	50.5	45.7	22.6	316.3	54.3	0.3	9.2	2,083.3
2007	17.0	290.8	63.6	349.8	845.8	27.1	50.8	46.0	22.7	318.3	54.6	0.3	9.3	2,096.3
2008	17.1	292.6	64.0	352.0	851.1	27.3	51.2	46.3	22.9	320.3	55.0	0.3	9.4	2,109.4
2009	17.2	294.5	64.4	354.2	856.4	27.5	51.5	46.6	23.0	322.3	55.3	0.3	9.4	2,122.6
2010	17.3	296.3	64.8	356.4	861.8	27.7	51.8	46.9	23.2	324.3	55.7	0.3	9.5	2,135.9
2011	17.4	298.2	65.2	358.7	867.2	27.8	52.1	47.2	23.3	326.3	56.0	0.3	9.5	2,149.3
2012	17.5	300.0	65.6	360.9	872.6	28.0	52.5	47.5	23.5	328.4	56.4	0.3	9.6	2,162.7
2013	17.6	301.9	66.0	363.2	878.1	28.2	52.8	47.8	23.6	330.4	56.7	0.3	9.7	2,176.3
2014	17.7	303.8	66.4	365.4	883.6	28.4	53.1	48.1	23.7	332.5	57.1	0.3	9.7	2,189.9
2015	17.9	305.7	66.8	367.7	889.1	28.5	53.4	48.4	23.9	334.6	57.4	0.3	9.8	2,203.6
2016	18.0	307.6	67.3	370.0	894.7	28.7	53.8	48.7	24.0	336.7	57.8	0.3	9.8	2,217.4
2017	18.1	309.5	67.7	372.3	900.3	28.9	54.1	49.0	24.2	338.8	58.1	0.3	9.9	2,231.2
2018	18.2	311.5	68.1	374.7	905.9	29.1	54.5	49.3	24.3	340.9	58.5	0.3	10.0	2,245.2
2019	18.3	313.4	68.5	377.0	911.6	29.3	54.8	49.6	24.5	343.0	58.9	0.3	10.0	2,259.3
2020	18.4	315.4	69.0	379.4	917.3	29.4	55.1	49.9	24.7	345.2	59.2	0.3	10.1	2,273.4

Table B-10
Commercial Degradable Organic Carbon Disposed

Commercial Waste – Baseline Mass of Degradable Organic Carbon Disposed (DDOC mdt) in Metric Tons

	Enhanced Recycled Paper Diversion			Food and Compostable Paper Waste Diversion					Construction and Demolition Waste Diversion					
Year	Newspaper	Office Paper	Corrugated Boxes	Coated Paper	Food	Grass	Leaves	Branches	Lumber	Textiles	Diapers	Medical Waste	Sludge/ Manure	Total
2005	26.0	1,048.8	388.5	866.9	1,514.1	41.7	78.1	108.5	106.3	208.6	79.2	9.1	13.5	4,489.2
2006	26.2	1,055.4	390.9	872.4	1,523.6	42.0	78.6	109.2	106.9	209.9	79.7	9.1	13.5	4,517.3
2007	26.3	1,062.0	393.3	877.8	1,533.2	42.2	79.1	109.9	107.6	211.2	80.1	9.2	13.6	4,545.6
2008	26.5	1,068.6	395.8	883.3	1,542.8	42.5	79.6	110.6	108.3	212.5	80.7	9.3	13.7	4,574.0
2009	26.7	1,075.3	398.3	888.8	1,552.4	42.7	80.1	111.3	108.9	213.9	81.2	9.3	13.8	4,602.7
2010	26.8	1,082.1	400.8	894.4	1,562.1	43.0	80.6	112.0	109.6	215.2	81.7	9.4	13.9	4,631.5
2011	27.0	1,088.8	403.3	900.0	1,571.9	43.3	81.1	112.7	110.3	216.5	82.2	9.4	14.0	4,660.4
2012	27.2	1,095.6	405.8	905.6	1,581.7	43.6	81.6	113.4	111.0	217.9	82.7	9.5	14.1	4,689.6
2013	27.3	1,102.5	408.3	911.3	1,591.6	43.8	82.1	114.1	111.7	219.3	83.2	9.6	14.1	4,718.9
2014	27.5	1,109.4	410.9	917.0	1,601.6	44.1	82.6	114.8	112.4	220.6	83.7	9.6	14.2	4,748.5
2015	27.7	1,116.3	413.5	922.7	1,611.6	44.4	83.1	115.5	113.1	222.0	84.3	9.7	14.3	4,778.2
2016	27.8	1,123.3	416.0	928.5	1,621.7	44.7	83.6	116.2	113.8	223.4	84.8	9.7	14.4	4,808.1
2017	28.0	1,130.4	418.6	934.3	1,631.8	44.9	84.2	117.0	114.5	224.8	85.3	9.8	14.5	4,838.2
2018	28.2	1,137.4	421.3	940.2	1,642.1	45.2	84.7	117.7	115.2	226.2	85.8	9.9	14.6	4,868.5
2019	28.4	1,144.5	423.9	946.1	1,652.3	45.5	85.2	118.4	116.0	227.6	86.4	9.9	14.7	4,898.9
2020	28.5	1,151.7	426.6	952.0	1,662.7	45.8	85.8	119.2	116.7	229.0	86.9	10.0	14.8	4,929.6

Commercial Waste – Mitigated Mass of Degradable Organic Carbon Disposed (DDOC mdt) in Metric Tons

Year	Newspaper	Office Paper	Corrugated Boxes	Coated Paper	Food	Grass	Leaves	Branches	Lumber	Textiles	Diapers	Medical Waste	Sludge/ Manure	Total
2005	13.0	524.4	194.2	658.8	1,150.6	41.7	78.1	108.5	71.7	208.6	79.2	9.1	13.5	3,151.4
2006	13.1	527.7	195.4	662.9	1,157.8	42.0	78.6	109.2	72.2	209.9	79.7	9.1	13.5	3,171.1
2007	13.2	531.0	196.7	667.1	1,165.0	42.2	79.1	109.9	72.6	211.2	80.1	9.2	13.6	3,190.9
2008	13.2	534.3	197.9	671.2	1,172.3	42.5	79.6	110.6	73.1	212.5	80.7	9.3	13.7	3,210.9
2009	13.3	537.7	199.1	675.4	1,179.7	42.7	80.1	111.3	73.5	213.9	81.2	9.3	13.8	3,231.0
2010	13.4	541.0	200.4	679.7	1,187.1	43.0	80.6	112.0	74.0	215.2	81.7	9.4	13.9	3,251.2
2011	13.5	544.4	201.6	683.9	1,194.5	43.3	81.1	112.7	74.5	216.5	82.2	9.4	14.0	3,271.5
2012	13.6	547.8	202.9	688.2	1,202.0	43.6	81.6	113.4	74.9	217.9	82.7	9.5	14.1	3,292.0
2013	13.7	551.2	204.2	692.5	1,209.5	43.8	82.1	114.1	75.4	219.3	83.2	9.6	14.1	3,312.6
2014	13.7	554.7	205.4	696.8	1,217.0	44.1	82.6	114.8	75.9	220.6	83.7	9.6	14.2	3,333.4
2015	13.8	558.2	206.7	701.2	1,224.7	44.4	83.1	115.5	76.3	222.0	84.3	9.7	14.3	3,354.2
2016	13.9	561.7	208.0	705.6	1,232.3	44.7	83.6	116.2	76.8	223.4	84.8	9.7	14.4	3,375.2
2017	14.0	565.2	209.3	710.0	1,240.0	44.9	84.2	117.0	77.3	224.8	85.3	9.8	14.5	3,396.3
2018	14.1	568.7	210.6	714.4	1,247.8	45.2	84.7	117.7	77.8	226.2	85.8	9.9	14.6	3,417.6
2019	14.2	572.3	212.0	718.9	1,255.6	45.5	85.2	118.4	78.3	227.6	86.4	9.9	14.7	3,439.0
2020	14.3	575.9	213.3	723.4	1,263.5	45.8	85.8	119.2	78.8	229.0	86.9	10.0	14.8	3,460.5

Chapter Five: Municipal Services and Operations

	Actions	*GHG Reductions in 2020 ($MTCO_2e$)*
Municipal Transportation-Fleet Fuel Conversion		
M1	Continue replacing gasoline- and diesel-powered fleet vehicles with alternative fuel vehicles, such as hybrids, compressed natural gas, and electric vehicles.	324
M2	Install charging and refuelling stations at appropriate sites throughout the city to service the fleet's alternative fuel vehicles.	
Quantification Methodology		***Sources***
This calculation estimates the GHG emission reduction potential from likely municipal fleet fuel efficiency improvements. Municipal fleet vehicles were divided into three classes including: 1) gasoline passenger and light-duty vehicles (passenger/LDV), 2) gasoline medium- and heavy-duty vehicles (MDV/HDV), and 3) diesel MDV/HDV. Average baseline fuel efficiency (miles/gallon) were calculated for each category. The calculation assumes that fuel efficiency will increase by 30% in 20% of the City's gasoline passenger and LDV, that fuel efficiency will increase by 10% in 5% of the City's gasoline MDV/HDV, and that no improvements will be realized in diesel MDV/HDV (see Table B-11). It is anticipated that federal CAFE standards will drive most of the improvements in fleet fuel efficiency.		City of Fremont Fleet Data, 2012

Table B-11
Municipal Fleet Fuel Conversion

	Weighted Average Fuel Efficiency (mi/gal)	Fleet Travel (miles)	Fuel Consumption (gallons/year)	Emission Factors			Total Emissions (MT CO_2e/year)
				CO_2 (grams/gal)	N_20 (grams/mi)	CH_4 (grams/mi)	
2020 Baseline Scenario							
Gasoline - Passenger/LDV	12.8	1,509,774	161,098	8,565	0.070	0.062	1,413
Gasoline - MDV/HDV	6.0	33,538	6,667	8,565	0.070	0.062	58
Diesel - MDV/HDV	11.1	99,299	12,962	10,007	0.050	0.042	131
Total			180,727				1,602
2020 Mitigated Scenario							
	Weighted Average Fuel Efficiency (mi/gal)	Fleet Travel (miles)	Fuel Consumption (gallons/year)	Emission Factors			Total Emissions (MT CO_2e/year)
				CO_2 (grams/gal)	N_20 (grams/mi)	CH_4 (grams/mi)	
Gasoline - Passenger/LDV	16.7	1,509,774	123,922	8,565	0.070	0.062	1,095
Gasoline - MDV/HDV	6.6	33,538	6,061	8,565	0.070	0.062	53
Diesel - MDV/HDV	11.1	99,299	12,962	10,007	0.050	0.042	131
Total			142,945				1,279
2020 Mitigated Scenario							
	Weighted Average Fuel Efficiency (mi/gal)	Fleet Travel (miles)	Fuel Consumption (gallons/year)	Emission Factors			Total Emissions (MT CO_2e/year)
				CO_2 (grams/gal)	N_20 (grams/mi)	CH_4 (grams/mi)	
Gasoline - Passenger/LDV	-	-	37,177	-	-	-	318
Gasoline - MDV/HDV	-	-	606	-	-	-	5
Diesel - MDV/HDV	-	-	0	-	-	-	0
Total	-	-	37,783	-	-	-	324

Chapter Five: Municipal Services and Operations		
Actions		***GHG Reductions in 2020 ($MTCO_2e$)***
Energy Efficiency Improvements-Public Lighting		
M4	Replace high-pressure sodium and mercury vapor lights used on public streets and public parking lots with energy-efficient alternatives, such as light-emitting diodes (LEDs.).	1,088
Quantification Methodology		***Sources***
A 2012 report from The Climate Group on energy savings associated with LED lighting estimates that replacing existing lighting technology with LEDs can generate between 50-70% energy savings. To determine the potential GHG emissions reductions in Fremont from retrofitting the City's 16,000 streetlights, a 60% reduction was assumed. The reduction was applied to the total electricity use attributed to lighting in 2005 to determine the total electricity use in the year 2020. The baseline and mitigated electricity use were multiplied by PG&E-specific emissions factors to determine the GHG emissions in each year. The GHG reductions in 2020 were determined by taking the difference in GHG emissions in the baseline and horizon years.		Energy Savings: Lighting the Clean Revolution: The Rise of LEDs and What It Means for Our Cities, 2012 Total Streetlights in Fremont: City of Fremont, 2012 Displaced Electricity Emission Factors: PG&E

Chapter Five: Municipal Services and Operations

Actions		*GHG Reductions in 2020 ($MTCO_2e$)*
Municipal Transportation-Transportation Demand Management		
M7	During employee recruitment, advertise the City's incentives and subsidies for choosing alternatives to single-occupant auto commuting.	29
M8	Provide preferential parking and/or other benefits for carpool and alternative fuel vehicles at City facilities, to encourage and reward carpooling and ownership of alternative fuel vehicles.	
M9	Provide secure bicycle parking, showers, lockers and other amenities at City facilities to promote bicycle use by both employees and visitors.	
M20	Expand and improve existing incentives for City employees to choose alternatives to single-occupant auto commuting, such as flexible work schedules, telecommuting, transit incentives and subsidies, and ridesharing services and subsidies.	

Quantification Methodology	*Sources*
These actions estimate the impact of transportation demand management (TDM) programs based on the assembled research. The estimated vehicle trip reductions apply to commute trips for employees of those businesses covered by the TDM program. See Table B-12 for calculations and assumptions related to these actions. **Rideshare promotion** – A study conducted by Reid Ewing concluded that ridesharing programs can reduce daily vehicle commute trips to specific worksites by 5-15%, and up to 20% or more if implemented with parking pricing. In these actions we assume 3% of commute trips shifted from single occupancy vehicles (SOV) to other modes. **Telecommuting/alternative work schedule** – A Center for Urban Transportation Research survey found vehicle trips reduced by up to 8% if 50% of employees are participating in alternative work programs, making it among the most effective commute trip reduction strategies considered in that study. A National Association of Regional Councils analysis estimates that compressed work weeks can reduce up to 0.6% of VMT and up to 0.5% of vehicle trips in a region. In these actions we assume telecommuting/compressed work will result in 3% of commute trips shifted from SOV to other modes. **Subsidized transit fares** – Various studies on the impact of subsidized transit passes indicate reductions in drive-alone mode share of 4% to 42%, with an average reduction of 19%. For Fremont, we estimate that a likely percent reduction in vehicle trips from transit pass subsidies would be 6% for those businesses offering passes. **Parking Cash Out** – Research performed by Donald Shoup at the University of California-Los Angeles found that single occupancy vehicle trips declined by 17% after a parking cash-out program was introduced at various urban and suburban worksites with varying levels of transit service. In quantifying these actions, we assumed that parking cash-out at $4 per day would reduce auto commute trips by approximately 12%, shifting trips from SOV to other modes of travel.	Sources: Nelson\Nygaard, 2010

Table B-12
TDM Calculations and Assumptions

Percent Reduction in VMT from Implementation of TDM Actions				
	VMT Split by Vehicle Fuel Type		Reduction in Total VMT by Vehicle Fuel Type	
	Gasoline	Diesel	Gasoline	Diesel
Reduction in Total VMT	92.8%	7.2%	0.0022%	0.0002%

2020 Mitigated Scenario - Vehicle Miles Traveled and Emissions							
	Fleet Travel (miles)	Weighted Average Fuel Efficiency (mi/gal)	Fuel Consumption (gallons)	Emission Factors			Total Emissions (MT CO_2e/year)
				CO_2 (g/gal)	N_20 (g/mi)	CH_4 (g/mi)	
Gasoline VMT (miles)	2,122,648,899	19.5	108,853,790	8,565	0.0700	0.0620	979,326
Diesel VMT (miles)	164,688,276	6.4	25,732,543	10,007	0.0500	0.0420	260,098
Total	**2,287,337,175**		**134,586,333**				**1,239,424**

Calculation of VMT, Fuel Consumption, and GHG Emission Reduction from TDM Actions			
	Fleet Travel (miles)	Fuel Consumption (gallons)	Total Emissions (MT CO_2e/year)
Gasoline VMT (miles)	50,449	2,587	23
Diesel VMT (miles)	3,914	612	6
Total	**54,363**	**3,199**	**29**

Chapter Five: Municipal Services and Operations

Actions		*GHG Reductions in 2020 ($MTCO_2e$)*
Energy Efficiency Improvements-Water & Wastewater Pumps		
M17	At the end of the units' useful life, replace least efficient water and wastewater motors and pumps in locations such as City parks with more energy-efficient units.	2
Quantification Methodology		***Sources***
The 2005 Baseline Inventory quantified the electricity use associated with water pumps and irrigation. The City has retrofitted some of its larger parks with a Calsense water management irrigation system, and plans to take additional reductions by expanding this system to include some of the smaller parks in Fremont. Total energy use attributed to water pumps and irrigation in 2005 was reduced by a 10% energy savings assumption to determine total annual energy use in 2020. Total energy use in 2005 and 2020 were multiplied by the PG&E-specific emissions factor. Total GHG emissions reductions were determined by taking the difference between GHG emissions in the baseline and horizon years.		Energy Savings: Calsense Case Studies Displaced Electricity Emission Factors: PG&E
Renewable Energy-Municipal		
M19	Evaluate the potential for providing solar, wind, and other renewable energy systems at City facilities.	534
Quantification Methodology		***Sources***
The City of Fremont conducted a Solar Feasibility Study and determined four municipal sites that would be well suited for solar photovoltaic systems. The feasibility study also determined what size system would be appropriate for these sites, as well as the potential annual PV output resulting from the installation of these proposed systems. The estimated annual PV output was multiplied by the PG&E specific emissions factor to determine the GHG emissions reduction that would result from the installation of all four of these proposed systems (see Table B-6 for calculations). .		Solar Feasibility Study Data: City of Fremont Displaced Electricity Emission Factors: PG&E

Appendix C:
Cost Estimate Analysis Assumptions

Introduction

As part of assessing feasibility of actions and priorities, the CAP includes an economic analysis of proposed GHG reduction measures. The analysis considered costs to the City; and both costs and savings to residents, property owners, and businesses associated with each action. These costs and savings were categorized into very low, low, medium, and high using the ranges provided in Table C-1.

Cost to City

For the City, the primary costs associated with implementing the CAP are capital costs and program implementation costs. Actions were analyzed for initial implementation costs, which typically incluced administrative costs for new programs and initital capital costs for infrastructure projects. While estimated GHG reductions for these programs and estimates were calculated as part of the development of the CAP, monetary savings were not estimated-these would be developed during more detailed engineering and program design. However, based on the City's preliminary experience with several of the CAP implementation measures, such as replacement of streetlights with LED fixtures, many measures will result in operating cost savings that will exceed the initial investment.

Cost to Resident or Business

Although many GHG reduction actions do not result in any notable private costs, the economic implications of some actions to the resident or property owner merit analysis and quantification, where possible. The cost analysis for residents or property owners was framed in terms of annual costs (or average annual costs). While several actions have costs that are mandatory (i.e. Water Efficient Landscape Ordinance), others are voluntary (i.e., water efficiency retrofits). However, there are funding sources and financing mechanisms available to help offset private costs. In order to provide a comparable assessment of costs, the calculations were based on a hypothetical average resident or business. For nearly every action with private cost implications, there are savings that would accrue over time, defraying some of the initial investment.

Cost Assumptions

Table C-1.1 (below) describes the cost inputs that were factored into the overall cost assumptions for each measure. Table C-1.2 describes the dollar amount associated with each category of cost (i.e., Cost Neutral, Very Low, Low Medium, High), as determined for the Public and Private sectors. Tables C-2 through C-6 describe the economic assumptions that factored into the overall cost determination for each individual action.

The inputs for each action include one-time costs, annual labor hours, annual FTE (burdened labor cost), annual labor cost, annual non-labor cost, percentage from internal funding, internal one-time cost and internal annual cost. The internal one-time cost is determined by multiplying the percentage from internal funding times applicable one-time costs. The internal annual cost is the sum of the annual labor cost and the annual non-labor costs. Total action costs are the sum of the internal one-time costs and internal annual costs that accrue from the assumed implementation year of 2013 to the horizon year 2020.

Table C-1.1: Cost Inputs

Cost Inputs	
Burdened labor cost (1 FTE)	$115,000
FTE Hours per Year	2,080
Start Year	2013
End Year	2020
Total Years	7

Table C-1.2: Cost Effect of Action for Public and Private Sectors

Effect of Action	Public Sector Cost (total)	Private Sector Cost (total)
Cost Neutral/NA	$0.00	$0.00
Very Low	$10,000 and below	Below $100
Low	$10,001 - $20,000	$101 - $200
Medium	$20,001 - $100,000	$201 - $1,000
High	Above $100,000	Above $1,000

Please note that the ranges between Public Sector Cost and Private Sector Cost are different due to the relative scales of the City's budget and that of a household or small business budget.

Table C-2: Cost Estimate Assumptions by Action—Land Use and Mobility

Chapter Two: Land Use and Mobility									
Transit-Oriented Development								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$45,188	State
L-A1	Apply transit-oriented development principles at the Fremont, Irvington, and Warm Springs BART Stations, the Centerville train station, and the City Center, and consider other opportunities, particularly the Fremont Boulevard corridor.				One-Time Cost: NA Labor: 0.03 FTE annually in TOD planning Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	52	0.03	$2,875	$0	100%	$0	$2,875		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$20,125		Medium			NA				
Action					***Cost Assumptions***				
L-R5	Prohibit redesignation and rezoning of land for lower intensity land uses in transit-oriented development areas, areas within walking distance of basic services, and other areas served by transit systems.				One-Time Cost: $15K to develop land-use policy Labor: 0.01 FTE annually in planning/permitting Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$15,000	26	0.01	$1,438	$0	100%	$15,000	$1,438		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$25,063		Medium			NA				

Table C-2: Cost Estimate Assumptions by Action—Land Use and Mobility

Chapter Two: Land Use and Mobility									
Pedestrian Improvements								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$8,442,625	State
L-A2	Continue implementation of the City's Pedestrian Master Plan to improve pedestrian infrastructure (such as sidewalks and conveniently located crosswalks) for walking throughout the community, in order to support increased pedestrian trips.				One-Time Cost: $11.2M for pedestrian improvements, per Pedestrian Master Plan Labor: NA Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$11,200,000	0	0.00	$0	$0	75%	$8,400,000	$0		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$8,400,000		High			NA				
Action					***Cost Assumptions***				
L-R3	Require new sidewalk construction to meet the five-foot width minimum requirement, to enhance usability by pedestrians and those using mobility devices.				One-Time Cost: $15K for building code amendment Labor: 0.01 FTE for code implementation Non-Labor: Assumes the incremental cost of extra concrete is negligible				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$15,000	26	0.01	$1,438	$0	100%	$15,000	$1,438		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$25,063		Medium			NA				
Action					***Cost Assumptions***				
L-R7	Require new developments, particularly those within transit-oriented areas and along transit corridors, to provide pedestrian, bicycle and transit amenities as a condition of approval.				One-Time Cost: $7.5K to develop ordinance Labor: 0.01 FTE annually to apply new bike/ped/transit requirements Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$7,500	26	0.01	$1,438	$0	100%	$7,500	$1,438		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$17,563		Low			High				

Table C-2: Cost Estimate Assumptions by Action—Land Use and Mobility

Chapter Two: Land Use and Mobility									
Bicycle Improvements								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$24,975,188	State
L-A3	Continue implementation of the City's Bicycle Master Plan to improve bicycle infrastructure, in order to support increased bicycle trips.				One-Time Cost: $30.6M for 66 miles of bike lanes, per Bicycle Master Plan Labor: $380K annually for maintenance, per Bicycle Master Plan Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$30,600,000	0	0.00	$0	$380,000	75%	$22,950,000	$285,000		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$24,945,000		High			NA				
Action					***Cost Assumptions***				
L-P1	In newly constructed and remodeled non-residential buildings, encourage the provision of amenities, such as showering and changing facilities, to enable walking and bicycle use by employees.				One-Time Cost: NA Labor: 0.03 FTE annually for outreach to building owners Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	52	0.03	$2,875	$0	100%	$0	$2,875		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$20,125		Medium			High				
Action					***Cost Assumptions***				
L-R7	Require new developments, particularly those within transit-oriented areas and along transit corridors, to provide pedestrian, bicycle and transit amenities as a condition of approval.				One-Time Cost: $7.5K to develop ordinance Labor: 0.01 FTE annually to apply new bike/ped/transit requirements Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	26	0.01	$1,438	$0	100%	$0	$1,438		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$10,063		Low			High				

Table C-2: Cost Estimate Assumptions by Action—Land Use and Mobility

Chapter Two: Land Use and Mobility									
Transportation Demand Management								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$165,844	State
L-A4	Encourage the reduction of single-occupancy vehicle use by establishing a commuter shuttle service program, to connect local business districts to Amtrak, BRT, and BART stations.				One-Time Cost: NA Labor: 0.05 FTE annually to work with local businesses Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	104	0.05	$5,750	$0	100%	$0	$5,750		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$40,250		Medium			High				
Action					***Cost Assumptions***				
L-R1	Require employers to provide preferential parking for carpools.				One-Time Cost: $15K to develop an ordinance/regulations on preferential parking/carpooling Labor: 0.03 FTE annually to enforce regulations Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$15,000	52	0.03	$2,875	$0	100%	$15,000	$2,875		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$35,125		Medium			High				
Action					***Cost Assumptions***				
L-R2	Require Transportation Demand Management strategies be implemented when developments outside transit-oriented development areas request increased development capacity (e.g. increases in floor area ratios).				One-Time Cost: $7.5K to develop ordinance Labor: 0.03 FTE annually to apply requirements Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$7,500	52	0.03	$2,875	$0	100%	$7,500	$2,875		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$27,625		Medium			High				

Table C-2: Cost Estimate Assumptions by Action—Land Use and Mobility

Chapter Two: Land Use and Mobility									
Transportation Demand Management Continued								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			continued from previous page	continued from previous page
L-C3	Collaborate with regional transportation agencies and the Chamber of Commerce to provide information about, and access to, incentives and services to increase the use of alternatives to single-occupant auto commuting, for employers of all sizes throughout the community. Examples include the Commuter Check and Bicycle Commuter Check Programs.				One-Time Cost: $10k for outreach campaign Labor: 0.03 FTE annually to work with external agencies Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$10,000	52	0.03	$2,875	$0	75%	$7,500	$2,156		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$22,594		Medium			Varies				
Action					***Cost Assumptions***				
L-C4	Partner with regional transportation agencies to encourage and facilitate the development of car-sharing, carpooling and other services that reduce the need to own a personal motor vehicle.				One-Time Cost: NA Labor: 0.03 FTE annually to partner with external agencies Non-Labor: NA (combined with LC-3)				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
See Action L-C3									
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
See Action L-C3									
Action					***Cost Assumptions***				
L-P2	Encourage employers to provide transit subsidies, bicycle facilities, alternative work schedules, flextime, telecommuting and work-at-home programs, and other measures to reduce peak hour travel demand.				One-Time Cost: NA Labor: 0.05 FTE annually to work with employers Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	104	0.05	$5,750	$0	100%	$0	$5,750		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$40,250		Medium			High				

Table C-2: Cost Estimate Assumptions by Action—Land Use and Mobility

Chapter Two: Land Use and Mobility

Alternative Fuel Infrastructure

Action Cost Subtotal	GHG Reduction Potential in 2020
$11,250	State

Action					*Cost Assumptions*		
L-C1	Cooperate with regional agencies seeking to develop a network of fuel stations for vehicles using electricity, biofuels, and other non-fossil fuel energy sources, using *"Ready, Set, Charge, California! A Guide to EV Ready Communities"* as a primary source.				One-Time Cost: NA Labor: 0.03 FTE annually to work with external agencies Non-Labor: NA		
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***
$0	52	0.03	$2,875	$0	NA	$0	$0
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$0		Cost Neutral			NA		
Action					***Cost Assumptions***		
L-R6	Consider requirements to provide pre-wiring for electric vehicle charging in new home construction as part of a Green Building program.				One-Time Cost: $15K to review EV charging requirements Labor: NA Non-Labor: NA		
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***
$15,000	0	0.00	$0	$0	75%	$11,250	$0
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$11,250		Low			High		

Vehicle Efficiency

Action Cost Subtotal	GHG Reduction Potential in 2020
$22,594	State

Action					*Cost Assumptions*		
L-C2	Collaborate with other agencies and the State of California to disseminate information about the "Just Check It" program, which addresses the importance and benefits of proper tire inflation.				One-Time Cost: $10K for outreach campaign Labor: 0.03 FTE annually to collaborate with other agencies Non-Labor: NA		
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***
$10,000	52	0.03	$2,875	$0	75%	$7,500	$2,156
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$22,594		Medium			NA		

Table C-2: Cost Estimate Assumptions by Action—Land Use and Mobility

Chapter Two: Land Use and Mobility									
Vehicle Idling								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$92,938	State
L-R4	Require applicants for private schools to submit plans for managing vehicular movement and parking which serves the school, and include, as a condition of approval, measures to address vehicle idling.				One-Time Cost: $7.5K to develop an ordinance/regulations on vehicle management Labor: 0.03 FTE annually for plan review and approval Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$7,500	52	0.03	$2,875	$0	100%	$7,500	$2,875		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$27,625		Medium			High				
Action					***Cost Assumptions***				
L-R8	Adopt regulations restricting locations of drive-through businesses to reduce the impacts of vehicle idling on adjacent uses, such as housing, schools, and health care facilities.				One-Time Cost: $7.5K to develop an ordinance/regulations on drive-through businesses Labor: 0.03FTE annually Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$7,500	52	0.03	$2,875	$0	100%	$7,500	$2,875		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$27,625		Medium			NA				
Action					***Cost Assumptions***				
L-C5	Partner with both public and private educational and childcare institutions to address vehicle idling at drop-off /pick-up locations serving the institutions.				One-Time Cost: NA Labor: 0.03 FTE annually for outreach to institutions Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	52	0.03	$2,875	$0	75%	$0	$2,156		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$15,094		Low			High				
Action					***Cost Assumptions***				
L-C6	Partner with BART, Washington Hospital, Kaiser Permanente and other large institutions to address vehicle idling at their facilities, through a public education campaign, signage, and enforcement program.				One-Time Cost: $10K for a vehicle idling campaign Labor: 0.03 FTE annually for coordination with other agencies/institutions Non-Labor: $10K annually for community events (e.g., event fees, posters, handouts)				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$10,000	52	0.03	$2,875	$0	75%	$7,500	$2,156		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$22,594		Medium			High				

Table C-2: Cost Estimate Assumptions by Action—Land Use and Mobility

Chapter Two: Land Use and Mobility Total Cost of All Land Use and Mobility Actions								
One Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One Time Cost***	***Internal Annual Cost***	**Total Action Costs**
$41,920,000	936	0.45	$51,800	$380,000	NA	$31,458,800	$328,100	**$33,755,600**

Table C-3: Cost Estimate Assumptions by Action—Energy

Chapter 3: Energy

Energy Efficiency Improvements-Existing, Residential (Weatherization)

Action Cost Subtotal	GHG Reduction Potential in 2020
$79,219	1,874

Action					*Cost Assumptions*		
E-A1	Work towards utilizing existing programs offered by Pacific Gas and Electric for weatherizing the homes of all qualifying low-income households in Fremont.				One-Time Cost: NA Labor: 0.03 FTE annually to apply existing weatherizing programs Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	52	0.03	$2,875	$0	75%	$0	$2,156
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$15,094		Low			Low		

Energy Efficiency Improvements-Existing, Residential

Action Cost Subtotal	GHG Reduction Potential in 2020
$79,219	168

Action					*Cost Assumptions*		
E-A2	Utilize existing funding programs, such as Community Development Block Grant programs, to achieve energy efficiency improvements in existing and new buildings.				One-Time Cost: NA Labor: Assumes cost neutral to continue existing program Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	0	0.00	$0	$0	100%	$0	$0
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$0		Cost Neutral			High		
Action					*Cost Assumptions*		
E-C1	Participate in the California Comprehensive Residential Building Retrofit Program, known as "Energy Upgrade California in Alameda County" and funded by the federal America Recovery and Reinvestment Act, to promote residential building retrofits.				One-Time Cost: NA Labor: 0.03 FTE annually to collaborate with other local governments, PG&E, etc. on a new program Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	52	0.03	$2,875	$0	100%	$0	$2,875
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$20,125		Medium			Varies		
Action					*Cost Assumptions*		
E-A3	Encourage the installation of energy efficiency retrofits by creating a Property Assessed Clean Energy (PACE) program, which allows qualified residential and non-residential property owners to repay the cost of installing energy efficiency retrofits on their property tax bill.				One-Time Cost: NA Labor: 0.05 FTE annually for outreach and program support to homeowners Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	104	0.05	$5,750	$0	100%	$0	$5,750
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$40,250		Medium			Varies		

Table C-3: Cost Estimate Assumptions by Action—Energy

Chapter 3: Energy									
Energy Efficiency Improvements-Existing, Residential								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			continued from previous page	continued from previous page
E-C6	Work with Pacific Gas and Electric to increase awareness and use of financial incentives to assist residential and commercial customers to improve energy efficiency.				One-Time Cost: $10K in outreach campaign costs (e.g. website, pamphlets, posters) Labor: 0.03 FTE annually to conduct outreach to residents and businesses Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$10,000	52	0.03	$2,875	$0	75%	$7,500	$2,156		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$11,297		Medium			High				
Action					***Cost Assumptions***				
E-P7	Provide support and incentives to increase energy efficiencies and partner with others to create tools and incentives to achieve this goal.				One-Time Cost: NA Labor: 0.03 FTE annually to collaborate with other agencies, PG&E, etc. to create energy efficiency incentives Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	52	0.03	$2,875	$0	75%	$0	$2,156		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$7,547		Low			Varies				

Table C-3: Cost Estimate Assumptions by Action—Energy

Chapter 3: Energy

Energy Efficiency Improvements-Existing, Residential (CYES)

Action Cost Subtotal	GHG Reduction Potential in 2020
$141,911	447

Action		*Cost Assumptions*
E-C2	Continue the annual collaboration with the California Youth Energy Services (CYES) program to conduct residential energy audits and to distribute compact fluorescent light bulbs and compact fluorescent lamp torchieres as replacements for halogen torchieres in Fremont households.	One-Time Cost: NA Labor: Assumes cost neutral to continue existing program Non-Labor: NA

One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	40	0.02	$2,212	$105,127*	17.2%	$0	$20,273

Total Action Costs	Relative Cost to City	Relative Private Cost
$141,911	High	NA

*Note: City annual contribution = $18,061; Water District annual contribution = $5,000; PG&E annual contribution (through the East Bay Energy Watch program) = $82,066; Source: City of Fremont, 2013 "

Action		*Cost Assumptions*
E-C3	Continue the annual collaboration with the California Youth Energy Services program to conduct residential energy and water audits and to distribute water-saving shower heads and faucet aerators to Fremont households, to replace less efficient fixtures. (This action is also listed in the "Water" Chapter).	One-Time Cost: NA Labor: Assumes cost neutral to continue existing program Non-Labor: NA

One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
See Action E-C2							

Total Action Costs	Relative Cost to City	Relative Private Cost
See Action E-C2		

Energy Star Appliances

Action Cost Subtotal	GHG Reduction Potential in 2020
$37,688	655

Action		*Cost Assumptions*
E-C5	Work with Pacific Gas and Electric in a public information and education campaign to encourage every household and business to reduce their energy consumption and to utilize more energy efficient lighting and appliances.	One-Time Cost: $10K in outreach campaign costs (e.g. website, pamphlets, posters) Labor: Assumes 0.05 FTE annually to conduct outreach to residents and businesses Non-Labor: NA

One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$10,000	104	0.05	$5,750	$0	75%	$7,500	$4,313

Total Action Costs	Relative Cost to City	Relative Private Cost
$37,688	Medium	Varies

Table C-3: Cost Estimate Assumptions by Action—Energy

Chapter 3: Energy									
Energy Efficiency Improvements-Existing Buildings, Non-Residential								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$15,094	395
E-A2	Utilize existing funding programs, such as Community Development Block Grant programs, to achieve energy efficiency improvements in existing and new buildings.				One-Time Cost: NA Labor: Assumes cost neutral to continue existing program Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	0	0.00	$0	$0	100%	$0	$0		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$0		Cost Neutral			Varies				
Action					***Cost Assumptions***				
E-C4	Continue to partner with Pacific Gas and Electric to offer energy efficiency programs for commercial buildings.				One-Time Cost: NA Labor: Assumes cost neutral to continue existing program Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	0	0.00	$0	$0	100%	$0	$0		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$0		Cost Neutral			Low				
Action					***Cost Assumptions***				
E-C6	Work with Pacific Gas and Electric to increase awareness and use of financial incentives to assist residential and commercial customers to improve energy efficiency.				One-Time Cost: $10K in outreach campaign costs (e.g. website, pamphlets, posters) Labor: 0.03 FTE annually to conduct outreach to residents and businesses Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	52	0.03	$2,875	$0	75%	$0	$2,156		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$7,547		Cost Neutral			Varies				
Action					***Cost Assumptions***				
E-P7	Provide support and incentives to increase energy efficiencies and partner with others to create tools and incentives to achieve this goal.				One-Time Cost: NA Labor: 0.03 FTE annually to collaborate with other agencies, PG&E, etc. to create energy efficiency incentives Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	52	0.03	$2,875	$0	75%	$0	$2,156		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$7,547		Low			Very Low				

Table C-3: Cost Estimate Assumptions by Action—Energy

Chapter 3: Energy

Energy Efficiency Improvements-New Buildings, Non-Residential

Action Cost Subtotal	GHG Reduction Potential in 2020
$15,000	NA

Action					*Cost Assumptions*		
E-A4	Consider establishing 'energy budgets' for newly-constructed and remodeled single family homes over a certain square footage beyond that which is required by State law.				One-Time Cost: $15K for analysis of energy budget development Labor: NA Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$15,000	0	0.00	$0	$0	100%	$15,000	$0
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$15,000		Low			Medium - High		

Energy Efficiency Improvements-Public Lighting

Action Cost Subtotal	GHG Reduction Potential in 2020
$75,375	1,049

Action					*Cost Assumptions*		
E-P1	Encourage the replacement of high-pressure sodium and mercury vapor lights used in existing private streets and private parking lots with energy-efficient alternatives, such as light-emitting diodes (LEDs).				One-Time Cost: NA Labor: 0.05 FTE annually to conduct outreach Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	104	0.05	$5,750	$0	100%	$0	$5,750
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$40,250		Medium			High		
Action					*Cost Assumptions*		
E-R2	Develop and enforce performance standards for exterior lighting of commercial and industrial buildings and parking lots, which will include minimum and maximum lighting levels while providing a safe environment.				One-Time Cost: $15K for development of lighting performance standards Labor: 0.03 FTE annually to enforce standards during permitting phase Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$15,000	52	0.03	$2,875	$0	100%	$15,000	$2,875
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$35,125		Medium			High		

Table C-3: Cost Estimate Assumptions by Action—Energy

Chapter 3: Energy

Renewable Energy-Existing & New, Residential & Non-Residential (Solar Hot Water)

Action Cost Subtotal	GHG Reduction Potential in 2020
$20,125	433

Action		*Cost Assumptions*
E-P3	Promote existing solar thermal programs, such as PG&E's Solar Water Heating Rebate and the California Solar Initiative's Thermal Program, to encourage the installation of solar hot water systems in existing and new residential and commercial buildings.	One-Time Cost: NA Labor: 0.03 FTE annually for outreach to building owners Non-Labor: NA

One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	52	0.03	$2,875	$0	100%	$0	$2,875

Total Action Costs	Relative Cost to City	Relative Private Cost
$20,125	Medium	High

Renewable Energy-Existing & New, Residential & Non-Residential (Solar Photovoltaic)

Action Cost Subtotal	GHG Reduction Potential in 2020
$30,000	5,738

Action		*Cost Assumptions*
E-P5	Consider requirements to provide pre-wiring for future solar photovoltaics and other renewable on-site power generation systems in new home construction as part of a Green Building program.	One-Time Cost: $15K for development of Green Building program elements Labor: NA Non-Labor: NA

One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$15,000	0	0.00	$0	$0	100%	$15,000	$0

Total Action Costs	Relative Cost to City	Relative Private Cost
$15,000	Low	High

Action		*Cost Assumptions*
E-R1	Eliminate local regulatory barriers to installation of distributed renewable energy systems, such as wind and solar, through revisions to the zoning code and other relevant city policies.	One-Time Cost: $15K for policy/zoning code amendments Labor: NA Non-Labor: NA

One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$15,000	0	0.00	$0	$0	100%	$15,000	$0

Total Action Costs	Relative Cost to City	Relative Private Cost
$15,000	Low	NA

Table C-3: Cost Estimate Assumptions by Action—Energy

Chapter 3: Energy

Energy Efficiency Improvements & Peak Load Reduction-Smart Grid

Action Cost Subtotal	GHG Reduction Potential in 2020
$20,000	3,785

Action		*Cost Assumptions*
E-P4	Facilitate adoption of smart grid and other peak load reduction technologies, such as building energy management systems and smart appliances, within new and existing buildings.	One-Time Cost: NA Labor: 0.03 FTE annually to coordinate with developers during planning and permitting Non-Labor: NA

One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	52	0.03	$2,875	$0		$0	$0

Total Action Costs	Relative Cost to City	Relative Private Cost
$20,000	Low	High

Building Shade Trees

Action Cost Subtotal	GHG Reduction Potential in 2020
$30,125	70

Action		*Cost Assumptions*
E-P2	Promote tree planting throughout the City, to provide shade on buildings which reduces demand for air conditioning and helps reduce the 'urban heat island' effect.	One-Time Cost: $10K in outreach campaign costs Labor: 0.03 FTE annually for planning/pursuing grants Non-Labor: NA

One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$10,000	52	0.03	$2,875	$0	100%	$10,000	$2,875

Total Action Costs	Relative Cost to City	Relative Private Cost
$30,125	Medium	Medium - High

Alternative Fuel-Off-road Equipment

Action Cost Subtotal	GHG Reduction Potential in 2020
$20,125	NA

Action		*Cost Assumptions*
E-P6	Encourage business owners to convert or replace their gasoline-powered gardening equipment, such as lawn mowers, leaf blowers, and edge trimmers, with electric equipment.	One-Time Cost: NA Labor: 0.03 FTE annually for outreach to local businesses Non-Labor: NA

One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	52	0.03	$2,875	$0	100%	$0	$2,875

Total Action Costs	Relative Cost to City	Relative Private Cost
$20,125	Medium	High

Chapter 3: Energy
Total Cost of All Energy Actions

Capital Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal Capital Cost*	*Internal Annual Cost*	Total Action Costs
$109,000	924	0.44	$51,100	$-	NA	$104,000	$43,200	**$392,300**

Table C-4: Cost Estimate Assumptions by Action—Solid Waste

Chapter Four: Solid Waste									
Extended Producer Responsibility								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$10,063	NA
SW-A1	Support Extended Producer Responsibility legislation and processes.				One-Time Cost: NA Labor: 0.01 FTE annually in policy support Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	26	0.01	$1,438	$0	100%	$0	$1,438		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$10,063		Low			Varies				
Waste Diversion-Single-use Disposables								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$10,063	NA
SW-A2	Support legislation that reduces waste and litter from single-use disposable items.				One-Time Cost: NA Labor: 0.01 FTE annually in policy support Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	26	0.01	$1,438	$0	100%	$0	$1,438		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$10,063		Low			NA				

Table C-4: Cost Estimate Assumptions by Action—Solid Waste

Chapter Four: Solid Waste

Certified Green Businesses

Action					Cost Assumptions			Action Cost Subtotal	GHG Reduction Potential in 2020
SW-A3	Increase the number of Certified Green Businesses each year.				One-Time Cost: $10K for an outreach campaign Labor: 0.03 FTE annually to conduct outreach to local businesses Non-Labor: NA			$30,125	NA
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*		
$10,000	52	0.03	$2,875	$0	100%	$10,000	$2,875		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$30,125		Medium			Varies				

Methane Capture

Action					Cost Assumptions			Action Cost Subtotal	GHG Reduction Potential in 2020
SW-C1	Work with Waste Management, Inc. to capture and recover methane gas to use as an energy source at the Tri-Cities Recycling and Disposal Facility and the Altamont Landfill and Resource Recovery Facility.				One-Time Cost: NA Labor: 0.03 FTE annually to collaborate with WM Non-Labor: NA			$15,094	32,222
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*		
$0	52	0.03	$2,875	$0	75%	$0	$2,156		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$15,094		Low			NA				

Table C-4: Cost Estimate Assumptions by Action—Solid Waste

Chapter Four: Solid Waste									
Waste Diversion- Recycled Paper, Residential and Non-Residential								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$275,406	4,129
SW-A4	Encourage large waste-generating businesses to get a free waste audit from the City of Fremont.				One-Time Cost: NA Labor: 0.03 FTE annually to conduct outreach to large waste generators Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	52	0.03	$2,875	$0	100%	$0	$2,875		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$20,125		Medium			NA				
Action					***Cost Assumptions***				
SW-A6	Develop policies and support new technologies to improve waste reduction, recycling and resource recovery programs for materials.				One-Time Cost: $15K for policy development Labor: 0.05 FTE annually to research/ write, etc Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$15,000	104	0.05	$5,750	$0	100%	$15,000	$5,750		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$55,250		Medium			NA				
Action					***Cost Assumptions***				
SW-A9	Increase recovery of recyclable materials from the commercial and residential sectors to 75%.				One-Time Cost: $5K for an outreach campaign (combine with SW-A7) Labor: 0.03 FTE annually for outreach Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$5,000	52	0.03	$2,875	$0	100%	$5,000	$2,875		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$25,125		Medium			NA				
Action					***Cost Assumptions***				
SW-A11	Increase recovery of recyclable materials from the commercial and residential sectors to 90%.				One-Time Cost: $10K for an out-reach campaign (higher level to get to 90%) Labor: 0.05 FTE annually for outreach Non-Labor: $5K annually for outreach materials (pamphlets, posters, etc.)				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$10,000	104	0.05	$5,750	$5,000	100%	$10,000	$10,750		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$79,500		Medium			NA				

Table C-4: Cost Estimate Assumptions by Action—Solid Waste

Chapter Four: Solid Waste									
Waste Diversion-Recycled Paper, Residential and Non-Residential								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			continued from previous page	continued from previous page
SW-C2	Partner with California Youth Energy Services staff to provide information on recycling and composting that can be distributed to residents when CYES performs their energy audits.				One-Time Cost: NA Labor: 0.03 FTE annually for coordination Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
See Action E-C2									
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
See Action E-C2									
Action					***Cost Assumptions***				
SW-R1	Implement commercial recycling by July 1, 2012, as required by the State of California and Alameda County.				One-Time Cost: $15K in program development Non-Labor: 0.05 FTE annually for outreach/program implemention Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$15,000	104	0.05	$5,750	$0	100%	$15,000	$5,750		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$55,250		Medium			NA				
Action					***Cost Assumptions***				
SW-R3	Require recycling as a condition of permit issuance for special events that must secure city-issued permits.				One-Time Cost: $5K for permitting amendment Labor: 0.01 FTE annually to apply new requiremnets Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$15,000	26	0.01	$1,438	$0	100%	$15,000	$1,438		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$25,063		Medium			Low				

Table C-4: Cost Estimate Assumptions by Action—Solid Waste

Chapter Four: Solid Waste

Waste Diversion-Food & Compostable Paper

Action Cost Subtotal	GHG Reduction Potential in 2020
$104,625	4,650

Action		*Cost Assumptions*
SW-A8	Increase recovery of organic materials from the commercial and residential sectors to 75%.	One-Time Cost: $5K for an outreach campaign (combine with SW-A10) Labor: 0.03 FTE annually for outreach Non-Labor: NA

One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$5,000	52	0.03	$2,875	$0	100%	$5,000	$2,875

Total Action Costs	Relative Cost to City	Relative Private Cost
$25,125	Medium	High

Action		*Cost Assumptions*
SW-A10	Increase recovery of organic materials from the commercial and residential sectors to 90%.	One-Time Cost: $10K for an outreach campaign (higher level to get to 90%) Labor: 0.05 FTE annually for outreach Non-Labor: $5K annually for outreach materials (pamphlets, posters, etc.)

One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$10,000	104	0.05	$5,750	$5,000	100%	$10,000	$10,750

Total Action Costs	Relative Cost to City	Relative Private Cost
$79,500	Medium	High

Waste Diversion-Food & Compostable Paper, Residential & Non-Residential

Action Cost Subtotal	GHG Reduction Potential in 2020
$0	1,185

Action		*Cost Assumptions*
SW-A7	Institute programs for multi-family units to allow for the collection and composting of food waste and compostable paper where feasible.	One-Time Cost: NA Labor: Assumes cost neutral compared to existing program Non-Labor: NA

One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	0	0.00	$0	$0	100%	$0	$0

Total Action Costs	Relative Cost to City	Relative Private Cost
$0	Cost Neutral	High

Table C-4: Cost Estimate Assumptions by Action—Solid Waste

Chapter Four: Solid Waste									
Waste Diversion-Construction & Demolition								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$85,375	193
SW-A5	Increase the amount of construction and demolition debris recycled from private-sector projects.				One-Time Cost: $10K for an out-reach campaign Labor: 0.03 FTE annually for outreach to developers/builders Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$10,000	52	0.03	$2,875	$0	100%	$10,000	$2,875		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$30,125		Medium			High				
Action					***Cost Assumptions***				
SW-R2	Comply with the California Green Building Code, effective January 1, 2011, which requires all new residential buildings to recycle 65% of the material generated from the project.				One-Time Cost: $15K for ordinance development Labor: 0.05 FTE annually for implementation Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$15,000	104	0.05	$5,750	$0	100%	$15,000	$5,750		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$55,250		Medium			Low -Med				

Chapter Four: Solid Waste Total Cost of All Solid Waste Actions								
Capital Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal Capital Cost***	***Internal Annual Cost***	**Total Action Costs**
$100,000	806	0.39	$44,600	$10,000	NA	$100,000	$53,800	**$465,400**

Table C-5: Cost Estimate Assumptions by Action—Water

Chapter Five: Water									
Water Efficiency Improvements-Indoor, Existing Buildings, Residential & Non-Residential								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$0	State
W-A1	Continue the annual collaboration with the California Youth Energy Services program to conduct residential energy and water audits and to distribute watersaving shower heads and faucet aerators to Fremont households, as replacements for less effi cient fi xtures. (This action is also listed in the "Energy" Chapter).				One-Time Cost: NA Labor: Assumes cost neutral compared to existing program Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
See Action E-C2									
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
See Action E-C2									
Water Efficiency Improvements-Outdoor, New Buildings, Residential & Non-Residential								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$0	State
W-C1	Continue to implement the Water Efficient Landscape Ordinance for private development.				One-Time Cost: NA Labor: Assumes cost neutral compared to existing program Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	0	0.00	$0	$0	75%	$0	$0		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$0		Cost Neutral			High				

Table C-5: Cost Estimate Assumptions by Action—Water

Chapter Five: Water									
Water Efficiency Improvements-Indoor & Outdoor, New & Existing Buildings, Residential & Non-Residential								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$30,141	State
W-C2	Collaborate with Alameda County Water District to implement voluntary water conservation and reclamation programs.				One-Time Cost: NA Labor: 0.03 FTE annually for program implementation and collaboration with ACWD (combine with W-C3) Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	52	0.03	$2,875	$0	75%	$0	$2,156		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$15,094		Low			High				
Action					***Cost Assumptions***				
W-C3	Collaborate with Alameda County Water District to adopt a retrofit program to encourage installation of water conservation measures in existing businesses and residences.				One-Time Cost: $10K for an out-reach campaign Labor: 0.01 FTE annually to collaborate with ACWD (combine with W-C2) Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$10,000	26	0.01	$1,438	$0	75%	$7,500	$1,078		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$15,047		Low			High				
Water Efficiency Improvements-Recycled Water								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$11,297	State
W-C4	Collaborate with Alameda County Water District and Union Sanitary District to support the use of recycled water.				One-Time Cost: $5K in program development costs (combine with W-C5, W-C6) Labor: 0.01 FTE annually for coordination with ACWD (combine with W-C6) Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$5,000	26	0.01	$1,438	$0	75%	$3,750	$1,078		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$11,297		Low			High				

Table C-5: Cost Estimate Assumptions by Action—Water

Chapter Five: Water									
Greywater Systems								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$86,672	State
W-P1	Encourage use of on-site recycled water systems, (also known as 'greywater systems' or "laundry to landscape') consistent with all environmental and health and safety regulations and Alameda County Water District policies and requirements.				One-Time Cost: $10K for an outreach campaign Labor: 0.03 FTE annually for outreach Non-Labor: NA"				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$10,000	52	0.03	$2,875	$0	100%	$10,000	$2,875		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$30,125		Medium			High				
Action					***Cost Assumptions***				
W-C5	Support development of a process for permitting, registration, and inspection of greywater systems by the City.				One-Time Cost: $5K for development of a greywater program (combine with W-C6) Labor: 0.05 FTE annually for program implementation Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$5,000	104	0.05	$5,750	$0	100%	$5,000	$5,750		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$45,250		Medium			High				
Action					***Cost Assumptions***				
W-C6	Consult with ACWD in developing policies and regulations supporting the use of water conserving strategies, including greywater systems.				One-Time Cost: $5K in program development costs (combine with W-C4, W-C5) Labor: 0.01 FTE annually for coordination with ACWD (combine with W-C4) Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$5,000	26	0.01	$1,438	$0	75%	$3,750	$1,078		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$11,297		Low			High				

Chapter Five: Water Total Cost of All Wate Actions								
Capital Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal Capital Cost***	***Internal Annual Cost***	**Total Action Costs**
$35,000	286	0.14	$15,800	$-	NA	$30,000	$14,000	**$128,100**

Table C-6: Cost Estimate Assumptions by Action—Municipal Services and Operations

Chapter Six: Municipal Services and Operations

Municipal Transportation-Fleet Fuel Conversion

Action Cost Subtotal	GHG Reduction Potential in 2020
$220,500	324

Action					*Cost Assumptions*		
M1	Continue replacing gasoline and diesel-powered fleet vehicles with alternative fuel vehicles, such as hybrids, compressed natural gas, and electric vehicles.				One-Time Cost: $200K price premium for purchase of 30 new hybrid or electric vehicles Labor: Assumes cost neutral compared to existing program Non-Labor: Assumes cost neutral compared to existing program		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$206,250	0	0.00	$0	$0	100%	$206,250	$0
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$206,250		High			NA		
Action					*Cost Assumptions*		
M2	Install charging and refueling stations at appropriate sites throughout the city to service the fleet's alternative fuel vehicles.				One-Time Cost: $19K to install two EV fueling stations Labor: NA Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$19,000	0	0.00	$0	$0	75%	$14,250	$0
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$14,250		Low			NA		

Vehicle Idling

Action Cost Subtotal	GHG Reduction Potential in 2020
$13,740	NA

Action					*Cost Assumptions*		
M3	Educate and encourage City staff to limit idling when using fleet vehicles.				One-Time Cost: NA Labor: 0.01 in internal outreach Non-Labor: $1K annually for outreach materials (pamphlets, posters, etc.)		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	20	0.01	$1,106	$1,000	100%	$0	$2,106
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$13,740		Low			NA		

Table C-6: Cost Estimate Assumptions by Action—Municipal Services and Operations

Chapter Six: Municipal Services and Operations

Energy Efficiency Improvements-Public Lighting

Action Cost Subtotal	GHG Reduction Potential in 2020
$6,000,000	1,088

Action					*Cost Assumptions*		
M4	Replace high-pressure sodium and mercury vapor lights used on public streets and public parking lots with energy-efficient alternatives, such as light-emitting diodes (LEDs.)				One-Time Cost: Assumes LED retrofits at $500 per head and 15,000 heads Labor: NA Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$7,500,000	100	0.00	$0	$0	80%	$6,000,000	$0
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$6,000,000		High			NA		

Procurement

Action Cost Subtotal	GHG Reduction Potential in 2020
$1,161	NA

Action					*Cost Assumptions*		
M5	For the biannual Capital Improvement Program Plan, add a new criterion to the "Capital Improvement Project Prioritization Process" addressing the potential for projects (including the purchase of equipment such as vehicles for the City's fleet) to reduce greenhouse gas emissions.				One-Time Cost: $5K to develop new criterion Labor: 0.01 FTE annually to apply new criterion 0.01 FTE annually to apply new criterion Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	3	0.00	$166	$0	100%	$0	$166
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$1,161		Very Low			NA		
Action					*Cost Assumptions*		
M6	For the annual Operating Budget, add a new criterion, to be used in the evaluation and prioritization of equipment purchasing that addresses the potential for projects to reduce greenhouse gas emissions.				One-Time Cost: $5K to develop new criterion Labor: 0.01 FTE annually to apply new criterion (combine with M5) Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
See Action M5							
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
See Action M5							

Table C-6: Cost Estimate Assumptions by Action—Municipal Services and Operations

Chapter Six: Municipal Services and Operations									
Transporation Demand Management-City Employees								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***				
M7	During employee recruitment, advertise the City's incentives and subsidies for choosing alternatives to single-occupant auto commuting.				One-Time Cost: NA Labor: Assumes cost neutral, incorporated into current employee recruiting activities Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	0	0.00	$0	$0	100%	$0	$0		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$0		Cost Neutral			NA				
Action					***Cost Assumptions***				
M8	Provide preferential parking and/or other benefits for carpool and alternative fuel vehicles at City facilities, to encourage and reward carpooling and ownership of alternative fuel vehicles.				One-Time Cost: Assumes cost neutral, included in M20 Labor: Assumes cost neutral, inlcuded in M20 Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	0	0.00	$0	$0	100%	$0	$0		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$0		Cost Neutral			NA			$132,094	25
Action					***Cost Assumptions***				
M9	Provide secure bicycle parking, showers, lockers and other amenities at City facilities to promote bicycle use by both employees and visitors.				One-Time Cost: $146K to install 2 showers, 30 bike racks and 18 lockers Labor: NA Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$146,000	0	0.00	$0	$0	75%	$109,550	$0		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$109,550		High			NA				
Action					***Cost Assumptions***				
M20	Expand and improve existing incentives for City employees to choose alternatives to single-occupant auto commuting, such as flexible work schedules, telecommuting, transit incentives and subsidies, and ridesharing services and subsidies.				One-Time Cost: $10K to improve alternative transportation incentives Labor: 0.03 FTE annually to administer program Non-Labor: NA				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$10,000	52	0.03	$2,875	$0	75%	$7,500	$2,156		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$22,594		Medium			NA				

Table C-6: Cost Estimate Assumptions by Action—Municipal Services and Operations

Chapter Six: Municipal Services and Operations

Waste Diversion-Recycling & Organics

Action					Cost Assumptions			Action Cost Subtotal	GHG Reduction Potential in 2020
M10	Increase the amount of recycling and composting at City facilities.				One-Time Cost: NA Labor: 0.01 FTE annually for internal outreach Non-Labor: NA			$10,063	NA
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*		
$0	26	0.01	$1,438	$0	100%	$0	$1,438		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$10,063		Low			NA				

Waste Diversion-Construction & Demolition

Action					Cost Assumptions			Action Cost Subtotal	GHG Reduction Potential in 2020
M11	Increase construction and demolition debris recycled from public-sector projects.				One-Time Cost: $5K for internal outreach campaign Labor: 0.01FTE annually for coordination Non-Labor: NA			$15,063	NA
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*		
$5,000	26	0.01	$1,438	$0	100%	$5,000	$1,438		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$15,063		Low			NA				

Table C-6: Cost Estimate Assumptions by Action—Municipal Services and Operations

Chapter Six: Municipal Services and Operations									
Waste Reduction-Environmentally Preferable Purchasing, Municipal								***Action Cost Subtotal***	***GHG Reduction Potential in 2020***
Action					***Cost Assumptions***			$64,250	NA
M12	Enhance and expand waste reduction policies and programs for City facilities, such as the environmentally preferable purchasing policy and incorporate new policies in response to innovations in materials and technologies.				One-Time Cost: $10K for policy development Labor: 0.03 FTE annually for ongoing policy development Non-Labor: $1K annually for incremental cost of environmentally preferable purchasing				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$10,000	52	0.03	$2,875	$1,000	100%	$10,000	$3,875		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$37,125		Medium			NA				
Action					***Cost Assumptions***				
M13	Support the source-reduction policy (AR 3.10) by discouraging the purchase of water in single-use, disposable containers by all City departments and agencies. Encourage reductions in the purchase of other beverages sold in single-use, disposable containers.				One-Time Cost: NA Labor: 0.01 in internal outreach Non-Labor: $5K in outreach materials (pamphlets, posters)				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	26	0.01	$1,438	$0	100%	$0	$1,438		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$10,063		Medium			NA				
Action					***Cost Assumptions***				
M14	Increase the use of recycled-content products at City facilities.				One-Time Cost: NA Labor: 0.01 FTE annually for internal outreach Non-Labor: $1K annually for incremental cost of recycled-content products				
One-Time Cost	***Annual Labor Hours***	***Annual FTE***	***Annual Labor Cost***	***Annual Non-Labor Cost***	***Internally Funded***	***Internal One-Time Cost***	***Internal Annual Cost***		
$0	26	0.01	$1,438	$1,000	100%	$0	$2,438		
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**				
$17,063		Varies			NA				

Table C-6: Cost Estimate Assumptions by Action—Municipal Services and Operations

Chapter Six: Municipal Services and Operations

Water Efficiency Improvements-Outdoor, Municipal

Action Cost Subtotal	GHG Reduction Potential in 2020
$10,063	State

Action					*Cost Assumptions*		
M15	Enhance and expand the computer-controlled irrigation system throughout the City's park system to reduce water use by tying watering cycles to soil moisture.				One-Time Cost: Pending Labor: 0.01 FTE annually to analyze and monitor new system Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	26	0.01	$1,438	$0	100%	$0	$1,438
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$10,063		Low			NA		
Action					*Cost Assumptions*		
M18	Continue implementing the Bay-Friendly Landscape requirements for civic improvement projects which include landscaped areas larger than 10,000 square feet.				One-Time Cost: NA Labor: Assumes cost neutral to continue existing program Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	0	0.00	$0	$0	100%	$0	$0
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$0		Cost Neutral			NA		

Water Efficiency Improvements-Indoor, Municipal

Action Cost Subtotal	GHG Reduction Potential in 2020
$26,297	State

Action					*Cost Assumptions*		
M16	Conduct a water audit of all City-owned and operated buildings and facilities and implement measures to reduce water use. Encourage meeting the LEED™ Standards Rating Systems for Existing Buildings or Commercial Interiors or other comparable sets of standards.				One-Time Cost: $25K for a water audit Labor: 0.01 FTE annually to coordinate new building projects Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$25,000	26	0.01	$1,438	$0	75%	$18,750	$1,078
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$26,297		Medium			NA		

Table C-6: Cost Estimate Assumptions by Action—Municipal Services and Operations

Chapter Six: Municipal Services and Operations

Energy Efficiency Improvements-Water & Wastewater Pumps

Action Cost Subtotal	GHG Reduction Potential in 2020
$35,000	2

Action					*Cost Assumptions*		
M17	At the end of the units' useful life, replace least efficient water and wastewater motors and pumps in locations such as City parks with more energy-efficient units.				One-Time Cost: NA Labor: NA Non-Labor: $5K annually for the incremental cost of more efficient motors and pumps		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	0	0.00	$0	$5,000	100%	$0	$5,000
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$35,000		Medium			NA		

Renewable Energy-Municipal

Action Cost Subtotal	GHG Reduction Potential in 2020
$25,000	534

Action					*Cost Assumptions*		
M19	Evaluate the potential for providing solar, wind, and other renewable energy systems at City facilities.				One-Time Cost: $25K for citywide evaluation Labor: NA Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$25,000	0	0.00	$0	$0	100%	$25,000	$0
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$25,000		Medium			NA		

Service Contracts

Action Cost Subtotal	GHG Reduction Potential in 2020
$30,000	NA

Action					*Cost Assumptions*		
M21	Evaluate the potential for setting greenhouse gas emission reduction targets and strategies for services contracted by the City, such as solid waste collection.				One-Time Cost: $25K for contractor evaluation Labor: NA Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$25,000	0	0.00	$0	$0	100%	$25,000	$0
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$25,000		Medium			NA		

Table C-6: Cost Estimate Assumptions by Action—Municipal Services and Operations

Chapter Six: Municipal Services and Operations

Service Contracts

Action Cost Subtotal	GHG Reduction Potential in 2020
continued from previous page	continued from previous page

Action					*Cost Assumptions*		
M22	Include a provision in the next contract with the City's solid waste collector that the provider use alternative fuel vehicles for the fleet which services Fremont.				One-Time Cost: $5K in legal fees for contract amendment Labor: NA Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$5,000	0	0.00	$0	$0	100%	$5,000	$0
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$5,000		Very Low			NA		

Paving Materials

Action Cost Subtotal	GHG Reduction Potential in 2020
$10,063	NA

Action					*Cost Assumptions*		
M23	Evaluate and, where appropriate, pursue the use of new greenhouse gas-reducing paving technologies for street and parking lot pavement projects. Examples include warm mix asphalt and paving with higher albedos (reflectivity) and improved rolling resistance.				One-Time Cost: NA Labor: 0.01 FTE annually to assess paving opportunities Non-Labor: NA		
One-Time Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal One-Time Cost*	*Internal Annual Cost*
$0	26	0.01	$1,438	$0	100%	$0	$1,438
Total Action Costs		**Relative Cost to City**			**Relative Private Cost**		
$10,063		Low			NA		

Chapter Six: Municipal Services and Operations
Total Cost of All Municipal Actions

Capital Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal Capital Cost*	*Internal Annual Cost*	**Total Action Costs**
7,751,000	409	0	$17,100	$8,000	NA	6,426,300	$24,000	**$6,593,300**

All CAP Actions
Total Cost of All CAP Actions

Capital Cost	*Annual Labor Hours*	*Annual FTE*	*Annual Labor Cost*	*Annual Non-Labor Cost*	*Internally Funded*	*Internal Capital Cost*	*Internal Annual Cost*	**Total Action Costs**
$49,896,000	3,361	1.57	$180,400	$417,000	NA	$38,100,000	$482,000	**$41,449,000**

CITY OF
Fremont

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