CITY OF MARTINEZ **CITY COUNCIL AGENDA**
June 3, 2009

TO: Mayor and City Council

FROM: Michael Chandler, Senior Management Analyst

SUBJECT: Climate Action Plan

DATE: May 28, 2009

RECOMMENDATION:

Adopt a resolution approving the City's Climate Action Plan (CAP). Staff met with the Climate Control Subcommittee on May 20th and the Subcommittee recommended forwarding the CAP to the City Council for approval.

BACKGROUND:

The City Council, upon the recommendation of the Climate Control Subcommittee, directed staff to develop a Climate Action Plan (CAP) on June 18, 2008. The CAP presents goals, principles, and strategies for reducing the City's greenhouse gas (GHG) emissions, conserving energy and natural resources, and preparing the community for the expected effects of global warming. The public planning process was a collaborative effort between City staff from various departments and the City's climate planning consultants ESA and Town-Green, with input from the general public. An overview of the CAP process and a draft of the initial Framework Document were presented to the City Council on October 15, 2008. Soon thereafter, the interactive CAP website www.greenmartinez.org was launched, followed by various public outreach efforts. A public workshop was held on February 25, 2009. Public input from this workshop was incorporated into the conceptual strategies itemized within the document, and a draft of the full CAP was released on April 18, 2009. The City accepted public comments on the draft through the middle of May, and incorporated suggestions from the public and the Climate Control Subcommittee into the final CAP. The City will provide annual progress reports regarding the CAP and its implementation to the City Council.

FISCAL IMPACT:

No direct impact on the General Fund to adopt the Climate Action Plan. Many of the conceptual strategies identified within the CAP have associated costs for startup and implementation; however, the City will pursue all available grant funding, including the federal stimulus funds to minimize any impact on the General Fund.

ACTION:

Motion adopting a resolution approving the City's Climate Action Plan.

Attachment: Resolution, Climate Action Plan

APPROVED BY: City Manager

APPROVED BY: Assistant City Manager
Administrative Services Director

RESOLUTION NO. -09

APPROVING THE CITY'S CLIMATE ACTION PLAN (CAP)

WHEREAS, the City of Martinez seeks to reduce the green house gas (GHG) emissions within its City limits and meet the GHG emission reduction targets established by AB32; and

WHEREAS, the City began development of a Climate Action Plan (CAP) in July 2009 with the intent of establishing goals, principles, and strategies for reducing the City's GHG emissions; and

WHEREAS, the City provided a collaborative, public planning process that engaged the community through public workshops and climate planning outreach efforts; and

WHEREAS, the CAP presents numerous strategies the City and its residents may implement to conserve energy and natural resources; prepare for the effects of climate change; and become a more sustainable community.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Martinez does hereby approve the attached Climate Action Plan.

*** * * * * ***

I HEREBY CERTIFY that the foregoing is a true and correct copy of a resolution duly adopted by the City Council of the City of Martinez at a Regular Meeting of said Council held on the 3rd day of June, 2009, by the following vote:

AYES:

NOES:

ABSENT:

RICHARD G. HERNANDEZ, CITY CLERK
CITY OF MARTINEZ

CITY OF MARTINEZ CLIMATE ACTION PLAN

City of Martinez
June 2009

CITY OF MARTINEZ CLIMATE ACTION PLAN

City of Martinez
June 2009

Prepared by: ESA

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CHAPTER 1
Climate Action Plan Framework

A. Introduction

The City of Martinez Climate Action Plan (CAP) presents goals, principles, and strategies for reducing the City's greenhouse gas (GHG) emissions, conserving energy and natural resources, and preparing the community for the expected effects of global warming. The CAP has been developed through a public planning process, under the direction of the City Council. The CAP addresses GHG emissions within the City limits. The CAP has been prepared as a collaborative effort of City staff and the City's consultants, ESA and Town-Green.

The City of Martinez, located in the north-central part of Contra Costa County, is the County seat. Martinez's roots can be traced to the late 1840's, when it served as a ferryboat transit point across the Carquinez straits on the way to the gold fields. By the time of its incorporation in 1876, Martinez had evolved into a major regional post and shipping port. The renowned naturalist John Muir made Martinez his home for nearly a quarter of a century and in 1915, the year after Muir's passing, the legendary baseball great Joe DiMaggio was born here.

There are approximately 14,300 households in the City and the population in 2008 was 36,144 (Bay Area Census, 2000; California Department of Finance, 2008). The predominant land uses in the Downtown area include institutional (25%); residential (24%); and commercial, industrial and office (18%) (City of Martinez, 2005). Commercial uses are concentrated along Main Street and Ferry Street, which together with governmental uses along Court Street and Pine Street serve as the main focal point of the Downtown area. A concentration of well-preserved historic buildings is located within the heart of the Downtown.

The major regional roadways serving the City include State Route 4 (SR 4), and I-680. A survey of transportation needs for the residents of the City indicate that the mean travel time to work is approximately 28 minutes, and the majority of people (approximately 88% of working individuals) commute alone or carpool, while approximately 6% use public transportation (Bay Area Census, 2000).

The CAP is organized into three chapters. Chapter 1 provides the framework for the CAP, including placing the CAP in the context of current climate change science and policy; providing an estimate of greenhouse gas emissions from the City of Martinez; and establishing the goals for the CAP. Chapter 2 presents strategies for reducing greenhouse gases, conserving energy and natural resources, and adapting to climate change. Strategies are presented at a conceptual and schematic level of detail only. Detailed descriptions of how strategies will be funded, implemented,

administered, and evaluated will be the subject of a follow-on planning effort. Chapter 3 presents next steps for development and implementation of the CAP, including a timetable for detailed program planning and implementation.

B. Global and Regional Climate Change Issues

Greenhouse Gases

The International Panel on Climate Change (IPCC) states that human activities contribute to climate change by causing changes in Earth's atmosphere in the amounts of greenhouse gases (GHGs), aerosols (small particles), and cloudiness (IPCC, 2007a). The largest known contribution comes from the burning of fossil fuels, which releases carbon dioxide gas to the atmosphere. GHGs and aerosols affect climate by altering incoming solar radiation and outgoing infrared (thermal) radiation that are part of Earth's energy balance. Changing the atmospheric abundance or properties of these gases and particles can lead to a warming or cooling of the climate system. Since the start of the industrial era (about 1750), the overall effect of human activities on climate has been a warming influence. The human impact on climate during this era greatly exceeds that due to known changes in natural processes, such as solar changes and volcanic eruptions (IPCC, 2007a).

Human activities result in emissions of four principal GHGs: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and the halocarbons (a group of gases containing fluorine, chlorine, and bromine). These gases are long-lived and accumulate in the atmosphere, causing concentrations to increase with time. Significant increases in all of these gases have occurred in the industrial era. All of these increases are attributable to human activities, as described below and shown in Table 1-1.

- Carbon dioxide has increased from fossil fuel use in transportation; building heating and cooling; utilities; and manufacturing. Deforestation releases CO_2 and reduces its uptake by plants. CO_2 is also released in natural processes such as the decay of plant matter.

- Methane has increased as a result of human activities related to agriculture, natural gas distribution, and landfills. CH_4 is also released from natural processes that occur, for example, in wetlands. CH_4 concentrations are not currently increasing in the atmosphere because growth rates have leveled off over the last two decades, but current atmospheric levels are approximately three times higher than the pre-industrial period. CH_4 has an influence on climate ("global warming potential" or GWP) 25 times that of CO_2 (IPCC, 2007a).

- Nitrous oxide is emitted by human activities such as fertilizer use and fossil fuel burning. Natural processes in soils and the oceans also release N_2O. N_2O has a GWP 298 times that of CO_2 (IPCC, 2007a).

- Increases in halocarbon gas concentrations are primarily due to human activities, though natural processes are also a small source. Principal halocarbons include the chlorofluorocarbons (e.g., CFC-11 and CFC-12), which were used extensively as refrigerants and in other industrial processes before their presence in the atmosphere was found to cause stratospheric ozone depletion. The abundance of chlorofluorocarbon gases is decreasing as a result of international regulations designed to protect the ozone layer. These gases, however, have GWPs many hundreds or thousands of times that of CO_2. (IPCC, 2007a).

TABLE 1-1
PRINCIPAL GREENHOUSE GASES

Greenhouse Gas	Sources	Global Warming Potential – 100 year period (relative to CO_2)	Status
Carbon Dioxide (CO_2)	Fossil fuel combustion, deforestation, decay of organic matter	1	Increasing in the atmosphere
Methane (CH_4)	Fossil fuel combustion, natural gas extraction and distribution, agriculture, landfills	25	Not currently increasing in the atmosphere, but current levels are 3 times pre-industrial levels
Nitrous Oxide (N_2O)	Fertilizer use, fossil fuel combustion, industrial processes, biomass burning	298	Increasing in the atmosphere
Chlorofluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulphur hexafluoride (SF_6)	Refrigerants, propellants, expansion agents, industrial uses and processes, some fire extinguishers	100s-1,000s	Concentrations of some of these gases are decreasing as a result of international regulations implemented to protect the ozone layer, but others are increasing

SOURCE: IPCC, 2007a

Global Climate Change

The projected effects of global warming on weather and climate are likely to vary regionally, but are expected to include the following direct effects (IPCC, 2007b):

- Higher maximum temperatures and more hot days over nearly all land areas;
- Higher minimum temperatures, fewer cold days and frost days over nearly all land areas;
- Reduced diurnal temperature range over most land areas;
- Increase of heat index over land areas; and
- More intense precipitation events.

Many secondary effects are projected to result from global warming, including a rise in sea level; impacts to agriculture; changes in disease vectors; and changes in habitat and biodiversity. While the outcomes and the feedback mechanisms involved are not fully understood, and much research remains to be done, global climate change has the potential to cause catastrophic environmental, social, and economic consequences. Globally, climate change may affect numerous environmental resources through impacts related to changing air temperatures and precipitation patterns.

The potential adverse effects of global warming in California are likely to include loss in snow pack; sea level rise and inundation of coastal areas; increased flooding of low-lying areas; more extreme heat days per year; high ozone days; increased incidence of large forest fires; and more frequent and severe drought years (CARB, 2006).

State and Federal Policies and Legislation

AB 32: The California Global Warming Solutions Act of 2006

The California State Assembly passed the California Global Warming Solutions Act of 2006 in August 2006, and Governor Schwarzenegger signed the bill into law the following month. Also known as Assembly Bill 32 (AB 32), the law instructs the California Air Resources Board (CARB) to set reporting requirements for GHG emissions and to devise rules and regulations that will achieve the maximum technologically feasible and cost-effective GHG emissions reductions to 1990 levels by 2020, and achieving further reductions in future years. While AB 32 sets out a timeline for the adoption of measures to evaluate and reduce GHG emissions across all source categories, it does not articulate these measures itself; instead, these measures will be determined by CARB in subsequent processes.

As part of the AB 32 process, the California Energy Commission (CEC) conducted a state-wide inventory of GHG emissions. The CEC estimated that in 2004, California produced 492 million metric tons of CO_2-equivalent (mmt-CO_2e)[1] (CEC, 2006). The CEC found that transportation is the source of 41% of the state's GHG emissions; followed by electricity generation at 22%; and industrial sources at 21%.

In December, 2008, CARB adopted its "Scoping Plan" (CARB, 2008) as a framework for achieving the AB 32 mandate of reducing California's greenhouse gas emissions to 1990 levels by 2020. Key elements of the Scoping Plan include the following:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Setting a goal of 33% of electricity from renewable sources by 2020;
- Developing a market-based California cap-and-trade program designed to provide incentives for cleaner industrial operations by requiring large-scale emitters to pay for offsets should they exceed established GHG thresholds, and linking with other Western Climate Initiative (WCI) partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and

[1] CO_2 –equivalency (CO_2e) is a term that accounts for the "global warming potential" of various gases compared to carbon dioxide. For example, methane (CH_4) has a global warming potential 25 times that of carbon dioxide; therefore, one ton of methane is equivalent to 25 tons of carbon dioxide in terms of its effects on the climate. One metric ton is equivalent to 1,000 kilograms, or 2,204.6 pounds.

- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long term commitment to AB 32 implementation.

The measures contained in the Scoping Plan will be developed and adopted through the normal rulemaking process, with public input. GHG emission limits and emission reduction measures from the Scoping Plan must be adopted by regulation on or before January 1, 2011, for enforcement by January 1, 2012. By January 1, 2014 and every five years thereafter, CARB will update the Scoping Plan.

Governor's Executive Order

On June 1, 2005 -- prior to the enactment of AB 32 -- Governor Schwarzenegger signed Executive Order No. S-3-05, mandating a reduction of GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050. The 2050 target remains the goal of the Executive Order only, as AB 32 does not speak to the 2050 target. The 80% emissions reduction target is consistent with the magnitude of reduction thought necessary to avoid the worst consequences of global climate change (IPCC, 2007c).

Additional Legislation

Additional legislation pertaining to climate change and GHG emissions include Senate Bill 97 (SB 97; statutes of 2007), which addresses GHG analysis under the California Environmental Quality Act (CEQA). SB 97 requires the Governor's Office of Planning and Research (OPR), by July 1, 2009, to develop and transmit to the California Resources Agency guidelines for the mitigation of GHG emissions and their effects. OPR issued draft regulations on January 8, 2009. The California Resources Agency will be required to adopt the regulations by January 1, 2010.

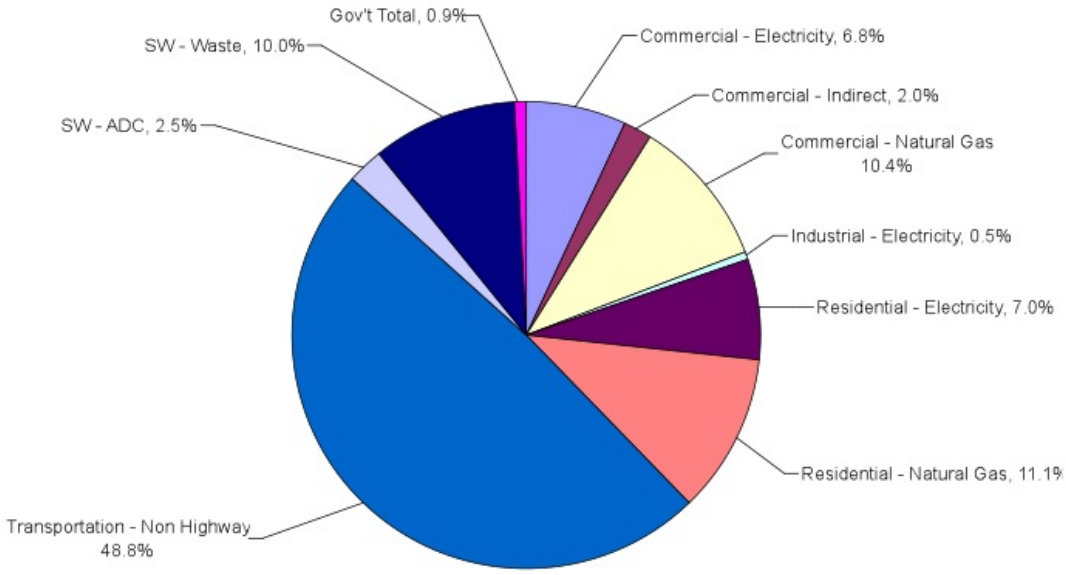
Another important piece of legislation that will have a profound effect on land use planning in all California cities and counties is SB 375, which was signed into law in 2008. This bill is intended to facilitate achievement of the GHG reduction mandates set forth in AB 32 and the Governor's Executive Order by establishing broad transportation and housing planning requirements intended to reduce the need for private vehicle use. According to the Legislative Analyst, this bill will establish regional GHG emission targets; include a "Sustainable Communities Strategy" within regional transportation plans; require cities and counties to revise their housing elements every 8 years in conjunction with the regional transportation plans; and relax CEQA requirements for housing developments that satisfy the Sustainable Communities Strategy.

While comprehensive federal legislation to curb global warming has not yet been enacted, both President Obama and congress support such legislation. In March, 2009, Congressmen Waxman (D-California) and Markey (D-Massachusetts) introduced the American Clean Energy and Security Act. Much of this bill is based on California's AB 32. In its current (April, 2009) form, the bill would establish the following at the federal level:

- A clean energy program that promotes renewable sources of energy, carbon capture and sequestration technologies, low-carbon fuels, clean electric vehicles, and smart grids for electricity transmission;
- A program that increases energy efficiency across all sectors of the economy, including buildings, appliances, transportation, and industry;
- Limits on emissions of greenhouse gases; and
- Protection of U.S. consumers and industry and promotion of green jobs during the transition to a clean energy economy.

C. City of Martinez Greenhouse Gas Inventory

In partnership with ICLEI, the City conducted an inventory of City-wide greenhouse gas emissions for calendar year 2005. The inventory shows that Martinez residents, businesses, and government emitted approximately 321,000 metric tonnes[2] of CO_2e in 2005. Table 1-2 shows a breakdown of emissions by source; Figure 1-1 provides a graphic depiction of the relative contribution of different sources. Please note that Table 1-2 and Figure 1-1 do not show emissions associated with transportation on adjacent State and federal highways.



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SOURCE: ICLEI, City of Martinez

Figure 1-1
Citywide Greenhouse Gas Emissions Inventory (2005)

[2] One metric tonne is equivalent to 1,000 kilograms, or 2,204.6 pounds.

As shown in Table 1-2 and Figure 1-1, the emissions category contributing the largest share of GHG emissions is transportation (emissions from trucks and autos), accounting for nearly half of the total inventory. Other major sources are residential and commercial electricity and natural gas use, and emissions related to solid waste collection and disposal. Municipal operations account for a relatively small part of the inventory (less than one percent) but are nonetheless important for the CAP, because these emissions are under the direct control of the City.

TABLE 1-2
CITY OF MARTINEZ GREENHOUSE GAS EMISSION INVENTORY, 2005

Inventory	Sector	Emission Source	CO2e (metric tonnes)	Percent of Total Inventory
Community	Commercial	Electricity	21,947	6.8%
		Electricity - Direct Access	6,510	2.0%
		Natural Gas	33,337	10.4%
	Commercial Total		61,794	19.2%
	Industrial	Electricity	1,627	0.5%
	Industrial Total		1,627	0.5%
	Residential	Electricity	22,457	7.0%
		Natural Gas	35,549	11.1%
	Residential Total		58,006	18.1%
	Transportation	Diesel	8,218	2.6%
		Gasoline	148,433	46.2%
	Transportation Total		156,651	48.8%
	Waste	ADC - Plant Debris	8,119	2.5%
		Food Waste	6,111	1.9%
		Paper Products	18,445	5.7%
		Plant Debris	2,684	0.8%
		Wood/Textiles	4,889	1.5%
	Waste Total		40,248	12.5%
Community Total			**318,326**	**99.1%**
Government	Electricity	Buildings	198	0.1%
		Street Lighting	381	0.1%
		Water/Sewage	1,035	0.3%
	Electricity Total		1,614	0.5%
	Recreation	Electricity	88	0.0%
	Recreation Total		88	0.0%
	Transportation	Commute - Gasoline	454	0.1%
		Diesel	74	0.0%
		Gasoline	525	0.2%
	Transportation Total		1,053	0.3%
Government Total			**2,755**	**0.9%**
Grand Total			321,081	100.0%

D. Climate Action Plan Goals

The CAP has three primary goals:

1. To reduce GHG emissions from sources within the City of Martinez;
2. To shift to renewable energy sources;
3. To prepare for a changing climate.

The following policies provide more specific intent and guidelines regarding the outcome of the CAP process and the CAP itself:

1. Strategies for reducing GHGs and for adapting to climate change should build on actions already completed or in progress. The CAP should focus on low-cost, simple, and comprehensive strategies.

2. Through the planning process, and also through implementation of strategies specified in the CAP, the City should increase awareness of climate change among Martinez residents and businesses, and facilitate individual actions to reduce GHG emissions and prepare for the effects of climate change.

3. The City should establish an institutional structure (including General Plan policies, ordinances, City government structure and staffing) to enable implementation of CAP programs.

4. The City should cooperate with state agencies and other local governments to broaden greenhouse gas reduction and adaptation programs, and to make them more effective.

5. The City should encourage and facilitate a shift from reliance on fossil fuels to renewable energy sources, including development of local renewable energy generation capacity.

E. The Planning Process

The process for developing the CAP has involved City staff from various departments and general public in the development of the CAP Framework Document. An overview of the CAP process and a draft of this Framework Document were presented to the City Council on October 15, 2008. Around the same time, the interactive CAP website www.greenmartinez.org was launched, followed by various public outreach efforts. A public workshop was held February 25th to engage and solicit the community's perspective and to further consider programs and strategies for GHG emission reduction and climate change adaptation. Public input was incorporated into the conceptual strategies presented in Chapter 2. A Draft of the full CAP was released to the public on April 18, 2009. The City accepted public comments on the Draft through the middle of May, and then incorporated additional suggestions into the final CAP. Additional in-depth planning is needed prior to implementing most of the reduction strategies identified in Chapter 2. Chapter 3 presents next steps for development and implementation of the CAP.

CHAPTER 2

Strategies for Reducing Greenhouse Gas Emissions and Adapting to Climate Change

A. Guiding Principles

The following principles will help ensure that the evaluation of CAP policies and programs reflects community interests and has the best chance of achieving the CAP's goals. The guiding principles provide a foundation for the evaluation and selection of strategies, and will facilitate a balanced approach to the CAP.

1. Sustainable function follows sustainable form.
2. Look for opportunities of greatest leverage.
3. Invest incrementally in new technologies.
4. Change behavior through education and example.
5. Choose strategies that build broad, long-term self-sufficiency.
6. Reduce, reuse, and recycle.
7. Evaluate strategies against realistic benefits and drawbacks.
8. Consider that every solution can potentially create new problems.
9. Take personal, business, and governmental responsibility for green living.
10. Look to Nature for Solutions.

These principles will be used to guide development of CAP strategies, specifically for moving from the conceptual strategies for GHG reduction presented below, to more specific strategies.

B. Conceptual Strategies

One of the primary purposes of the CAP is to plan for reduction of greenhouse gases emitted within the City of Martinez. The CAP develops specific strategies to target emissions from the sources identified in the 2005 baseline inventory of GHG emissions. Major source categories in the inventory include transportation, energy, solid waste, and municipal operations. The CAP adds emissions associated with supplying fresh water (a big consumer of power). Water conservation efforts help save energy and also prepare the community for future climate change impacts that are expected to include decreased water supply. Each major source category within the City of Martinez is described in more detail below, along with conceptual strategies for reducing GHG emissions in each category.

Transportation

Transportation emissions account for nearly half of the City's 2005 GHG emissions inventory. These include tailpipe emissions from cars, trucks, buses, and other vehicles that burn fossil fuels. Conceptual strategies to reduce transportation-related GHG emissions focus on decreasing vehicle miles traveled (VMT) and reducing emissions per mile traveled. VMT can be reduced by ridesharing, carpooling and better trip planning, and by increasing the use and convenience of public transportation, bicycling, and walking. Getting drivers to decrease their use of personal vehicles involves a mix of incentives and convenience. There should be adequate density of development to warrant efficient transit service, as well as safe bike and pedestrian access to the circulation networks throughout the City. An example is the "Safe Routes to School" program, which recognizes and supports strategies that enable students to find safe, convenient, and attractive pathways to school. Auto dependency can be further reduced by removing barriers to locating employment and daily shopping needs in close proximity to housing. Regional efforts, which may ultimately be undertaken to satisfy the requirements of SB 375, will be important in developing effective programs to reduce VMTs.

Switching to more fuel efficient vehicles also reduces GHG emissions associated with transportation. Finally, transportation-related emissions can be lowered by switching to alternative (low carbon) fuels that emit lower levels of greenhouse gases per unit of power produced than gasoline and conventional diesel.

Electricity and Natural Gas

Emissions associated with consumption of electricity and natural gas account for more than 38% of the City's 2005 GHG emissions inventory. About half of this is from commercial buildings, and half from residential. In general, the amount of power consumed and the resultant GHG emissions are related to square footage, building type, building materials, and construction, with considerable efficiencies for denser and more compact development. Nation-wide, single family detached homes consume twice the energy of multi-unit dwellings, and individuals living in single family homes consume about one and a half times as much as those living in multi-unit dwellings.[1] Typically, the best strategy for reducing emissions associated with energy consumption is to start with conservation, then look for improved efficiencies, then look for opportunities to add renewable energy generation capacity (preferably on-site). Examples of energy conservation programs include requirements or incentives for "green building," including increasing insulation in buildings, installing energy efficient lighting and appliances, use of "cool" roofing materials; and using energy conserving windows. New state standards will soon require such provisions for new construction. Renewable sources of energy are becoming more available and affordable through tax incentives and advances in technology for solar, wind, and tidal energy systems.

[1] U.S. Department of Energy, Buildings Energy Data Book: http://www.btscoredatabook.net/

Solid Waste

GHG emissions associated with solid waste are a significant contributor to the City's inventory. Much of this impact comes from the transporting and disposing of solid waste. In addition, organic waste deposited in landfills generates methane (a potent GHG), much of which escapes to the atmosphere, even at landfills that are designed to capture and flare the methane. There is also an enormous amount of energy (with associated GHG emissions) embodied in the products that City residents purchase, use, and discard. This energy is expended in the extraction, processing, and transporting of raw materials, and in manufacturing and delivering goods to market.

Diverting solid waste from landfills is an effective way to reduce GHG emissions. Reuse and recycling saves energy associated with raw materials and manufacturing. Composting of organics results in avoided landfill methane emissions, and has ancillary benefits related to water demand reduction and increased carbon sequestration in soils. The CAP includes strategies for reducing the amount of solid waste generated by the City of Martinez, by building on existing programs and by joining regional efforts to increase recycling and composting. The emissions embodied in products do not fall within the boundary of the City's GHG emissions inventory. Nonetheless, reducing consumption of material goods and the packaging associated with those goods is a very effective way to reduce emissions associated with materials extraction and manufacturing.

Water

Water conservation is already common practice for most cities in California, and it is becoming even more important as we experience increased droughts and other impacts of climate change. One of the generally accepted outcomes of global warming is that water resources will become more limited in places like California, where the winter snowpack (which supplies most of our water) is expected to diminish substantially.

Water-related energy use consumes about 20 percent of California's electricity. Large amounts of energy are required for pumping, treating, and distributing water throughout the State for urban, agricultural, and industrial use. Wastewater treatment also requires energy, as does heating water at the point of use.

Water conservation reduces GHG emissions by reducing energy consumption. Conceptual strategies include common water conservation methods for home, garden, businesses, parks and open spaces. Additionally, use of energy-efficient appliances such as on-demand water heaters, or using rooftop solar-thermal water heaters reduce GHG emissions and save energy and money. Reducing the use of bottled water has many benefits including less packaging and less energy associated with the transportation and distribution of water from remote areas.

Adaptation

In Martinez, climate change is expected to result in increased average temperatures; increased periods of drought; and more frequent extreme weather events, including heat waves and severe storms. Secondary effects will likely include inundation of the shoreline; more frequent and

severe flooding; more frequent and severe wildfires on the urban fringe; a less reliable water supply; increased incidence of disease and mortality (both from effects of heat waves and from changing patterns of disease distribution); and disruption of local ecosystems. Some conceptual strategies to adapt to climate change for Martinez include land use planning to prepare for sea level rise and higher flood levels; elimination of urban heat islands and increasing tree cover; fuels reduction in the urban-wild land interface; and water conservation and recycling.

Carbon Sequestration

Living and dead plants and animals, soil, and soil microorganisms all contain large quantities of carbon. An important tool for addressing climate change is to remove carbon from the atmosphere and store, or "sequester" it, in growing forests, wetlands, and healthy soils that are managed for long-term stability. This can also increase and improve wildlife habitat, shading, and the beauty of the City. The CAP includes programs for sequestering carbon, including wetland restoration, increased tree cover, and use of compost and mulch products to increase organic content of soil, improve soil fertility, and decrease soil evaporation.

C. City Strategies Already in Place or in Development

The City already has a number of strategies in place (in the form of programs and policies) that promote or accomplish reductions in greenhouse gases and related conservation efforts. Appendix A lists current strategies addressing transportation, energy use, solid waste, and water. These strategies serve as a starting point for the CAP. The CAP examines way that existing programs and policies may be expanded, leveraged, or improved to achieve desired emissions reductions.

D. CAP Strategies Evaluation and Selection

Through the CAP planning process, City staff and the CAP consulting team discussed and refined the conceptual strategies described in Section B above, along with members of the City Council's Climate Control Subcommittee, and with the full Council at their October 15, 2008 meeting. From these discussions, more specific strategies emerged that are consistent with the Guiding Principals and with the City's current resources. These strategies were the subject of a public workshop attended by several Council members, City staff, and members of the public, held on February 25, 2009. Appendix D presents a summary evaluation of the strategies that have emerged from this process. Each strategy is further described below. The descriptions are presented at a schematic level of detail; many of the strategies will need to be further developed and refined in the next phase of the CAP process (see Chapter 3).

Transportation Strategies

Program T1: Safe Route to Schools

Details:

- *Emissions Category*: Community Transportation
- *Conceptual Strategy*: Reduce motor vehicle miles traveled (VMT)
- *Schematic Strategy*: Institute a "Safe Route to Schools" program or create a "home-grown" version
- *Reduction Potential* (per Category): 2-6% of Community Transportation category

Description:

Safe Routes to School consists of an international, national and State program that increases the number of children who walk or bicycle to school by funding projects that remove the barriers that currently prevent them from doing so within a collaborative community framework. Those barriers include lack of infrastructure (e.g., no crosswalks), unsafe infrastructure (e.g., walkways invisible from the street), and lack of programs that promote walking and bicycling through education/encouragement programs aimed at children, parents, and the community.

Benefits:

Walking or biking to school decreases both private and public motor vehicle use and related costs, and improves health by increasing walking which reduces childhood obesity. The program has been widely used throughout the US with demonstrated success.

Estimated Costs:

$50,000 and up, depending on grants and efforts required to create safe routes to school, and the number, location, the surrounding circulation context, and types of schools.

Implementation Considerations:

Education is the key. Expect moderate public and, in particular, parental support when the program is explained and qualified with success stories, and when the estimated costs are significantly offset by grants and common sense measures such as adding stop signs at crosswalks. Neighborhood "walking audits" provide a direct means of assessing the opportunities, constraints, costs and benefits involved in creating a safe, convenient and attractive path to school.

Resources:

1. Program information available at http://www.dot.ca.gov/hq/LocalPrograms/saferoutes/saferoutes.htm and http://www.saferoutesinfo.org/
2. Grants available through Cycle 8 State-Legislated Safe Routes to School (SR2S) projects with $48.50 million; the last submission deadline was 4/15/09. Contact information: www.dot.ca.gov/hq/LocalPrograms/dlae.htm

Program T2: Zone and Code for Neighborhoods Serving Commercial Areas

Details:

- *Emissions Category*: Community Transportation
- *Conceptual Strategy*: Reduce motor vehicle miles traveled (VMT)
- *Schematic Strategy*: Allow for incorporation of small scale, neighborhood-serving commercial areas into existing residential areas, pursuant to the General Plan Update
- *Reduction Potential* (per Category): 1-10% of Community Transportation category

Description:

This strategy facilitates the integration of appropriately scaled and use-compatible non-residential uses into existing residential areas through modification of City zoning and development standards. Market forces will help determine the intensity, type, location, and number of uses. Most pre-WWII American cities and neighborhoods incorporated mixed-use buildings into their urban fabric, creating the walkable, use-diverse, and employment-rich environment, often connected by transit, that helped transform the US into an economic power.

Under this strategy, the City would:

- Allow live/work (primary residential, secondary commercial) and work/live (primary commercial, secondary residential) where appropriate in existing residential and commercial areas, particularly along or near commercial/transit corridors;
- Allow first floor commercial uses where appropriate in residential zoned areas, such as on or near busy street corners and commercial/transit corridors;
- Create zoning incentives for attracting ‘green’ businesses in appropriate locations such as expediting permit approvals for qualifying businesses and developers;
- Create municipal redevelopment standards that include minimum parking requirements and maximize pedestrian and transit access at mixed use areas, and design requirements for compatible architecture and scale of buildings.

Benefits:

Moving “daily needs” and specialty destinations at the edges of or into single use neighborhoods and along busy corridors will decrease auto-dependency and improve walkability and biking.

Increasing the numbers and locations of non-residential uses will increase local business and employment opportunities, and contribute to economic diversity.

Estimated Costs:

$10,000 to initiate a review and selection of target areas, proposed locations, types, and intensities of additional uses, and $40,000 to draft development standards. The assessed and refined modifications and additions would be adopted into the City’s General Plan and Municipal Codes for citywide application.

Implementation Considerations:

Expect some local opposition to the introduction of non-residential uses in residential-only areas that may subside as the economic opportunities and benefits of walkability manifest. Specific concerns will likely include noise, parking, and traffic. The key is the introduction of appropriate uses compatible with the surrounding context.

Resources:

1. Rajamani, Jayanthi, et al. Assessing the impact of urban form measures in non-work trip mode, Transportation Research Board 2003, Annual Meeting. Schlossberg, Marc, et al
2. Growing Cooler: The Evidence on Urban Development and Climate Change: how key changes in land development patterns could help reduce vehicle greenhouse gas emissions, ULI, Reid Ewing, Keith Bartholomew, Steve Winkelman, Jerry Walters, and Don Chen. http://www.1kfriends.com/documents/GrowingCooler9-18-07small.pdf
3. Mixed Use Zoning Overview: www.mapc.org/whats_new/Regional_Record/May2006/Mixed_Use_Toolkit/Mixed_Use_Planners_Toolkit.pdf

Program T3: Community-Based Carpool and Ride Share Program

Details:

- *Emissions Category*: Community Transportation
- *Conceptual Strategy*: Reduce motor vehicle miles traveled (VMT)
- *Schematic Strategy*: Research a community-based carpool and ride share program for residents, businesses, and City employees
- *Reduction Potential* (per Category): 1-5% of Community Transportation category

Description:

Investigate, assess, develop, test, and implement a car sharing programs, such as City Car Share and Zip Car®, and encourage employers and educational institutions to implement such programs. Assist businesses in developing and implementing an emergency ride home program and participation in commuter rideshare programs.

Benefits:

Reducing VMT will result in a smaller amount of fuel burned, and a reduction both of GHGs and criteria air pollutants. This will also reduce single occupant auto-dependency, and traffic congestion. The strategy complements the City's Transportation Management Plan, and program versions have been widely used with success throughout the US.

Estimated Costs:

$25,000 depending on the scale and level of program development, promotion, and educational costs.

Implementation Considerations:

The benefits become self-evident, particularly as fuel prices inevitably rise. Promotion and education is a key to acceptance and support, though incentives might be necessary to "prime the pump". The primary difference between City Car Share and commercial programs like Zip Car® and Hertz's new hybrid program: the City is a non-profit that attempts to reduce driving by offering a short time, short distance auto alternative to relying on private car ownership.

Resources:

1. The Green Bean Commuting Newsletter by Accor Services provides information on commuter benefits (:http://accorservicesusa.com/enews.aspx). This document describes a recent commuter survey in which 44 percent of respondents report that rising fuel prices have affected their travel decisions: http://www.accorservicesusa.com/Images/email/commuting_habit_change.jpg
2. World Changing: Tools: Models and Ideas for Building a Bright Green Future, "My Other Car is a Bright Green City," Brad Aaron, 2/13/08.
3. The L.E.K. Consulting Carbon Footprint Report 2007 Carbon Footprints and the Evolution of Brand-Consumer Relationships
4. BAAQMD Transportation Fund for Clean Air is a possible funding source.

Program T4: Pursue Alternative Mass Transit Options

Details:

- *Emissions Category*: Community Transportation
- *Conceptual Strategy*: Reduce motor vehicle miles traveled (VMT)
- *Schematic Strategy*: Pursue alternative mass transit options such as a ferry system
- *Reduction Potential* (per Category): 1-5% of Community Transportation category

Description:

Explore with the Metropolitan Transportation Commission, the Water Emergency Transit Authority, and other transportation agencies and vendors, the short-and long-term transit opportunities to expand services and reconstitute ferry service. Both public and private transit providers should be considered as private auto traffic costs increase over time.

Benefits:

The strategy reduces VMT and auto-dependency, and it complements the following components of the City's Transportation Management Plan:

1. Transit Orientation and Outreach
2. Downtown Martinez Community Shuttle
3. Bus Stop Amenities and Improvements
4. Lifeline Bus Service Improvements
5. Transit Fare Subsidy/Pass Provision

Estimated Costs:

Starting at roughly $500,000 for increased bus service, mass transit is neither inexpensive in first cost nor in operations when viewed as an isolated mode of transportation. However, every dollar invested in appropriate public transit returns at least twice the economic benefit, and stimulates development and redevelopment. Public transit can boost business revenues and profits, and demand will increase as fuel prices climb. Bus transit typically involves lower first cost and higher operating cost than fixed rail alternatives such as streetcar and light rail, which can employ renewal energy power most easily. The considerably higher infrastructure and vehicle costs of fixed rail are also offset by the market incentive of rail transit-oriented development. A streetcar or light rail connection to BART would provide a seamless regional/local transit system.

Implementation Considerations:

The benefits become self-evident, particularly as fuel prices inevitably rise. Promotion and education is a key to acceptance and support (though incentives) might be necessary to "prime the pump." The Water Emergency Transit Authority's current plans include a ferry terminal in Martinez.

Resources:

1. The Contra Costa Low Income Transportation Action Plan, policies for improving mobility for senior citizens: www.co.contracosta.ca.us/depart/cd/transportation/committee/twic/packet/2007/December/Item_12.pdf
2. UC Davis. Susan Shaheen. Easy Connect II: Integrating Transportation, Information, and Energy Technologies at TOD's, 2005 ITS
3. Cervero, Robert, et al. Transit-Oriented Development in the United States: Experience, Challenges, and Prospects. Washington, DC: Transit Cooperative Research Program, Transportation Research Board. http://gulliver.trb.org/publications/tcrp
4. TRB's Transit Cooperative Research Program (TCRP) Report 128: Effects of TOD on Housing, Parking, and Travel, 2004.
5. Pedestrian Safety Guide for Transit Agencies, February 2008, FHWA-SA-07-017Pedestrian and Transit-Friendly Design: A Primer for Smart Growth. www.epa.gov/dced/pdf/ptfd_primer.pdf
6. Intelligent Transportation Systems (ITS), US Department of Transportation. www.its.dot.gov and www.itsoverview.its.dot.gov

Program T5: Implement the Downtown Martinez Community-Based Transportation Plan

Details:

- *Emissions Category*: Community Transportation
- *Conceptual Strategy*: Reduce motor vehicle miles traveled (VMT)
- *Schematic Strategy*: Promote walking, bicycling, and the use of public transit by implementing the 2008 Downtown Martinez Community-Based Transportation Plan
- *Reduction Potential* (per Category): 1-15% of Community Transportation category

Description:

The recently completed Downtown Martinez Community-Based Transportation Plan documents the efforts and results of the community-based planning process that yielded nine transportation solutions recommended for Downtown Martinez.

Benefits:

The strategy reduces VMT and auto-dependency. The Transportation Management Plan includes the following components:

1. Transit Orientation and Outreach would identify and connect target populations with the substantial transit information, resources and training already available. In addition, a Transit Guide would be prepared focused on the Downtown Martinez community.
2. Downtown Martinez Community Shuttle would connect the Downtown Martinez community with key civic, shopping, medical and transit destinations.
3. Pedestrian Access and Safety Improvements would identify and implement pedestrian safety improvements such as roadway crossings and sidewalk repair.
4. Bicycle Network Improvements would enhance the City's existing network of bicycle facilities by providing continuous access to key destinations in and beyond Downtown Martinez.
5. Bicycle Parking Improvements would provide bicycle parking (bicycle racks and lockers) throughout the Downtown and at key destinations.
6. Bus Stop Amenities and Improvements would provide benches, bus shelters, lighting and other amenities at bus stops in Downtown Martinez.
7. Lifeline Bus Service Improvements would provide more frequent bus service and longer bus service hours for designated Lifeline transit routes for weekday and weekend transit service.
8. Taxi Fare Vouchers would provide taxi vouchers for those needing a ride.
9. Transit Fare Subsidy/Pass Provision would provide low-cost or no-cost transit passes for those who qualify.

Estimated Costs:

Estimated Cost Range, per strategies 1 through 9:

1. Negligible for outreach programs; $15,000 - $30,000 for map production and installation depending on number of locations and type of information kiosk; $2,000 – 3,000 annually in maintenance and updating costs.
2. $195,000 ($110,000 annual operating and maintenance costs; $85,000 one-time cost for vehicle purchase).
3. $50,000 - $100,000 for initial study; $1 - $3 million for pedestrian safety improvements and sidewalk replacement; $1 - $3 million for cost sharing sidewalk replacement program.
4. $15,000 - $30,000.
5. $10,000 - $20,000.
6. $0 - $500,000.
7. $320,000 - $2,300,000.

8. $20,000 - $50,000 annually depending on number and value of vouchers offered.
9. $10,000 - $60,000 depending on number of passes and level of subsidy.

Implementation Considerations:

The City of Martinez, Contra Costa County and community organizations will assume responsibility for implementation of the CBTP using the following steps:

1. Continue community involvement to ensure participation by members of the community and appropriate public agencies.
2. Find a champion, a person, public agency, community group or public official.
3. Define work plan and timeline, starting with the high priority projects.
4. Secure funding, beginning by identifying funding (even partial funding) sources as soon as possible.

Resources:

1. Copies of CBTP report are available by calling 925-372-3515 or by downloading from the City of Martinez website at: www.cityofmartinez.org/depts/planning/transportation_plan.asp.

Program T6: Improve Vehicle Fuel Efficiency through Community Education

Details:

- *Emissions Category*: Community Transportation
- *Conceptual Strategy*: Increase motor vehicle fuel efficiencies and switch to low carbon fuels
- *Schematic Strategy*: Promote ways to improve vehicle fuel efficiency through community educational outreach
- *Reduction Potential* (per Category): 1-10% of Community Transportation category

Description:

Maximize community education to encourage awareness of and participation in individual and collective actions that reduce vehicle emissions by improving driving habits and vehicle maintenance that increase fuel efficiency, promote the switch or conversion to low/no carbon vehicles, and encourage an interest in and use of alternatives to personal motor vehicle use.

Benefits:

This strategy increases fuel efficiencies for both conventional motor vehicles and hybrids/alternative vehicles; and decreases VMT, SOV trips, and auto-dependency.

Estimated Costs:

Estimates will depend on the amount of City staff time necessary to develop and execute new communication, outreach and education plans, and to develop promotional and education tools. Professional educators in public and private institutions may assist as volunteers and/or incorporate programs into their own curricula.

Implementation Considerations:

The City and educational institutions can institute policies and programs that make it easier for individuals and businesses to reduce emissions, but programs are only as effective as their reach, range, and consistency, and the community's responding commitment to reducing emissions.

Resources:

1. Example websites www.beclimatesmart.com/ www.greenmartinez.org
2. Communicating about Climate Change: Challenges and Opportunities, Brownlash Communication about Climate Change: An Analysis of Recent Publications, www.fes.uwaterloo.ca/research/climateconference/
3. Climate Change Action Plans: Sustainability: City of Vancouver. To reduce community green house gas emissions (GHG's), www.vancouver.ca/sustainability/climate_protection.htm
4. Lesson Plans Global Warming: Earth Science, Physical Sciences ... K-12 School Lesson Plans, Curriculum and Materials, www.climatechangeeducation.org

Program T7: Find Funding to Replace City Vehicles with Low-Emissions Alternatives

Details:

- *Emissions Category*: Government Transportation
- *Conceptual Strategy*: Increase motor vehicle fuel efficiencies and switch to low carbon fuels
- *Schematic Strategy*: Pursue grant opportunities to fund replacement of City vehicles with hybrid and/or electric vehicles and purchase the smallest/most efficient vehicle that can serve the intended purpose
- *Reduction Potential* (per Category): 10-20% of Government Transportation category

Description:

Establish City policy and purchasing program to evaluate and purchase low carbon-intensity vehicles, including fuel efficient conventional, hybrid, and alternative-fuel vehicles.

Benefits:

The strategy will reduce municipal vehicle operating costs and improve air quality. The actions will demonstrate the City's commitment to progressive action towards better, cleaner technology that provides higher quality City services. If the fuel economy of vehicles improves while the initial cost of vehicles remains relatively constant, the City could save a significant amount of money from decreased fuel expenditures. Bio-diesel and other alternative-fueled vehicles may save fuel costs over time, as petroleum-based fuels increase in costs, and as alternative fuels become a market commodity.

Estimated Costs:

The cost impacts will consist of the cost premium of purchasing lower carbon-intensity vehicles, estimated at roughly 50 to 60% per vehicle. For example, a vehicle that is priced at $50,000 as an

ordinary diesel-powered model could sell for about $70,000 as a hybrid. With gasoline at $3 per gallon, the payback period would be as long as 20 years, thus some type of purchase grant or other incentive would likely be necessary.

Implementation Considerations:

Higher purchase cost for alternative or high-efficiency vehicles continues to present the primary constraint to implementation. The federal government and California could provide tax credits for hybrid vehicles. This provides both a purchase incentive and motivation to save petroleum fuel costs. Implementing programs and policies for alternative fuel vehicles will be difficult without incentive programs and access low- cost alternative fuels. Alternative or high-efficiency vehicles should be relatively inexpensive and reliable in order to compete with less efficient varieties. More motor vehicles, however efficient, may not provide the best means of reducing carbon emissions when compared to vehicle mile reduction strategies such as transit, walking and biking.

Resources:

1. EECBG Program: Contact the EERE'S Information Center at http:///www1.eere.energy.gov/informationcenter/ or call toll-free at 1-877-EERE-INFO (1-877-337-3463) between 9 a.m. and 7 p.m. EST, Monday-Friday.
2. DOE. Clean Energy Resources Database for Local Governments. http://cfpub.epa.gov/ceird/index.cfm?fuseaction=local.search_js#category_criteria
3. Building a Market for Low-Carbon Cars: Lessons from the UK: www.ec.europa.eu/ enterprise/automotive/pagesbackground/competitiveness/cars21_hearing/est.pdf
4. Federal Tax Incentives (United States) | Hybrid Cars, www.hybridcars.com/federal-incentives.html
5. New Energy Tax Credit for Hybrids www.fueleconomy.gov/Feg/tax_hybrid.shtml
6. US Senate: "Incentives/disincentives should be put in place", chris4senate.org/alternativeenergy.html
7. Climate Institute: Attempts to transform the system by creating disincentives. physics.harvard.edu/~wilson/energypmp/2007_MacCracken-Dingell.pdf
8. Green Vehicle Guide | US EPA, The US Environmental Protection Agency's Green Vehicle Guide provides vehicle ratings based on emissions and fuel economy, www.epa.gov/greenvehicle

Program T8: Replace City Tools and Equipment with More Energy-Efficient Alternatives

Details:

- *Emissions Category*: Government
- *Conceptual Strategy*: Increase motor vehicle fuel efficiencies and switch to low carbon fuels
- *Schematic Strategy*: Replace city power tools and equipment with more energy efficient models as useful life cycle is reached and replacements are needed
- *Reduction Potential* (per Category): 0-1% of Government Transportation Category

Description:

Replace city power tools and equipment with more energy efficient models as useful life cycle is reached and replacements are needed.

Benefits:

The strategy should reduce municipal tool and equipment operating costs and will improve air quality. The actions will demonstrate the City's commitment to progressive action towards better, cleaner technology that provides higher quality City services.

Estimated Costs:

Cost impacts of selecting more energy efficient and less polluting models may consist of a substantial cost premium for purchasing lower carbon-intensity tools and equipment, estimated at up to 50%-65% over the cost of less efficient models. The higher first costs will likely require a federal, State or local incentives to offset the hybrid system's premium cost. However, life cycle cost savings through lower power and fuel costs may offset the premium purchase prices.

Implementation Considerations:

Relative energy inefficiency should become a criterion during the City's periodic review and evaluation of existing inventory of tools and equipment.

Resources:

1. EECBG Program: Contact the EERE'S Information Center at http:///www1.eere.energy.gov/informationcenter/ or call toll-free at 1-877-EERE-INFO (1-877-337-3463) between 9 a.m. and 7 p.m. EST, Monday-Friday.
2. Popularity of heavy-duty hybrid trucks fails to live up to the hype, October 10, 2008, Construction Corner, Korky Koroluk http://dcnonl.com/article/id30885
3. Kenworth-Eaton Hybrid Makes Clean Deliveries: "Diesel-electric" truck saves about 35 percent in fuel for its owner, a building supply chain located in hilly Seattle, Washington, January 1, 2008, Tom Berg, Truck Editorhttp://www.constructionequipment.com/article/ca6521909.html

Program T9: Upgrade Signal Timers

Details:

- *Emissions Category*: Community Transportation
- *Conceptual Strategy*: Increase motor vehicle fuel efficiencies and switch to low carbon fuels
- *Schematic Strategy*: Continue upgrading signal timers to improve traffic flow and reduce traffic congestion
- *Reduction Potential* (per Category): 1-2% of Community Transportation category

Description:

Synchronize traffic signals; utilize transit and emergency signal priority, and other traffic flow management techniques to improve traffic flow and reduce vehicle idling.

Benefits:

Clinton Climate Initiative reports that the City of Portland, Oregon invested $533,000 in its traffic signal optimization program. It is estimated that drivers save approximately $4.13 million per year in fuel savings, in addition to reduced traffic congestion and increased air quality.

Comprehensive signal retiming programs have documented benefits of 7-13% reduction in overall travel time, 15-37% reduction in delay and a 6-9% fuel savings, according to the Institute for Transportation Engineers.

Estimated Costs:

Costs for City to continue to upgrade signal timers and install new devices where necessary to better synchronize traffic flow is roughly $3,000 per intersection. Benefits of investing in signal timing, including carbon reduction, outweigh costs by at least 40:1, according to the Institute for Transportation Engineers.

Implementation Considerations:

Implementation will be greatly influenced by City's ability to fund improvements. Ease of implementation will also depend on the potential for and quantity of federal and State transportation improvement funds.

Resources:

1. Improved Methods For Assessing Social, Cultural, And Economic Effects Of Transportation Projects. http://www.statewideplanning.org/_resources/234_NCHRP-8-36-66.pdf
2. National Household Travel Survey, 2001-2002. Bureau of Transportation Statistics (BTS). www.bts.gov/programs/national_household_travel_survey
3. The Broader Connection between Public Transportation, Energy Conservation. and Greenhouse Gas Reduction. ICF International. www.apta.com/research/info/online/documents/land_use.pdf
4. Explanation: Intelligent Transportation Systems (ITS), US Department of Transportation. www.its.dot.gov and www.itsoverview.its.dot.gov
5. Institute for Transportation Engineers: http://www.ite.org/signal/index.asp and www.ite.org/reportcard/badgrade.asp.
6. Clinton Climate Initiative: http://www.c40cities.org/bestpractices/transport/portland_traffic.jsp.

Program T10: Designated Motorcycle and Scooter Parking Downtown

Details:

- *Emissions Category*: Community Transportation
- *Conceptual Strategy*: Increase motor vehicle fuel efficiencies and switch to low carbon fuels
- *Schematic Strategy*: Provide Designated Motorcycle and Scooter Parking Downtown
- *Reduction Potential* (per Category): 1-3% of Community Transportation category

Description:

Modify City parking ordinances to create incentives for the use of motorcycles and scooters by increasing the number of these types of parking spots. The process will require the conversion of passenger vehicle spaces to those sized for motorcycles and scooters, and should be done in phases to test the efficacy of the results.

Benefits:

The addition and conversion of motorcycle and scooter parking spaces will result in a net decrease in tailpipe emissions while increasing the number of downtown parking and shoppers. Reduced traffic congestion, increased parking fee revenues, and potential for improved public health from walking and biking could also result. However, the greatest benefit for both shoppers and retailers can be attained through demand- and time-responsive fees and payment streamlining for parking.

Estimated Costs:

- *Estimated Cost Range*: $10,000 and up, depending on the number of spaces that require restriping and new signage.

Implementation Considerations:

Designated motorcycle and scooter parking could be perceived by local businesses as having a negative impact on patronage and could face opposition unless both economic and environmental benefits are promoted.

Resources:

1. Motor Scooter: Parking Issues: http://motorscootermuse.com/parking.php
2. Putting on their Parking Caps.pdf Adam Millard-Ball, "Putting on their Parking Caps," Planning, April 2002, v68 i4 p16(6).
3. Donald Shoup, The High Cost of Free Parking (2005), Planners Press, American Planning Association; Chapter 20
4. The San Mateo County Senior Mobility Action Plan, A broad coalition of concerned entities in San Mateo County, www.seniormobilityplan.com

Program T11: Develop Alternative and Flexible-Fuel Vehicle Power/ Fuel Sources

Details:

- *Emissions Category*: Community Transportation
- *Conceptual Strategy*: Increase motor vehicle fuel efficiencies and switch to low carbon fuels
- *Schematic Strategy*: Develop convenient and reliable alternative and flexible-fuel vehicle power/fuel sources such as electric plug-in stations, for non-fossil fuel-powered vehicles
- *Reduction Potential* (per Category): 1-15% of Community Transportation category

Description:

The development of convenient and reliable alternative and flexible-fuel vehicle power/fuel sources or stations will reduce or eliminate vehicle emissions by providing operational incentives for switching or conversion to low/no gas or diesel-fueled vehicles. The public or private sources or stations provide alternative non-fossil fuels or electricity, including electric plug-in stations. An alternative fuel vehicle refers to a vehicle that runs on a fuel other than "traditional" petroleum fuels or any method of powering an engine that does not depend only on petroleum, such as electric, petrol-electric hybrid, or solar powered vehicles. A flexible-fuel vehicle (FFV) or dual-fuel vehicle is an alternative fuel automobile or light duty truck with a multi-fuel engine that can use more than one fuel, usually mixed in the same tank, and then burned as a blend in the combustion chamber.

Benefits:

This strategy decreases or eliminates GHG tailpipe emissions in the subject vehicles, reducing carbon and improving air quality.

Costs:

Estimates will depend on the amount of City-generated incentives and programs, though a first step would consist of launching an expedited permit process for bio-fuel stations, the installation of metered charging stations in city garages and lots, and promoting or providing incentives for charging stations in private facilities. The IRS allows taxpayers to claim a special tax credit for using alternative fuels, known as the Alternative Fuel Vehicle Refueling Property Credit, for any fuel containing at least 85 percent of one or more of ethanol, natural gas, compressed natural gas, liquefied natural gas, liquefied petroleum gas, or hydrogen; or any mixture which consists of two or more of biodiesel, diesel fuel, or kerosene, and at least 20% of which consists of biodiesel.

Implementation Considerations:

- Conventional and solar charging stations for electric vehicles have been installed nation-wide, typically located in parking garages and lots.
- There are fewer than 200 ethanol fueling stations in the country, which means most of these vehicles are running on gasoline. Compressed natural gas and/or propane are available at nearly 200 natural gas fueling stations in California, with more than half offering full or limited public access, and at more than a thousand stations nationwide. They include facilities at some gasoline service stations under contract with gas utility companies.
- There are about 25 biodiesel fueling stations in California, mainly along the coast.
- There are only a handful of places in the country where hydrogen vehicles can be fueled. A hydrogen refueling station is extremely expensive at a half-million dollars or more, making the creation of a widespread refueling infrastructure a daunting and expensive task.

Resources:

1. Alternative Motor Fuels And Vehicles: http://www.gao.gov/new.items/d01957t.pdf
2. The Emergency Economic Stabilization Act of 2008, Energy Improvement and Extension Act of 2008: Alternative Fuels
3. Biodiesel Retail Locations, http://www.biodiesel.org/buyingBioDiesel/retailfuelingsites/

Energy Strategies

Program E1: Martinez Green Building Standards

Details:

- *Emissions Category*: Energy
- *Conceptual Strategy*: Reduce energy demand and use
- *Schematic Strategy*: Implement California Green Building Standards Code
- *Reduction Potential* (per Category): 1-10% of Community Energy Category

Description:

Martinez would consider implementing tighter building codes and an appropriate building scale checklist based on LEED rating systems and GreenPoint at the site and neighborhood scale. The City should consider adopting the Title 24 voluntary green building standards for nonresidential construction and green building standards ahead of the scheduled effective dates in 2010.

Benefits:

The early adoption of the building codes would prepare the City for future regulation and promote smart growth. Builders would construct more sustainable buildings, reducing energy consumption and decreasing costs for residents and businesses.

Estimated Costs:

Cost would be minimal and limited to City staff time.

Implementation Considerations:

The City should consider prioritizing the adoption of the Title 24 Green Building Standard and update the City's building and neighborhood rating systems as new systems are released. The current Title 24 Green Building Standard represents future minimum requirements for green building. The City might consider even more rigorous codes in anticipation of future requirements becoming more stringent.

Resources:

1. Title 24 Green Building Standards Code. More information at: http://www.documents.dgs.ca.gov/bsc/2009/part11_2008_calgreen_code.pdf
2. U.S. Green Building Council. http://www.usgbc.org/DisplayPage.aspx?CategoryID=19

Program E2: Energy Efficiency and Rebate Program

Details:

- *Emissions Category*: Energy
- *Conceptual Strategy*: Reduce energy demand and use

- *Schematic Strategy*: Promote energy efficiency programs and rebate opportunities, including opportunities for residential and commercial solar retrofitting, and continue evaluating and considering potential discounts for energy efficient retrofits
- *Reduction Potential* (per Category): 2-10% of Community Energy Category

Description:

The City would promote services, rebates, and tax incentives for energy conservation and renewable energy. This would include services provided by the East Bay Energy Watch Partnership and PG&E to reduce energy use for commercial, residential and municipal facilities. The City would organize local outreach events and provide programmatic information, services and rebates through the City's website and outreach materials. Outreach materials would be distributed to businesses and made available through City offices and media outlets to increase awareness of the programs. The City would continue to gather and distribute the most up-to-date information about energy efficiency programs, rebate opportunities, and tax incentives to residents and businesses. The existing programs would see an increase in outreach opportunities to increase energy efficiency programs, reduce energy consumption, and install residential and commercial solar power and other alternative energy generation systems (see also Strategy E-5). Federal stimulus funds may also be available through the Energy Efficiency and Conservation Block Grant (EECBG) Program to support energy audits and energy efficiency retrofits in residential and commercial buildings.

Benefits:

Residents, organizations and businesses would reduce energy consumption and their carbon footprints. Participants would also see a decrease in their utility bills.

Estimated Costs:

Cost would be minimal and limited to City staff time.

Implementation Considerations:

Determine which department is best suited to institutionalize the role of energy efficiency program research and outreach. Include information about all associated benefits in outreach – economic and environmental.

Resources:

1. 2009 East Bay Energy Watch Partnership. More information at: http://www.pge.com/energywatch/
2. PG&E Business Programs & Rebates. More information at: http://www.pge.com/mybusiness/energysavingsrebates/
3. PG&E Residential Programs & Rebates. http://www.pge.com/myhome/saveenergymoney/rebates/
4. PG&E 2009 Non-residential Retrofit – Demand Response (NRR-DR) Program. http://www.pge.com/mybusiness/energysavingsrebates/resources/otherprograms/incentiveapplicationnrrdr/
5. PG&E Retrocommissioning Program (Large Commercial). http://www.pge.com/mybusiness/energysavingsrebates/analyzer/retrocommissioning/

Program E3: Greening and Streamlining the Permit Process

Details:

- *Emissions Category*: Energy
- *Conceptual Strategy*: To reduce energy demand and use
- *Schematic Strategy*: Expedite green permits and include outreach materials in all permit applications
- *Reduction Potential* (per Category): 2-5% of Total Energy Category

Description:

In this program, the City would develop a permit process that would encourage and facilitate green building and renewable energy projects. The City would develop simplified or assisted permitting procedures for obtaining the necessary approvals for projects that exceed the new State standards for green building (LEED gold or platinum), for green remodels and retrofits, for adaptive re-use of existing buildings, and for renewable energy system development.

Benefits:

More rapid adoption of green building materials and methods, and of renewable energy systems, resulting in reduced GHG emissions, reduced energy consumption, and lower power costs.

Implementation Considerations:

Permitting renewable energy and green building projects should gain the reputation as having the full the support of the City, and few institutional barriers.

Estimated Costs:

Cost would be minimal and limited to City staff time to develop and implement the program.

Resources:

1. Summary of solar permit fees in Northern California and how municipalities are most effectively promoting solar energy through the permit process. http://lomaprieta.sierraclub.org/global_warming/pv_permit_study.htm#Why_Cities_Require_Solar_Permits

Program E4: Municipal Energy Efficiency Program

Details:

- *Emissions Category*: Government Energy
- *Conceptual Strategy*: Reduce energy demand and use
- *Schematic Strategy*: Install more efficient heating and cooling systems in City buildings (only as replacement systems are needed) and street lighting; and reduce energy used for computers, servers, and accessories
- *Reduction Potential* (per Category): 10-20% of Government Energy

Description:

The City would continue its commitment to reducing energy consumption by replacing lighting and HVAC systems with more efficient systems, and by selecting energy-efficient computers, computer peripherals, and servers. Minor, low-cost improvements, such as lighting improvements, should be completed as quickly as possible. Larger, more costly replacements, such as HVAC systems and computer equipment, would be done as equipment reaches the end of its useful life and requires replacement. All City buildings would be monitored on a rolling basis and the older systems would be prioritized for retrofits and new installation. The City could pursue loans from the California Energy Commission to take on such energy efficiency projects. Federal stimulus funds may also be available through the Energy Efficiency and Conservation Block Grant (EECBG) Program.

Benefits:

Decrease non-renewable energy use and operating costs for the City. Take advantage of California Energy Commission's low interest loans for efficiency retrofits and LED street lighting (http://www.energy.ca.gov/efficiency/financing). The City can achieve cost savings from reduced maintenance requirements.

Implementation Considerations:

Collaborate with in-house Energy Watch partnership for the most current rebate and incentive programs. The cost feasibility of a particular project may happen suddenly with the availability of new programs or rebates. Audits will be required at all City buildings to identify opportunities for efficiency improvements from both operations and equipment upgrades.

Estimated Costs:

Program would likely be cost effective, subsidized with rebates and limited to City staff time. Martinez can apply for a low interest (as low as 3.95%) loans from the CEC to fund streetlight retrofits.

Resources:

1. Energy Efficiency Financing: http://www.energy.ca.gov/efficiency/financing/index.html
2. Cool Cities Mayoral Guide demonstrates what actions other cities have taken to reduce energy. http://www.coolcities.us/resources/bestPracticeGuides/USConferenceMayorsBestPractices60.pdf
3. Green Building Guidelines & Rating Systems: http://www.builditgreen.org/guidelines-rating-systems

Program E5: Martinez Is Renewable

Details:

- *Emissions Category*: Government and Community Energy
- *Conceptual Strategy*: Use on-site renewable energy generation
- *Schematic Strategy*: Consider use of on-site renewable energy for municipal operations and promote availability of renewable energy
- *Reduction Potential* (per Category): 1-10% of Total Energy Category

Description:

In this program, the City would lead by example and install a small-scale renewable energy system, such as a solar rooftop system. The City would actively demonstrate its commitment to on-site renewable energy generation. The installation would be used as a promotion for residents & businesses to consider on-site generation for their electricity needs. Information on state and federal incentives and tax credits would also be included in the promotional program. Federal stimulus funds for may also be available for installing renewable energy technologies on government buildings through the Energy Efficiency and Conservation Block Grant (EECBG) Program.

Benefits:

By actively engaging the residents, the City would demonstrate its commitment to renewable energy. The program would result in decreased energy bills for the City and encourage residents to implement on-site renewable energy projects.

Implementation Considerations:

The monthly financing of a solar installation may be comparable to a monthly energy bill from PG&E. The City could solicit discounted bids from solar contractors in exchange for advertising to Martinez residents.

Estimated Costs:

A solar installation and outreach materials could total 50k, but then would offset the City's energy costs.

Resources:

1. Solar Sebastopol – An example of a Municipal commitment and success story to solar energy. http://www.solarsebastopol.com/
2. Berkeley First Solar Initiative is a municipal financing program to make solar installations more affordable and accessible. http://www.ci.berkeley.ca.us/ContentDisplay.aspx?id=26580

Solid Waste and Recycling Strategies

Program SW1: Think Reusable, Less Disposable

Details:

- *Emissions Category*: Solid Waste and Recycling
- *Conceptual Strategy*: Reduce waste from producers and consumers
- *Schematic Strategy*: Encourage residents and businesses to use more durable, local, less-packaged, and low-impact goods, including re-usable shopping bags
- *Reduction Potential* (per Category): 1-5% of Total Solid Waste and Recycling

Description:

The City would encourage green purchasing by educating residents, local businesses and government officials to consider the entire lifecycle of products and packaging. The City would target specific disposable items like disposable bags and plastic water bottles through outreach with the chamber of commerce, schools, the City's website, and special events. The City would also encourage businesses and residents to reduce paper use, by encouraging use of electronic media for document distribution and storage, double-sided printing and copying, and paper re-use.

Benefits:

Greenhouse gas reductions associated with lowered lifecycle energy and resource use for goods. Likely cost savings for consumers. Opportunity for local merchants to purvey "green" goods.

Implementation Considerations:

Implementation of this program can rely substantially on existing public outreach media, including the City's website, local newspapers, and special events.

Estimated Costs:

Costs would include staff time. Possible expense for developing and coordinating a public service campaign.

Resources:

1. Plastic bag study in Los Angeles County. http://www.healthebay.org/assets/pdfdocs/actionalerts/2007_08_27_plasticbagban/staffreport.pdf
2. Seattle Bag Tax Initiative. http://www.seattlebagtax.org/index.html
3. California Integrated Waste Management Board, Business Waste Reduction Program, Office Paper Reduction Quick Tips: http://www.ciwmb.ca.gov/Bizwaste/OfficePaper/QuickTip.htm

Program SW2: Municipal Purchasing Policy

Details:

- *Emissions Category*: Solid Waste and Recycling
- *Conceptual Strategy*: Reduce waste from producers and consumers
- *Schematic Strategy*: Include provision in Municipal purchasing policy to reduce purchase of disposable items, such as bottled water, wherever practical
- *Reduction Potential* (per Category): 1-2% of Total Solid Waste and Recycling

Description:

Municipalities can reduce waste and save money by revising purchasing policies. Typically, cities purchase disposable and over-packaged items for daily consumption like disposable cups, flatware and bottled water. The City would target these disposable items in the purchasing policy and make a shift toward more reusable items.

Benefits:

The City would decrease purchasing, operating and janitorial costs and reduce waste.

Implementation Considerations:

The City would need to promote the changes in the purchasing policy from an environmental and economical standpoint.

Estimated Costs:

Costs would be minimal and include staff time for researching, developing, and implementing the policy.

Resources:

1. US Conference of Mayors proposal on bottled water. http://www.usmayors.org/Resolutions/76th_conference/environment_07.asp
2. City of Seattle Green Purchasing Policy. http://www.seattle.gov/environment/Purchasing.htm
3. Energy Star Website: http://www.energystar.gov/index.cfm?c=home.index

Program SW3: Martinez Schools Outreach

Details:

- *Emissions Category*: Solid Waste and Recycling
- *Conceptual Strategy*: Reduce waste from producers and consumers
- *Schematic Strategy*: Assist area schools with on-site waste audits to evaluate and improve current recycling practices, and promote recycling to schoolchildren
- *Reduction Potential* (per Category): 1-5% of Total Solid Waste and Recycling

Description:

Good habits, such as recycling, are most effective when acquired at an early age. The City of Martinez will continue to conduct several waste audits annually at the Martinez Unified School District and educate the student body about the environmental benefits of recycling and waste reduction. School children can be expected to act as “ambassadors” to bring back the recycling message and practices to their families.

Benefits:

The Martinez Unified School District would reduce costs and prepare students for the green economy.

Implementation Considerations:

The School District could institutionalize the program by creating a focus group of teachers that want to include sustainability as a part of their curricula.

Estimated Costs:

Costs would include staff time; currently the program is coordinated by the City's recycling consultant.

Resources:

1. North American Association for Environmental Education.
   http://www.naaee.org/
2. Alameda County Schools Recycling Program.
   http://www.stopwaste.org/home/index.asp?page=5

Program SW4: Commercial Recycling Study

Details:

- *Emissions Category*: Solid Waste and Recycling
- *Conceptual Strategy*: Reuse and recycle all potential waste
- *Schematic Strategy*: Research and consider commercial recycling program
- *Reduction Potential* (per Category): 5-10% of Total Solid Waste and Recycling

Description:

The City would perform a feasibility and rate structure analysis to determine the best approach for commercial recycling. The City would examine the possibility of renegotiating their contract with Allied Waste Services to incorporate the findings and increase the City's waste diversion.

As part of this study, the City would solicit comments from stakeholders and consider free or discounted recycling that would be subsidized through the rate structure.

Benefits:

Reduce the landfilling of natural resources and encourage businesses to be better environmental stewards. Reduce operating costs and make recycling more economically incentivized. Reduce lifecycle GHG emissions through recycling rather than landfilling.

Implementation Considerations:

The incentivized rate structure is the most important component of a successful, commercial recycling program. Martinez's neighboring city Pleasant Hill already has an incentivizing rate structure in place with the hauler and Martinez may be able to learn from Pleasant Hill's experiences.

Estimated Costs:

The recycling study will be funded and conducted by Allied Waste at no cost to the City. The cost of the program would be covered by the commercial refuse rates.

Resources:

1. California Resource Recovery Association guide to incentive recycling.
   http://www.crra.com/zerowaste/links/incentives.htm
2. Rate Structure guide to achieve Zero Waste goals.
   http://www.grrn.org/zerowaste/articles/loc_gov_zw_incentives.html

Program SW5: Composting Workshops

Details:

- *Emissions Category*: Solid Waste and Recycling
- *Conceptual Strategy*: Reduce landfilling of organic wastes
- *Schematic Strategy*: Continue providing community workshops on backyard composting/home management of organics programs
- *Reduction Potential* (per Category): 5-10% of Total Solid Waste and Recycling

Description:

Martinez will continue organizing composting workshops and distributing discounted backyard compost bins. The City currently provides compost bins at half price and organizes several workshops annually. The events will continue to be posted on the City's website and marketed to Martinez residents.

Benefits:

Residents can reduce a significant portion of the City's greenhouse gas inventory simply through backyard composting. Compost can be used a garden fertilizer and soil amendment. Composting can also reduce refuse collection costs by keeping organics out of the waste stream.

Implementation Considerations:

Already an ongoing program.

Estimated Costs:

Costs would be minimal and include staff time.

Resources:

1. EPA Backyard Compost Guide
   http://www.epa.gov/osw/conserve/rrr/composting/by_compost.htm
2. Martinez Composting Workshops
   http://www.cityofmartinez.org/depts/building/recycling/home.asp

Program SW6: Contra Costa County Compost Initiative

Details:

- *Emissions Category*: Solid Waste and Recycling
- *Conceptual Strategy*: Reduce landfilling of organic wastes
- *Schematic Strategy*: Work with the County, other local agencies, and waste agencies to develop ways to reduce organics in the landfill within Contra Costa County
- *Reduction Potential* (per Category): 30-40% of Total Solid Waste and Recycling

Description:

Regionally, the City would cooperate and collaborate with Contra Costa County, other Contra Costa cities, and regional solid waste authorities in an initiative to permit a composting facility in the County and expand the yard waste program to accept food scraps and food soiled paper. After the implementation of the program, the City would offer curbside food scraps collection to residents and businesses. Rates would be structured to encourage use of the program. The initiative also includes development of a City policy to prevent the use of organic materials, including yard waste and food scraps, as alternate daily cover at landfills when a viable alternative such as composting is available.

Benefits:

Organic waste creates methane gas as it decomposes in landfills. Much of the methane escapes to the atmosphere. Avoiding landfilling of organic wastes reduces methane gas generation and emissions. Beneficial use of compost as a soil amendment or mulch improves soil quality and water retention, compared with use of synthetic fertilizers.

Implementation Considerations:

The composting service could be started in a two step process involving commercial and residential sectors. Residents are already separating green waste; the main issue is the lack of a permitted facility in the County that accepts food waste for composting.

Estimated Costs:

Costs are to be determined at a later date. Initially, staff time would be needed to create momentum for the project. Grants, tipping fees and adjusted rate structures could all serve as potential funding sources for project implementation.

Resources:

1. The California Integrated Waste Management Board food scrap composting page: http://www.ciwmb.ca.gov/foodwaste/Compost/

Water Conservation Strategies

Program W1: Promote Water Conservation

Details:

- *Emissions Category*: Government Water/Sewage
- *Conceptual Strategy*: Reduce water demand and increase efficiencies
- *Schematic Strategy*: Continue to promote water conservation through various community outreach programs and activities
- *Reduction Potential*: 10-20% of Community Water

Description:

This program would build on existing efforts by the City's Public Works Department, Contra Costa Water District, and state agencies to encourage and facilitate residents and businesses to conserve water.

Benefits:

Benefits of the program include reducing water demand and consumption, reducing energy consumption, and reducing greenhouse gas emissions associated with water system operations.

Implementation Considerations:

The City already has an active water conservation outreach program, as does Contra Costa Water District

Estimated Costs:

Ongoing costs for public outreach and incentives for water conservation retrofits.

Resources:

1. City of Martinez Water System: www.cityofmartinez.org/depts/public_works/water.asp
2. Contra Costa Water District water conservation programs: www.ccwater.com/conserve/
3. California Department of Water Resources: www.water.ca.gov/

Program W2: Reduce Water Use in Municipal Operations

Details:

- *Emissions Category*: Government Water/Sewage
- *Conceptual Strategy*: Reduce water demand and increase efficiencies
- *Schematic Strategy*: Identify and implement more efficient use of water in municipal operations, including use of "smart" irrigation systems for City parks and landscaping
- *Reduction Potential* (per Category): 5-10% of Government Water

Description:

This program would involve a comprehensive assessment by City of its current water use, and establishment of prioritized efforts to reduce water use. This would include water use in municipal buildings, and in parks and urban landscaping, including examination of "smart" irrigation systems for City parks and landscaping.

Benefits:

Reduced water use and associated energy use and greenhouse gas emissions.

Implementation Considerations:

Many improvements and retrofits can be accomplished at the time of normal system upgrades.

Estimated Costs:

Water conservation systems typically have very rapid payback periods of 1-3 years, after relatively modest initial investment.

Resources:

1. The Irrigation Association has general information on "smart" irrigation control systems: www.irrigation.org/smartwater/
2. There are several local designers and suppliers of smart irrigation systems. Search the internet for "smart irrigation systems."

Adaptation and Carbon Sequestration Strategies

Program A1: Tree City USA

Details:

- *Emissions Category*: Adaptation & Carbon Sequestration
- *Conceptual Strategy*: Sequester carbon, offset emissions
- *Schematic Strategy*: Build on Tree City USA designation, e.g., by reporting sequestered carbon
- *Reduction Potential* (per Category): 0-1% of Total Emissions

Description:

Planting trees is one of the easiest ways for cities to sequester carbon, reduce local effects of climate change, and create more livable place. Martinez is already recognized as a "Tree City USA" by the Arbor Day Foundation, and the City would build on that program. By planting trees, the City may also have a chance to sell carbon credits through the California Climate Action Registry. The City would consider arbor projects for street trees, park trees and other projects such as greenways, mitigation areas, corporate partnerships and brownfields.

Benefits:

The City would beautify its public spaces while sequestering carbon.

Implementation Considerations:

Institutionalizing the program and increasing public involvement would make the program more successful. Events that promote tree planting and forest conservation within the city would lead to more public involvement.

Estimated Costs:

Costs may be minimized by institutionalizing the process within the Recreation and Parks departments and forging corporate sponsorships. The possibility exists for selling carbon emission offset credits.

Resources:

1. Information on the Tree City USA program can be found at: www.arborday.org/programs/treeCityUSA/index.cfm
2. Urban Forest Reporting and Verification Protocols have been developed by CCAR: www.climateregistry.org/tools/protocols/project-protocols/urban-forest.html

Program A2: Investigate and Prioritize Afforestation and Wetland Restoration Projects within City Limits

Details:

- *Emissions Category*: Adaptation & Carbon Sequestration
- *Conceptual Strategy*: Sequester carbon, offset carbon emissions
- *Schematic Strategy*: Identify and prioritize specific projects within the City limits that sequester carbon and provide other amenities, including wildlife habitat.
- *Reduction Potential* (per Category): 0-1% of Total Emissions

Description:

The City has considerable potential for restoring wetlands and planting cleared areas to native forest species. This program would start by identifying, evaluating, and prioritizing sites within the City for wetland and forest restoration. Funding would then be sought for program implementation and maintenance.

Benefits:

The City would beautify public spaces and increase wildlife habitat while sequestering carbon. Wetlands and forests also serve to reduce flooding hazards.

Implementation Considerations:

Projected sea level rise must be taken into consideration for any project in low lying coastal areas.

Estimated Costs:

$10,000-20,000 for initial effort to identify, prioritize, and prepare initial plans for sites. Funding for project implementation likely available from various sources, such as the California State Coastal Conservancy.

Resources:

1. *Urban Forestry and Urban Greening* is a refereed, international journal aimed at presenting high-quality research with urban and peri-urban woody and non-woody vegetation and its use, planning, design, establishment and management as its main topics. Some articles are available free on-line. www.elsevier.com/wps/find/journaldescription.cws_home/701803/description#description
2. California State Coastal Conservancy: www.scc.ca.gov/

Program A3: Promote PG&E ClimateSmart and other Offset Programs

Details:

- *Emissions Category*: Adaptation & Carbon Sequestration
- *Conceptual Strategy*: The City will promote PG&E's ClimateSmart program and other carbon offset programs to businesses and residents
- *Schematic Strategy*: Sequester carbon and offset carbon emissions
- *Reduction Potential* (per Category): 0-1% of Total Emissions

Description:

PG&E's ClimateSmart program offers residential and commercial customers the opportunity to offset the carbon emissions associated with their energy use. Voluntary payments to PG&E are fully tax deductible, and are used to support projects that sequester carbon or reduce carbon emissions, including conserving and restoring native redwood forests and capturing methane gas from dairy farms and landfills. Many other programs also exist that provide renewable energy credits and carbon offsets to those wishing to purchase them voluntarily. The City would help promote these programs as a way to encourage Martinez residents and businesses to offset their own carbon emissions.

Benefits:

Program benefits include sequestration of carbon and avoided emissions, as well as greater awareness on the part of program participants regarding their own carbon footprints.

Implementation Considerations:

The ClimateSmart program is available to PG&E's residential and commercial customers. Many other organizations provide carbon offsets and renewable energy credits.

Estimated Costs:

Minimal costs consisting of staff time. Average cost for residents to participate in the ClimateSmart program is about $5 per month.

Resources:

1. ClimateSmart program information is available at: http://www.joinclimatesmart.com/
2. Green-e, based in San Francisco, provides retail carbon offset and renewable energy credits. http://www.green-e.org/

3. The Carbon Neutral Company assists businesses and organizations to become "carbon neutral" by assisting them in calculating their GHG emissions, reducing these emissions, and offsetting those that cannot be reduced. www.carbonneutral.com

Program A4: Reduce Urban Heat Islands

Details:

- *Emissions Category*: Adaptation and Carbon Sequestration
- *Conceptual Strategy*: Adapt to climate change
- *Schematic Strategy*: Reduce urban heat islands through use of reflective surfaces, targeted tree planting and new requirements for shading in new parking lots and other large paved areas.
- *Reduction Potential* (per Category): 1-2% of community energy

Description:

Heat islands occur where parking lots, rooftops, and other large paved or constructed areas increase the surrounding temperature. This program would be a crucial element in ensuring that Martinez remains a liveable community, even in the face of a warming climate. Through targeted upgrades of existing buildings and paved areas, adoption of new building standards, including the new "cool roof" standard contained in California's Title 24 Energy Standards, the tree planting, and new parking and landscape regulations, including requiring minimum shade tree planting standards for non-residential and multi-family parking lots, the program would eliminate existing heat islands and avoid future ones.

Benefits:

Program benefits include cooler microclimates, more trees within the City, more bird and wildlife habitat, lower energy consumption for cooling and refrigeration, reduced GHG emissions, greater comfort and health for residents, and greater carbon sequestration.

Implementation Considerations:

This program dovetails well with the Tree City USA program.

Estimated Costs:

Cost of $10,000-20,000 plus staff time to identify and prioritize existing urban heat islands and to develop building standards.

Resources:

1. USEPA Urban Heat Island website: www.epa.gov/hiri/index.htm
2. Publication from Lawrence Berkeley Laboratory Urban Heat Island Working Group: Akbari, Hashem, "Energy Saving Potentials and Air Quality Benefits of Urban Heat Island Mitigation." www.osti.gov/bridge/servlets/purl/860475-UlHWIq/860475.pdf

Program A5: Increase Public Awareness Regarding Potential Health Impacts of Global Warming

Details:

- *Emissions Category*: Not applicable
- *Conceptual Strategy*: Adapt to climate change
- *Schematic Strategy*: Promote awareness of the dangers of heat exposure and recommend low-cost and low-GHG adaptation strategies
- *Reduction Potential* (per Category): Not applicable

Description:

Predicted health effects of global warming include increased heat stress, particularly during heat waves, higher ground-level ozone layers, increased smog, injury or death due to catastrophic weather events and flooding, and spread of infectious diseases. This program consists of an effort on the part of the City to inform residents of the potential health hazards associated with global warming, including ways that residents can prepare and protect themselves. This program would rely on information produced by local, state, and federal health authorities.

Benefits:

This program will encourage Martinez residents to take action to prepare for the effects of global warming.

Implementation Considerations:

It is likely that similar public outreach campaigns will be undertaken at the regional, state, and federal levels; the City should watch for opportunities to enhance and promote locally these programs.

Estimated Costs:

Minimal cost, primarily staff time; information will be disseminated through existing City media outlets.

Resources:

1. This EPA website has excellent information on the potential health effects of global warming, including links to more detailed information sources: www.epa.gov/climatechange/effects/health.html

Program A6: Plan for Sea Level Rise

Details:

- *Emissions Category*: Not applicable
- *Conceptual Strategy*: Adapt to climate change
- *Schematic Strategy*: Prepare for sea level rise, first by mapping low lying areas subject to inundation, then by incorporating this information into the City's General Plan Update.

- *Reduction Potential* (per Category): Not applicable

Description:

Global warming is already having an effect on sea level, as glaciers and icecaps melt and as the ocean warms and expands. The ultimate amount of sea level rise due to global warming is uncertain, but predictions range from several inches to several feet or more over the next century. In recognition of the vulnerability of California's low-lying and coastal areas to sea level rise, the Governor signed Executive Order S-13-08 in October, 2008, requiring state and local agencies to incorporate sea level rise into their planning efforts. The Order also calls upon the Resources Agency to request that the National Academy of Sciences (NAS) convene an independent panel to prepare a California Sea Level Rise Assessment Report by December 1, 2010. The Sea Level Rise Assessment Report will advise how California should plan for future sea level rise.

To initiate its own effort to prepare for sea level rise, the City will undertake a mapping effort of low-lying coastal and flood-prone areas within the City. Contra Costa County recently conducted an aerial survey using LIDAR (Light Detection and Ranging) technology that results in high resolution topographic contours. This data should soon be in the public domain, and combined with FEMA Q3 floodplain data should provide an adequate basis for mapping sea level rise. The resulting maps may be used to predict future inundation patterns given different scenarios for sea level rise. This will be an invaluable tool for the City as it embarks on the update of the General Plan.

Benefits:

This program will help the City, residents, and businesses prepare for the anticipated consequences of global warming.

Implementation Considerations:

Mapping may be based on existing fine-resolution topographic surveys, if available, and/or on existing Federal Emergency Management Agency flood maps. The maps will be produced in a Geographic Information System to enable their future adjustment and application.

Estimated Costs:

$5,000 - $10,000 for the initial mapping effort.

Resources:

1. Governor's Executive Order S-13-08: http://gov.ca.gov/executive-order/11036/
2. Intergovernmental Panel on Climate Change, *Fourth Assessment Report, Working Group 1 Report, The Physical Science Basis*: http://www.ipcc.ch/ipccreports/ar4-wg1.htm
3. Brahic, Catherine, "Sea level rise could bust IPCC estimate." Newscientist.com, March 10, 2009: http://www.newscientist.com/article/dn16732-sea-level-rise-could-bust-ipcc-estimate.html.

CHAPTER 3
Next Steps

A. Further Development and Implementation of CAP Strategies

The Climate Action Plan (CAP) strategies for reducing greenhouse gas (GHG) emissions and adapting to climate change are described only at a schematic level of detail in Chapter 2. While this level of detail is sufficient for some strategies, others will require an additional, more in-depth round of planning prior to implementation. In this later round of planning, strategies will be described in more detail, including specific priorities for implementation, costs, funding sources, and staffing. The City is currently seeking funding for detailed program planning.

A major concern with implementing the CAP is limitations on funding and staffing. Due to the current state of the economy, it is essential to focus the CAP on affordable solutions while implementing strategies that will move the City closer to the goals of the CAP. By taking a realistic approach and setting achievable goals, the City will increase its chances of implementing a successful plan and demonstrating tangible progress in the future.

Public education is by far the most powerful and affordable tool to overcome this hurdle. In addition to the programs and policies the City has already put in place or is in the process of developing (Appendix A), strategies may include incorporating relevant information and ideas in existing publications and events, such as the City's website, and the annual Earth Day event. The schools can be a powerful instrument for change, and working with schools on climate change education programs is considered an essential strategy. Furthermore, much can be accomplished by supporting community groups interested in promoting and implementing the CAP. Finally, the City can lead by example and promote awareness by adopting measures that reduce GHG emissions associated with municipal operations.

Various quantitative and qualitative measures might be used to judge the success of the CAP. While the CAP does not set targets for GHG emissions reductions within the City beyond those required by AB32, progress toward achievement of CAP goals may be observed through reduced GHG emissions as measured by future emissions inventories; reduced fuel and energy bills for municipal operations; reduced generation of solid waste; decreased water use; increased use of public transit; carpools and ridesharing programs; reduced natural gas consumption; installation of alternative energy sources; and increased use of bicycles, motorcycles and scooters. The City will prepare annual progress reports to Council on the implementation of the CAP.

B. Schedule

The following is the schedule used to complete the CAP and to plan for implementation of strategies identified in the CAP.

City Council approves contract with ESA to prepare CAP	June 2008
City staff meeting to discuss framework for CAP	August 2008
Presentation to the City Council on the framework for the CAP	October 15, 2008
Release Draft CAP	Spring 2009
Earth Day – CAP Promotion April 18	2009
Public Comment on Draft CAP	April-May 2009
Finalize CAP	June 2009
City seeks funding for additional detailed program planning	Spring/Summer 2009
Begin program implementation	Summer 2009

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CHAPTER 4
Report Preparers

The Martinez CAP was prepared by Environmental Science Associates (ESA) and Town-Green, under contract with the City of Martinez. Many people, however, contributed to the development of the CAP, including the City Council and its Climate Control Subcommittee; City staff; and members of the public who participated in the public workshop and on-line forum, and who provided comments on the Draft CAP. The City is grateful to all those who contributed their ideas, time, and energy.

Those directly involved in preparation of the CAP include the following:

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APPENDIX A

City Programs Already in Place or in Development

In a staff report to Council in April, 2008, City staff outlined programs already in place that promote or accomplish reductions in greenhouse gases and related conservation efforts. These are listed below.

1) Promoting Public Awareness
   a. Promotion in City Newsletter (i.e., Clean Water Program, Contra Costa Water District, CCTA, Central San/Household Hazardous Waste Collection Facility)
   b. Promotion on website and Recreation Activity Guide (recycling/composting programs)
   c. Promotion at community special events (recycling)

2) Conserving Energy
   a. Energy-efficient lighting at City Hall with room occupancy sensors
   b. Double-switching in all City Hall offices (enables better control over lighting on bright days)
   c. Double-paned, energy-efficient windows at City Hall
   d. Computer-controlled, energy-efficient HVAC system at City Hall
   e. Electric vehicle for recreation staff
   f. Recycling programs at all City facilities

3) Community Improvements
   a. LED's on traffic signal heads and downtown tree lighting
   b. Construction and Demolition Ordinance No. 1325 C.S.
   c. Wood Burning Appliance Ordinance No. 1332 C.S.
   d. Tree City U.S.A. designation
   e. Permit inspection fee discounts for environmentally-friendly installations
   f. Single-stream recycling for residents (Allied Waste)

4) Partnerships with Organizations
   a. ICLEI (Climate Action Planning)
   b. Central Sanitary District (Household Hazardous Waste Collection Facility)

c. Contra Costa Water District (water conservation promotion)

d. Clean Water Program (stormwater pollution prevention)

e. Allied Waste (single-stream residential recycling)

5) Grant Applications

a. Used Oil Block Grant (CIWMB)

b. Beverage Container Recycling (Department of Conservation)

c. National Recycling Coalition Bin Grant (Coca-Cola)

APPENDIX B

Background on Greenhouse Gas Emissions Sources and Calculations

The City of Martinez GHG emission inventory for 2005 is divided into sources from the community (commercial, industrial, and residential power consumption; transportation, and waste), and sources from the municipal government (power consumption and transportation). GHG emissions are expressed in carbon dioxide equivalence (CO_2e). GHG emissions included in the inventory are associated with electricity generation; direct burning of fossil fuels, including natural gas, diesel, and gasoline; and solid waste, which produces methane gas when disposed in a landfill. The following explanations are provided to show how GHG emissions are calculated from different forms of energy and waste.

Electricity

A *watt-hour* (W-h) is a unit of energy commonly used to measure electricity. It describes the amount of electrical energy supplied to a one-watt load drawing power for one hour. The commonly used form *kilowatt-hour* (kW-h) is equivalent to 1,000 W-h. Ten 100 watt bulbs burning for 1 hour consume 1 kW-h of electricity. A *megawatt-hour* (MW-h) is equivalent to 1,000,000 W-h or 1,000 kW-h. A kW-h of electricity for the City of Martinez is estimated to produce 0.88 pounds of CO_2e emissions. The average household in California uses about 8,000 kW-h per year, which produces about 3.5 tons of CO_2e.

Natural Gas

A *therm* is a unit of energy commonly used to measure heat, such as the heat produced by burning natural gas. Although partially dependent on the average concentration of ethane, propane, or butane, and the presence of impurities such as carbon dioxide or nitrogen found in the natural gas source, a therm is approximately equal to 29.3 kW-h of electrical energy. A therm of heat energy for the City of Martinez is estimated to produce 11.73 pounds of CO_2e emissions. Martinez businesses and residents emit more GHG from use of natural gas than from use of electricity.

Transportation - Gasoline and Diesel

GHG emissions resulting from the combustion of diesel or gasoline are determined from the volume of fuel consumed, or estimated based on average fuel economy and the number of miles driven. Diesel fuel has an emission factor of 22.38 pounds of CO_2 per gallon consumed. Gasoline

has an emission factor of 19.42 pounds of CO_2 per gallon consumed. Both types of fuel also produce a small amount of methane and nitrous oxide, both of which are potent GHGs. If the volume of fuel consumed is unknown, then the number of vehicle miles traveled can be used to estimate the number of gallons of fuel consumed. According to the U.S. EPA, the average fuel economy of the entire US 2004 model year fleet (cars and light duty trucks and SUVs) was 24.7 mpg.

Solid Waste

When organic materials decompose in a landfill, they do so mostly in the absence of oxygen. In these anaerobic conditions, methanogenic (methane-producing) bacteria produce methane as the material decomposes. Methane is 25 times more potent than carbon dioxide in its effects on the climate, over a 100-year timeframe.

The GHG inventory used municipal waste disposal figures and waste characterization studies to determine the amount of organic putrescible waste produced annually within the City of Martinez. Waste-specific emission factors were used to determine the amount of methane produced. This figure was then reduced by the amount of methane captured by the landfill's gas collection and flaring system: flaring converts methane to carbon dioxide, and so greatly reduces its effect on the climate.

APPENDIX C
List of Key Acronyms

CAP – Climate Action Plan: Local plan designed to reduce the greenhouse gas emissions associated with Martinez as a city and community.

CARB – California Air Resources Board: Established by the California Legislature in 1967, this Board works with the public, business sector, and local governments to protect the public's health, the economy, and the State's ecological resources through the most cost-effective reduction of air pollution. The Board plays an instrumental role in defining reporting requirements, devising rules and regulations, and developing recommendations for achieving State-mandated greenhouse gas reduction targets.

CEC – California Energy Commission: The California Energy Commission is the State's primary energy policy and planning agency.

CEQA – California Environmental Quality Act: A law passed in 1970 that requires developers to submit documentation regarding the potential environmental impacts of their projects.

GHG – Greenhouse Gases: Greenhouse gases are any of the atmospheric gases, both natural and caused by man, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds.

ICLEI – International Council for Local Environmental Initiatives: ICLEI is an international association of local governments as well as national and regional local government organizations that have made a commitment to sustainable development. Martinez joined ICLEI in 2007.

IPCC – International Panel on Climate Change: The IPCC was established by the World Meteorological Organization and the United Nations Environment Program to provide decision-makers and others interested in climate change with an objective source of information.

APPENDIX D

Strategy Matrix

Appendix D, GHG Emissions Reduction Strategy Matrix, City of Martinez Draft CAP

Conceptual Strategies	Schematic Strategies	Years to Activate	Emission Category	Reduction Potential per Category	Synergistic	Quantifiable Benefits	Qualitative Benefits	Activation Cost Estimate	Life Cycle Considerations	Potential Funding Sources
	Transportation									
Reduce motor vehicle miles traveled (VMT)	T1. Institute a "Safe Route to Schools" program or create a "home-grown" version	1 - 3	**Community & Government Transportation**	2-6%	With City's Transportation Management Plan	Increases number of students that walk to school per year; decreased VMT	Reduction in childhood obesity	$50K	Reduction in motor vehicle operation costs	Safe Route to Schools grants
	T2. Allow for incorporation of small scale, neighborhood-serving commercial areas into existing residential areas, pursuant to the General Plan Update	1 - 2		1-3%	With City's "green" economic growth plans	Potential for improved Jobs/Housing ratio; decreased VMT	Increases local business opportunities	$10K		BAAQMD Climate Protection Grant
	T3. Research a community-based carpool and ride share program for residents, businesses, and City employees	1 - 3		1-5%	With City's Transportation Management Plan	Decreased VMT, SOV trips, and auto-dependency	Better traffic flow and reduced delays	$25K		BAAQMD, TFCA grant program
	T4. Pursue alternative mass transit options such as a ferry system	3 - 5		1-5%	With City's Waterfront Development Plans	Decreased VMT, SOV trips, and auto-dependency	Reduced Highway 4 - I-80 corridor congestion; transit link to Antioch/ Pittsburg; emergency transportation system	$500K		WETA
	T5. Promote walking, bicycling, and the use of public transit by implementing the 2008 Downtown Martinez Community-Based Transportation Plan	1 -1 0		1-15%	With all City services and community activities that require mobility	Decreased VMT, SOV trips, and auto-dependency	Improved transit services, walkability and biking; better traffic flow and reduced delays	Refer to the CBTP		Refer to the CBTP
Increase motor vehicle fuel efficiencies and switch to low carbon fuels	T6. Promote ways to improve vehicle fuel efficiency through community educational outreach	0 - 2	**Community Transportation**	1-10%	With City's Transportation Management Plan	Decreased VMT, SOV trips, and auto-dependency	Increased public health from better air quality, walking, and biking	Program dependent	Reduction in motor vehicle operation costs	Volunteer programs, grants
	T7. Pursue grant opportunities to fund replacement of City vehicles with hybrid and/or electric vehicles and purchase the smallest/most efficient vehicle that can serve the intended purpose	1 - 3	**Gov't Trans.**	10-20%	With City's Transportation Management Plan	Reduced costs, increased air quality	Better, cleaner technology = higher quality City services	Staff time	Reduction in motor vehicle operation costs	BAAQMD, TFCA grant program
	T8. Replace city power tools and equipment with more energy efficient models as useful life cycle is over and replacements are needed	1 - 5		0-1%	With City's "green" economic growth plans	Reduction in energy use, cost savings	Better, cleaner technology = higher quality City services	$50K	Reduction in equipment operation costs	BAAQMD, TFCA grant program
	T9. Continue upgrading signal timers to improve traffic flow and reduce traffic congestion	0 - 2	**Community Trans.**	1-2%	With City's Transportation Management Plan	Decreased VMT, travel times, congestion; increased level of service	Less stressful motoring, biking	Refer to the CBTP	Reduction in motor vehicle operation costs	Refer to the CBTP
	T10. Provide designated motorcycle and scooter parking downtown	1 - 3		1-3%	With City's Transportation Management Plan	Decreased VMT, SOV trips, congestion, and auto-dependency	Less stressful motoring	Refer to the CBTP	Reduction in motor vehicle operation costs	Refer to the CBTP
	T11. Develop convenient and reliable alternative and flexible-fuel vehicle power/fuel sources, such as electric plug-in stations, for non-fossil fuel-powered vehicles	1 -1 0		1-15%	With City's Transportation Management Plan	Lower GHG emissions per VMT; better air quality	First steps to transition to alternative fuels	TBD	Future business model for energy stations	Grants, partnerships with private businesses

Appendix D, GHG Emissions Reduction Strategy Matrix, City of Martinez Draft CAP

Conceptual Strategies	Schematic Strategies	Years to Activate	Emission Category	Reduction Potential per Category	Synergistic	Quantifiable Benefits	Qualitative Benefits	Activation Cost Estimate	Life Cycle Considerations	Potential Funding Sources
	Energy									
Reduce energy demand and use	E1. Implement California Green Building Standards Code	1	**Community Energy**	1-5%	With other energy conservation, water and waste reduction programs	Reduction in energy use on a unit basis (e.g., per square foot)	Improved indoor environments	Minimal: costs for training staff	Iincreased construction costs, reduced operating expenses for heating, cooling, lighting, water	Building permits
	E2. Promote PG&E energy efficiency programs and rebate opportunities, including opportunities for residential and commercial solar retrofitting, and continue evaluating and considering potential discounts for energy efficient retrofits	1		2-10%	With other energy conservation, water and waste reduction programs	Reduction in energy use on a unit basis (e.g., per square foot)	Greater energy security and independence	Minimal: existing staff time to work with PG&E	Conservation measures typically have rapid payback, 2-5 years	PG&E, East Bay Energy Watch, & potential funds from the Federal EECBG Program
	E3. Expedite green permits and include outreach materials in all permit applications	1		2-5%	With on-site renewable energy generation.	Reduction in energy use on a unit basis (e.g., per square foot), Number of green permits solicited	Incentivize projects through reduced costs and time investment in permist process	Minimal: costs for staff time	Reduction in energy demand and natural resources upstream	City funds
	E4. Install more efficient heating, cooling, computer, and lighting systems in City infrastructure whenever practical and/or replacement systems are needed	1 - 1 0	**Gov't Energy**	10-20%	With other programs addressing municipal energy and water consumption	Energy cost savings for City	Greater energy security and independence	Does not require additional expenditures	Typically rapid payback on investment from energy savings	City funds, PG&E rebates and incentives, Federal EECBG Program
Use on-site renewable energy generation.	E5. Consider use of on-site renewable energy for municipal operations. Use the program as a method to distibute information regarding existing tax incentives, financing opportunities, local contractors, and suppliers of renewable energy systems.	0 - 2	**Gov't, Community Energy**	1-10%	With existing programs	Number of distributed renewal resource generation installations; reduced grid power consumption	Greater energy security and independence	Approx. .25 FTE staff time for 1 year for program coordination	Payback period typically 2-10 years, after which power production costs very low	State and federal funds, including Federal EECBG Program
	Solid Waste									
Reduce Waste from producers and consumers	SW1. Encourage residents and businesses to use more durable, local, and low-impact goods, including re-usable shopping bags.	0 - 2	**Community Waste**	1-5%	With other waste reduction programs	Reduction in per capita waste production	Cost savings for consumers and additional revenue for businesses	Cost of outreach program	Waste and energy reduction in resource extraction, manufacturing, transport	State grant funds
	SW2. Include provision in Municipal purchasing policy to reduce purchase of disposable items, such as bottled water, wherever practical	1 - 2		1-2%	With other waste reduction programs	Reduction in waste stream from municipal sources; likely reduction in costs for the City	Demonstrates leadership role of the City	Minimal		City funds
	SW3. Assist area schools with on-site waste audits to evaluate and improve current recycling practices, and promote recycling to schoolchildren	0 - 3		1-5%	With other waste reduction programs	Reduction in waste stream from schools; potential cost savings for school district	Fosters recycling ethic among school children	$5-8,000/year		City funds

Conceptual Strategies	Schematic Strategies	Years to Activate	Emission Category	Reduction Potential per Category	Synergistic	Quantifiable Benefits	Qualitative Benefits	Activation Cost Estimate	Life Cycle Considerations	Potential Funding Sources
Solid Waste (Continued)										
Reuse and recycle all potential waste	SW4. Research and consider commercial recycling program	1 - 3		5-10%	With other waste reduction programs	Reduction in commercial waste stream; reduced cost for participating businesses	Reduced waste = reduced costs	Franchisee to provide	Costs of program, if implemented, would be covered by commercial refuse rates	Commercial refuse rates
Reduce land filling of organic wastes	SW5. Continue providing community workshops on backyard composting/home management of organics programs	0	**Community Waste**	5-10%	With other waste reduction programs	Reduction in organics in collected waste stream	Residents and businesses produce their own soil amendments	$3-5,000/year	Reduced water consumption for irrigation. Helathier soils.	City funds
	SW6. Work with the County, other local agencies, and waste agencies to develop ways to reduce organics in the landfill within Contra Costa County.	2 - 5		30-40%	With other waste reduction programs	Reduction in disposed organic wastes	Reduced methane emissions, land fill, added fertilizer source	TBD	Considerations for transport of materials to a centralized composting facility and to market	Grants, tipping fees, and adjusted rate structures
Water										
Reduce water demand and increase efficiencies	W1. Continue to promote water conservation through various community outreach programs and activities	0 - 2	**Community Water**	10-20%	With backyard composting program and Contra Costa Water District conservation programs	Reduction in water use city-wide; reduction in water costs	Potential improvements to surface water quality from decreased runoff	Minimal	Reducing peak water usage has multiplier effect on energy and cost savings	City funds
	W2. Identify and implement more efficient use of water in municipal operations, including use of "smart" irrigation systems for City parks and landscaping	1 - 5	**Gov't Water**	5-10%	With other water conservation programs	Reduction in water use and costs for City	Demonstrates leadership role of the City	Unknown	Typically very rapid payback period due to savings on water costs	City funds

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Conceptual Strategies	Schematic Strategies	Years to Activate	Emission Category	Reduction Potential per Category	Synergistic	Quantifiable Benefits	Qualitative Benefits	Activation Cost Estimate	Life Cycle Considerations	Potential Funding Sources
Adaptation and Carbon Sequestration										
Sequester Carbon, offset emissions	A1. Build on Tree City USA designation, e.g., by reporting sequestered carbon	1 - 5	**Community Adaption/Sequestration**	0-1%	With adaptation programs (e.g., reduce heat islands)	Increased tree cover and shading; increased carbon sequestration	Aesthetic benefits		Carbon sequestration benefits increase over time	City and private funds
	A2. Identify and prioritize specific projects within the City limits that sequester carbon and provide other amenities, including wildlife habitat.	1 - 10		0-1%	With adaptation and sequestration programs	Increased habitat; increased carbon sequestration	Aesthetic and open space benefits	Unknown	Carbon sequestration benefits increase over time	California Coastal Commission
	A3. Promote PG&E's ClimateSmart program and other offset programs to businesses and residents	0 - 2		1-10%	With energy conservation programs	Quantified offset of energy-related emissions	Funds projects within California to preserve and enhance forest lands	Minimal	Carbon sequestration benefits increase over time	PG&E
Adapt to Climate Change	A4. Reduce urban heat islands through use of reflective surfaces, targeted tree planting and new requirements for shading in new parking lots and other large paved areas	1 - 5	**Community Adaption & Sequestration**	1-2%	With Tree City and afforestation projects	Reduced heat index	Aesthetic benefits	Unknown	Long term cost savings	State and federal funds
	A5. Promote awareness of the dangers of heat exposure and recommend low-cost and low-GHG adaptation strategies	0 - 2		not applicable	With energy conservation programs	Reduced medical and public health benefits over time	Increased awareness of consequences of global climate change	Minimal	Long term cost savings	City and state funds
	A6 Plan for anticipated sea level rise	1-10		not applicable	With General Plan update	Reduced risk to life, property, and infrastructure	Increased awareness of consequences of global climate change	$10-50,000	Will inform and streamline General Plan update	City funds for General Plan update