TOWN OF FAIRFAX
STAFF REPORT
December 4, 2013

TO: Mayor and Town Council

FROM: Jim Moore, Director of Planning & Building Services GK

SUBJECT: Accept the draft of the Climate Action Plan (CAP) and letter from the General Plan Implementation Committee (GPIC) requesting the formation of a Climate Action Committee (CAC) to implement the CAP

RECOMMENDATION

Accept the draft of the Climate Action Plan (CAP) and accept the GPIC letter regarding the formation of a Climate Action Committee (CAC).

DISCUSSION

The 2010 – 2030 General Plan calls for the creation of a Climate Action Plan (CAP) and a Climate Action Committee (CAC). The General Plan Implementation Committee and an ad-hoc subcommittee have been working diligently to create the attached draft CAP. The GPIC is recommending a Climate Action Committee be formed which would be responsible for implementing and maintaining the CAP. The Town's General Plan calls for the formation of a CAC.

Staff recommends that Councilmembers review the CAP and submit their individual comments to staff. At the January 15, 2014 Council meeting, staff anticipates providing the Council with the final draft CAP which will address the Council's comments and include the final calculations as determined by Marin Climate & Energy Partnership (MCEP). Staff will also prepare a resolution for Council consideration at the January meeting which will create the CAC.

FISCAL IMPACT

The template for this document was created by the Marin Climate & Energy Partnership (MCEP) committee of which the Town is a member (please see: marinclimate.org). The annual dues for membership are $2,000. As a result of this membership, the Town has been the beneficiary of not only the template for this draft CAP but both the 2005 and 2010 Green House Gas Inventories used in the formation of the draft CAP, which has resulted in significant cost savings to the Town.

ATTACHMENTS

Exhibit A – Draft Climate Action Plan
Exhibit B – Letter from GPIC recommending the creation of a Climate Action Committee

AGENDA ITEM # 14

To: Mayor, Town Council

From: General Plan Implementation Committee (GPIC)

Date: December 4, 2013

Subject: Climate Action Plan and formation of Climate Committee

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We would like to inform you of the current status of the Climate Action Plan, and GPIC's recommendations regarding the formation of a Climate Committee.

Status of the Climate Action Plan: Beginning with an excellent first draft provided by Marin Climate and Energy Partnership (MCEP), GPIC and its subcommittee has nearly completed a CAP tailored to our Town, and oriented toward meaningful and appropriate actions the Town and its residents can take. GPIC feels that the Recommended Actions in the current draft CAP look good and are consistent with the General Plan. At present the last rather technical updates are being performed by Christine O'Rourke of MCEP. Ms O'Rourke has been exceedingly helpful and generous with her time, and has indicated that she appreciates the directions Fairfax is going with our CAP.

The draft CAP is being presented to you at tonight's Town Council meeting for your acceptance and/or comments, and a final draft with updated calculations will be available for your review and adoption at your January 15 meeting.

Given that GPIC has a larger mission, of interfacing with multiple town groups toward successful implementation of the General Plan, the committee feels that our work on the CAP has reached the point where it should be handed off to the (yet to be formed) Climate Committee. It is understood that both of the GPIC members who have formed our CAP subcommittee, Cassidy DeBaker and Bruce Ackerman, intend to volunteer for the Climate Committee.

Formation of the Climate Committee: The formation of the Climate Committee ("CC") is called for in the General Plan, in which it was referred to by the working name of Fairfax Climate Action Committee (FCAC). GPIC is asking Town Council to approve and create the Climate Committee, and would like to share recommendations regarding its structure.

- We envision this as a working group, whose primary task would be to actually implement some of the programs described in the CAP; we therefore hope that it can be structured in a way that allows efficient progress on multiple fronts as the CAP is implemented.

- GPIC suggests that the CC be created as a subcommittee of GPIC, but open to members beyond those on GPIC proper. It has been suggested that the CC membership allow residents of Fairfax as well as adjacent unincorporated areas, in order to widen the pool of working members.

- It is suggested that a town staff member *not* be required to be present at CC meetings, to lighten the load on staff and allow more frequent meetings.

- Similar to the Volunteer Board, there would not be a requirement that all working meetings of the CC be noticed; this would allow more efficient and frequent meetings for the purpose of performing work that has already been incorporated into the CAP.

- A member of GPIC would chair the CC. This would provide a mechanism for GPIC to monitor the progress of the CC and CAP implementation, as we do with other Town boards and committees in our role as monitors of the progress in implementation of the General Plan.

- GPIC would be responsible for interviewing and selecting applicants for CC membership.

- Membership might be limited to no more than 7.

- The CC would provide an annual action plan, to appraise GPIC and the Town of its progress and priorities.

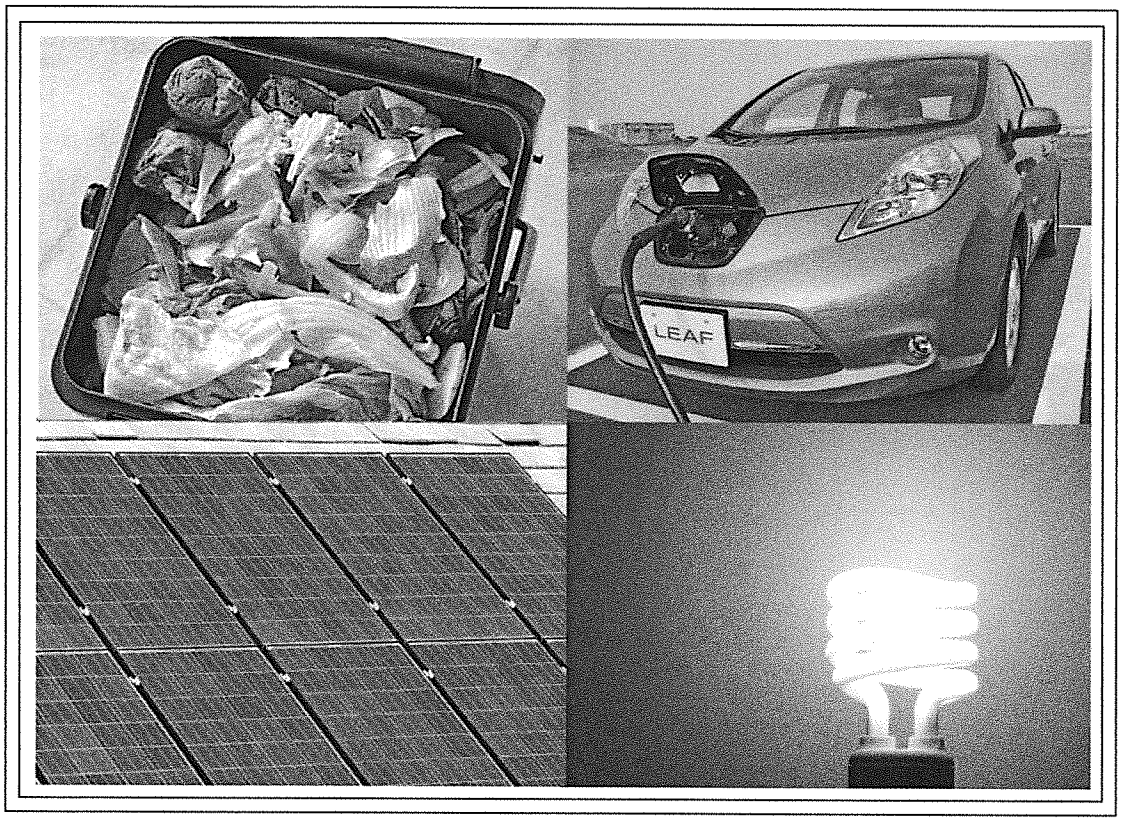
- The CC would be expected to collaborate with other interested groups within and outside of Fairfax, e.g. Sustainable Fairfax and the other "Sustainables", the committees of neighboring jurisdictions that serve as Climate Committees, etc.

We believe that the above is consistent with the General Plan. Program CON-1.1.1.1 calls for the Town to form the Climate Action Committee (aka FCAC). Program CON-1.1.1.3 calls for the Town to create and maintain a CAP, for which primary responsibility is assigned to the Climate Committee.

Thank you for your support.

--GPIC

TOWN OF FAIRFAX
CLIMATE ACTION PLAN



FINAL DRAFT DECEMBER 4, 2013

Prepared by:
Marin Climate & Energy Partnership
Town of Fairfax General Plan Implementation Committee

MARIN CLIMATE & ENERGY PARTNERSHIP

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Calculation of Emissions Reduction Measures

ACRONYMS AND ABBREVIATIONS

Assembly Bill	AB
Association of Bay Area Governments	ABAG
Bay Conservation and Development Commission's	BCDC
Building, Energy, Retrofit & Solar Transformation	BERST
Business-As-Usual	BAU
California Air Resources Board	CARB
California Energy Commission	CEC
Climate Action Plan	CAP
Carbon Dioxide	CO_2
Carbon Dioxide Equivalent	CO_2e
California Environmental Quality Act	CEQA
Department of Motor Vehicles	DMV
Electric Vehicles	EV
Environmental Protection Agency	EPA
Extended Producer Responsibility	EPR
Fairfax Carbon Action Committee	FCAC
General Plan	GP
General Plan Implementation Committee	GPIC
Greenhouse Gases	GHG
Global Warming Potential	GWP
Heating Ventilation and Air Conditioning	HVAC
International Council for Local Environmental Initiatives	ICLEI
Joint Powers Authority	JPA
Leadership in Energy in Environmental Design	LEED
Lighting to Energy-efficient Technologies	LED
Low Carbon Fuel Standard	LCFS
Marin County Biking Coalition	MCBC
Marin Clean Energy	MCE
Marin Climate & Energy Partnership	MCEP
Marin County Energy Watch	MCEW
Marin Municipal Water District	MMWD
Marin Sanitary Service	MSS
Metropolitan Transportation Commission	MTC
Methane	CH_4
Metropolitan Planning Organization	MPO
Miles per gallon	MPG
Nitrous Oxide	N_2O
Property Assessed Clean Energy	PACE
Pacific Gas and Electric Company	PG&E
Plug-in Hybrid Electric Vehicle	PHEV
Renewable Portfolio Standard	RPS

Senate Bill	SB
Transit-Oriented Development	TOD
Transportation Authority of Marin	TAM
United States Geological Survey	USGS
Vehicle Miles Traveled	VMT

1.0 INTRODUCTION

1.1 PURPOSE OF THE CLIMATE ACTION PLAN

The Town of Fairfax understands that climate change has the potential to significantly affect Fairfax's residents and businesses, as well as other communities around the world. The Town also recognizes that local governments play a strong role in reducing greenhouse gas emissions and mitigating the potential impacts of climate change.

The purpose of this Climate Action Plan (CAP) is to compile existing and potential strategies (i.e., actions, projects, and programs) that the Town's government and the community can use to address climate change. It provides a brief background on what climate change is and its potential impacts, but focuses on the efforts Fairfax can take to reduce its greenhouse gas emissions and mitigate, to the extent feasible at the local level, the potential impacts of climate change.

Through the actions outlined in this plan, such as increasing energy efficiency in buildings, encouraging less dependence on the automobile, and using clean, renewable energy sources, the Fairfax community can experience lower energy bills, improved air quality, reduced emissions, and an enhanced quality of life. The Town's preparation of 2005 and 2010 Greenhouse Gas Emissions Inventories and this Climate Action Plan are the beginning of an ongoing planning process that includes assessing, planning, mitigating and adapting to climate change.

Specifically, this plan does the following:

- Summarizes the various regulations at the federal, state, and regional levels.
- Incorporates the Town's 2005 and 2010 Greenhouse Gas Emission Inventories, which identified sources of greenhouse gas emissions generated by both the community and the Town's government operations.
- Estimates how these emissions may change over time and establishes a target to reduce greenhouse gas emissions for the Town to 20% below 2005 levels by 2020.
- Provides natural system, energy use, transportation, land use, green purchasing, waste and water use strategies necessary to minimize Fairfax's impacts on climate change and meet the established greenhouse gas emissions reduction target.
- Provides strategies by which progress toward lowering greenhouse gas emissions could enter the daily awareness of Fairfax citizens, and by which action to make that progress can be taken in a community context.

1.2 RELATIONSHIP TO THE GENERAL PLAN

The Town of Fairfax 2010 - 2030 General Plan Final Draft[1] (GP), adopted by the Town Council in April 2012, commits the Town to creating a Climate Action Plan, publishing it on the Town website, and maintaining it on an ongoing basis. The General Plan Final Draft contains polices and strategies to reduce greenhouse gas emissions. These policies and programs are referenced and integrated into this Climate Action Plan. Though both the General Plan and the Climate Action Plan are intended as long-range plans, the Climate Action Plan may be updated on a more regular basis to add and amend strategies as new information, policy guidance, and regulations regarding climate change evolve and new technologies to address it are developed.

1.3 CLIMATE CHANGE BACKGROUND

A balance of naturally occurring gases dispersed in the atmosphere determines the Earth's climate by trapping infrared radiation (heat), a phenomenon known as the greenhouse effect (Figure 1). Significant evidence suggests that human activities are increasing the concentration of these gases (known as "greenhouse gases" or GHG) in the atmosphere, causing a rise in global average surface temperature and consequent global climate change. The greenhouse gases include carbon dioxide, methane, nitrous oxide, halocarbons, ozone, and water vapor (Table 1). Each one has a different degree of impact on climate change. To facilitate comparison across different emission sources with mixed and varied compositions of several GHG, the term "carbon dioxide equivalent" or CO_2e is used. One metric ton of CO_2e may consist of any combination of GHG, and has the equivalent Global Warming Potential (GWP) as one metric ton of carbon dioxide (CO_2). According to the U.S. Environmental Protection Agency's (EPA) April 2009, "Inventory of U.S. Greenhouse Gas Emissions," the majority of GHG emissions comes from fossil fuel combustion, which in turn is used for electricity, transportation, industry, heating, etc.

Collectively, these gases intensify the natural greenhouse effect, causing global average surface temperatures to rise, which affects local and global climate patterns. These changes in climate are forecasted to manifest themselves in a number of ways that might impact Fairfax as well as other changes to local and regional weather patterns and species migration.

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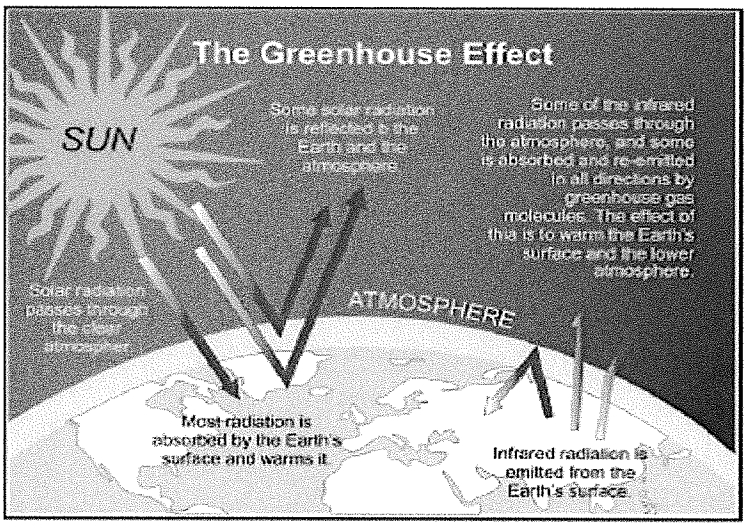
[1] Town of Fairfax 2010-2030 General Plan Final Draft, April 2012.
http://www.town-of-fairfax.org/pdfs/planning_dept/general%20plan/TownofFairfax_2010-2030GeneraPlan_PDFreduced.pdf
(accessed 07/01/2013)

Figure 1 The Greenhouse Effect



Source: International Council for Local Environmental Initiatives

According to a 2006 Summary Report from the California Climate Change Center, global warming could significantly impact California water and forest resources. The Center's 2006 Summary Report noted the following findings and potential risks to California:[2]

- Precipitation is the most important hydrologic variable and most difficult to forecast.
- Warming raises the elevation of snow levels with reduced spring snowmelt and more winter runoff.
- Less snowmelt runoff means lower early summer storage at major foothill reservoirs with less hydroelectric power production.
- Higher temperatures and reduced snowmelt compounds the problem of providing suitable cold-water habitat for salmon species.
- Rising sea levels would adversely affect many coastal marshes and wildlife reserves.

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[2] A Summary Report from: California Climate Change Center. *Our Changing Climate: Assessing the Risks to California.* Document No. CEC-500-2006-077, July 2006. http://www.energy.ca.gov/2006publications/CEC-500-2006-077/CEC-500-2006-077.PDF (accessed 02/14/11)

- Higher temperatures increase the demand for water by plants.
- Climate change in California will result in a higher frequency of large damaging fires.
- Regional climates that are hotter and drier will result in increased pest and insect epidemics within California's forests.

Table 1 Greenhouse Gases

Gas	Chemical Formula	Emission Source	Global Warming Potential
Carbon Dioxide	CO_2	Combustion of natural gas, gasoline, diesel, and other fuels	1
Methane	CH_4	Combustion, anaerobic decomposition of organic waste in landfills, wastewater and livestock	21
Nitrous Oxide	N_2O	Combustion, wastewater treatment	310
Hydroflourocarbons	Various	Leaked refrigerants, fire suppressants	12 to 11,700

Sea Level Rise

Because of scientific uncertainties, it is difficult to predict with a high degree of accuracy the sea level rise that will impact Marin County residents. The San Francisco Bay Conservation and Development Commission's (BCDC) most recent assessment assumes a 1.8° to 5.4° F (1° to 3° C) rise in global temperature over the next century and a corresponding sea level rise in San Francisco Bay of 16 inches by mid-century and 55 inches by 2100.[3] Sea level rise of this magnitude would have dramatic impacts on residences, businesses, schools, and public infrastructure located near the shoreline. Inundation maps created by BCDC (Figure 2) integrate Geographic Information System (GIS) data from the United States Geological Survey (USGS) and sea level rise projections to assess the vulnerability of Bay Area communities to different sea level rise scenarios. A 16-inch rise in sea level would result in the flooding of 180,000 acres of shoreline, which is roughly equivalent to today's 100-year floodplain. A 55-inch rise in sea level would flood over 213,000 acres of shoreline, putting billions of dollars of private and public

[3] San Francisco Bay Conservation and Development Commission Draft Staff Report, "Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline," April 7, 2009. http://www.bcdc.ca.gov/proposed_bay_plan/bp_1-08_cc_draft.pdf (accessed 03/30/10).

development at risk. Changes in climate and sea level could cause an increase in storm activity, storm surges, and even greater flooding.

Figure 2 Inundation Effect of 16-Inch Sea Level Rise

The areas in blue identify the land area that is subject to inundation from a 16-inch rise in sea level[4]

[4]DISCLAIMER: Inundation data does not account for existing shoreline protection or wave activity. This map is for informational purposes only.

Source: Inundation data from Knowles, 2008. Aerial imagery is NAIP 2005 data. (accessed 07/02/10).

1.4 Climate Change Mitigation Activities in Fairfax

The Town has taken a number of initiatives in recent years to reduce greenhouse gas emissions. These include the following early actions:

- Installed energy-efficient lighting, double-paned window and a new door in town hall.
- Installed a 25 KW solar panel system on the Pavilion roof.
- Installed electric car charging stations in the Parkade.
- Joined the Marin Energy Authority and chose Marin Clean Energy deep green 100% renewable electricity for all Town operations.
- Adopted the Town of Fairfax Bicycle and Pedestrian Master Plan Update in 2008 which outlines future bicycle and pedestrian improvement programs and projects throughout the Town to promote increased bicycle and pedestrian travel and decrease the use of vehicles.
- Secured Safe Routes to Schools and Safe Paths to Schools grant money to construct crosswalks and safety improvements at Glen Drive/Mitchell Drive and Oak Tree Lane at Sir Francis Drake Boulevard, and a new sidewalk on Oak Manor Drive.
- Constructed bicycle and pedestrian improvements on Center Boulevard between Pastori Avenue and Pacheco Avenue, including new sidewalks, curb extensions, new and improved crosswalks and bicycle lane repaving.
- Working with funding through the Non-Motorized Transportation Pilot Program, installed new sidewalks on Pastori Avenue and Sir Francis Drake Boulevard. The improvements are intended to increase the mode share of cycling and walking for everyday transportation.
- Town sponsored electronic waste events.
- In partnership with Marin Sanitary Service, implemented curbside food waste collection for residences. The program reduces methane emissions by composting food waste instead of depositing it into the landfill. Work is being done to include businesses and restaurants in this program.
- Adopted a construction and demolition (C&D) debris recycling ordinance that requires a minimum of 70% of C&D waste to be recycled rather than deposited into the landfill. The ordinance incrementally increases diversion requirements until targets meet 94% by the end of 2025.
- Adopted a Zero Waste resolution that commits the Town to reaching a 94% diversion rate by 2020, and an ultimate goal of Zero Waste.
- Adopted the new CALGreen standards as part of the new California Building Code.
- Participated in the Energy Upgrade California program, which provides substantial rebates to homeowners to perform energy audits and "whole house" energy upgrade retrofits.

- Implemented Marin Municipal Water District's Ordinance 421 which added, amended, and repealed certain sections of MMWD's Title 13 Water Code. The revisions were necessary to further meet conservation measures within the District's service area, as well as meet 2010 California Green (CalGreen) Building Standards, improve the effectiveness of the District's water waste prevention program, and increase efficiency standards.
- Purchased two hybrid and two fuel-efficient vehicles to optimize fuel utilization. The police department plans to phase more fuel-efficient models into the police fleet as existing vehicles are replaced.
- Purchased numerous pieces of Energy Star-rated computer equipment to phase out older, less energy efficient equipment.

1.5 Regulation of Climate Change – Federal, State and County Levels

Federal Climate Policy

Currently, there is no federal legislation mandating comprehensive greenhouse gas emissions reporting or reduction in the United States. The U.S. Senate considered, but failed to pass, various cap-and-trade bills in 2009 and 2010. Therefore, the U.S. has used its rulemaking authority under the Clean Air Act to begin to regulate greenhouse gas emissions. In 2009, the EPA made an "endangerment finding" that GHGs threaten the public health and welfare of the American people[5]. This finding provided the statutory prerequisite for EPA regulation of GHG emissions from motor vehicles and has led to a number of GHG regulations for stationary sources. In May 2010, the EPA issued a "tailoring" rule that enables the agency to control GHG emissions from the nation's largest GHG sources, including power plants, refineries, cement production facilities, industrial manufacturers and solid waste landfills, when these facilities are newly constructed or substantially modified. The EPA reports that its GHG permitting requirements will address 70% of the national GHG emissions from stationary sources[6]. These rules were scheduled to go into effect in January 2011.

In April of 2010, the EPA and Department of Transportation finalized new fuel efficiency standards for model year 2012 through 2016 cars and light trucks. These vehicles will have to meet a combined average emissions level of 250 grams of carbon dioxide per mile, or the equivalent to 35.5 miles per gallon (MPG), up from the current standard of 27.5 miles per gallon (MPG). The EPA and the Department of Transportation are currently developing first-ever regulations for medium and heavy-duty vehicles[7].

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[5] Final Rule, EPA, Endangerment and Cause or Contribute Findings for Greenhouse Gases Under the Clean Air Act, 74 Fed. Reg. 66495, December 7, 2009. (accessed 12/09/2010).

[6] Final Rule: Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule Fact Sheet, EPA, http://www.epa.gov/NSR/documents/20100413fs.pdf. (accessed 07/01/2013).

[7] U.S. Environmental Protection Agency, http://www.epa.gov/oms/climate/regulations.htm#1-1. (accessed 12/09/2010).

State Climate Policy

Since 2005, the State of California has responded to growing concerns over the effects of climate change by adopting a comprehensive approach to addressing emissions in the public and private sectors. This approach was officially initiated with the passage of the Global Warming Solutions Act of 2006 (AB 32), which requires the State to reduce its greenhouse gas emissions to 1990 levels by 2020. The AB 32 Scoping Plan was developed to identify strategies for meeting the AB 32 goal, and was adopted by the California Air Resources Board (CARB) in December 2008. Among many other strategies, it encourages local governments to reduce emissions in their jurisdictions by 15 percent below current levels by 2020. In addition, it identifies the following strategies that will impact local governance:

- Develop a California cap-and-trade program
- Expand energy efficiency programs
- Establish and seek to achieve reduction targets for transportation-related GHG emissions
- Expand the use of green building practices
- Increase waste diversion, composting, and commercial recycling toward zero-waste
- Continue water efficiency programs and use cleaner energy sources to move and treat water
- Reduce methane emissions at landfills
- Preserve forests that sequester carbon dioxide

Other measures taken by the State include mandating stronger vehicle emissions standards (AB 1493, 2002), establishing a low-carbon fuel standard (EO # S-01-07, 2007), mandating a climate adaptation plan for the State (S-EO # 13-08, 2008), establishing a Green Collar Job Council, and establishing a renewable energy portfolio standard for power generation or purchase in the state. The State also has made a number of legislative and regulatory changes that have significant implications for local governments:

- SB 97 (2007) required the Office of Planning and Research to create greenhouse gas planning guidelines for the California Environmental Quality Act (CEQA). In addition, CARB is tasked with creating energy-use and transportation thresholds in CEQA reviews, which require local governments to account for greenhouse gas emissions when reviewing project applications.
- AB 811 (2007) authorizes all local governments in California to establish special districts that can be used to finance solar or other renewable energy improvements to homes and businesses in their jurisdiction.

- SB 375 (2008) revises the process of regional transportation planning by metropolitan planning organizations (MPOs), which are governed by elected officials from local jurisdictions. The statute calls on the ARB to establish regional transportation-related greenhouse gas targets and requires the large MPOs to develop regional "Sustainable Communities Strategies" of land use, housing and transportation policies that will move the region towards its GHG target. The statute stipulates that transportation investments must be consistent with the Sustainable Communities Strategy and provides CEQA streamlining for local development projects that are consistent with the Strategy. The Bay Area's target is a 7% per capita reduction by 2020 and a 15% reduction by 2035.

The most significant of these initiatives are AB 32 and SB 375; the first requires California to reduce its GHG to 1990 levels by 2020, and the second begins to tie GHG reductions to land use. In 2007, the CARB conducted an emissions inventory for the State to identify emissions levels in 1990 that figure 427 million metric tons of carbon dioxide equivalents. The inventory revealed that transportation was the largest single sector (35% of the state's total 1990 emissions), followed by industrial emissions (24%), imported electricity (14%), in-state electricity generation (11%), residential use (7%), agriculture (5%), and commercial use (3%). Preliminary estimates indicate that California's 2020 emission projections could be 600 million tons of CO_2e if no actions are taken to reduce GHG. This means that California must prevent 173 million tons of CO_2e from being emitted by 2020 in order to meet the 1990 levels as required by AB 32.

CARB is responsible for monitoring and reducing GHG emissions set forth in AB 32, and is, therefore, coordinating statewide efforts. In December 2008, CARB adopted a Scoping Plan that outlines the actions required for California to reach its 2020 emission target. The actions include a broad set of clean energy, clean transportation, and efficiency standards. In 2009, CARB identified and implemented nine discrete early action measures including regulations affecting landfills, motor vehicle fuels, refrigerants in cars, tire pressure, port operations and consumer products. More recently, CARB has implemented the Low Carbon Fuel Standard, Advanced Clean Car standards and the Cap-and-Trade program. CARB is currently updating the Scoping Plan to define climate change priorities for the next five years and to set the groundwork to reach California's longer-term climate goal of reducing GHG emissions to 80% below 1990 levels by 2050.

Key strategies identified in the CARB Climate Change Scoping Plan that are best developed and supported by local governments in achieving the climate protection and emission reduction goals include:

- Transportation and community design
- Local and regional emission targets
- Recycling and waste reduction
- Clean energy

- Green buildings
- Water

The CARB Climate Change Scoping Plan "encourages local governments to adopt a reduction goal for municipal operations emissions and move toward establishing similar goals for community emissions that parallel the State commitment to reduce greenhouse gas emissions by approximately 15 percent from current levels by 2020."[8] However, CARB does not yet require cities to adopt climate action plans as part of AB 32 implementation efforts.

In the Bay Area, four regional government agencies – the Association of Bay Area Governments, the Bay Area Air Quality Management District, the Bay Conservation and Development Commissions, and the Metropolitan Transportation Commission, worked together to create Plan Bay Area, the region's sustainable communities strategy. Adopted in July 2013, the plan anticipates that the Bay Area's population will grow from about 7.2 million in 2013 to 9.3 million by 2040 and provides a strategy for meeting 78 percent of the region's future housing need and 62 percent of new jobs in Priority Development Areas (PDAs).[9] PDAs are areas, voluntarily nominated by local governments, which are or will be walkable and bikable and close to public transit, jobs, schools, shopping, parks, recreation and other amenities. With more limited transit access and fewer PDAs, North Bay counties, including Marin, are expected to take on a much smaller share of the regional growth. There are no PDAs located in Fairfax. Plan Bay Area is projected to reduce regional greenhouse gas emissions from passenger vehicles and light duty trucks 10.3% by 2020 and 16.4% by 2035.[10]

State Actions

The following are State reduction strategies included in the AB 32 Scoping Plan and accounted for in the Town's adjustment of the business-as-usual forecast. To clarify, the State of California has approved, programmed, and/or adopted these actions. Furthermore, they are programs or projects that require no local involvement. Incorporating them into the forecast and reduction assessment provides a more accurate picture of future emissions growth and the responsibility for action.

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[8] California Air Resources Board, "Climate Change Scoping Plan," December 2008, p. 27, http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf, (accessed0 3/31/10).

[9] Metropolitan Transportation Commission, Draft Plan Bay Area, March 2013, page 55, and Summary of Major Revisions and Corrections to the Draft Plan Bay Area, July 2013.

[10] Association of Bay Area Governments and Metropolitan Transportation Commission, Draft Plan Bay Area Draft Environmental Impact Report, April 2013, pages 2.5-50 and 3.1.59.

Renewable Portfolio Standard (RPS)
Established in 2002 in Senate Bill 1078, the Renewable Portfolio Standard program requires electricity providers to increase the portion of energy that comes from eligible renewable sources, including solar, wind, small hydroelectric, geothermal, biomass and biowaste, to 20% by 2010 and to 33% by 2020. In 2012, PG&E's electric power generation mix contained 19% renewable energy. Marin Clean Energy's Light Green electricity contained 53% renewable energy; the Deep Green product contained 100% renewable energy.

Pavley (AB 1493)
Assembly Bill 1493 (Pavley), signed into law in 2002, requires carmakers to reduce greenhouse gas emissions from new passenger cars and light trucks beginning in 2009. The California Air Resources Board (CARB) adopted regulations in September 2009 that reduce greenhouse gas emissions in new passenger cars, pickup trucks and sport utility vehicles for model years 2012-2016. CARB expects the new standards to reduce GHG emissions from California passenger vehicles by about 22 percent in 2012 and about 30 percent in 2016, while improving fuel efficiency and reducing motorists' costs.

Low Carbon Fuel Standard
The State is also working to reduce the carbon intensity of transportation fuels consumed in California. To achieve this, CARB has developed a Low Carbon Fuel Standard (LCFS), which will reduce the carbon intensity of California's transportation fuels by at least 10% by 2020 as called for by Governor Schwarzenegger in Executive Order S-01-07. LCFS uses a market-based cap and trade approach to lowering the greenhouse gas emissions from petroleum-based transportation fuels like reformulated gasoline and diesel. Petroleum importers, refiners and wholesalers can either develop their own low carbon fuel products or buy LCFS credits from other companies that develop and sell low carbon alternative fuels, such as biofuels, electricity, natural gas or hydrogen.

Title 24
The California Energy Commission (CEC) promotes energy efficiency and conservation by setting the state's building efficiency standards. Title 24, the 24th part of the California Code of Regulations, consists of regulations that cover the structural, electrical, mechanical, and plumbing system of every building constructed or altered after 1978. The building energy efficiency standards are updated on an approximately three-year cycle, and each cycle imposes increasingly higher demands on energy efficiency and conservation. The CEC's 2007 Integrated Policy Report established the goal that new building standards achieve "net zero energy" levels by 2020 for residences and by 2030 for commercial buildings. The California Public Utility Commission's (CPUC) California Long Term Energy Efficiency Strategic Plan, dated July 2008, endorses the Energy Commission's zero net energy goals for all newly constructed homes by 2020 and for all newly constructed commercial buildings by 2030.

California Solar Initiative
The California Solar Initiative program is a solar rebate program for electric customers of the investor-owned utilities, including PG&E. The program funds solar installations on homes and commercial buildings and offers different incentive levels based on system capacity as well as the performance of

the solar panels. The program has a total budget of $2.167 billion between 2007 and 2016 and a goal to install approximately 1,940 MW of new solar generation capacity.

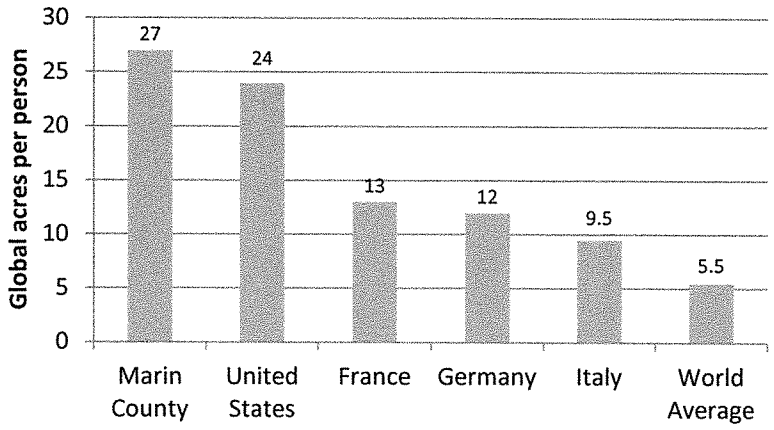
Table 2 Impact of State Actions on Fairfax Community Emissions

State Action	GHG Emissions Reduced (metric tons $CO2_e$)
Renewable Portfolio Standard	316
AB 1493 Pavley I Standards and the Low Carbon Fuel Standard	3,992
Title 24	49
California Solar Initiative	61
Total GHG Reductions 2010-2020	**4,417**

Marin County Climate Policy

Underpinning sustainability and climate change efforts in Marin County is the recognition that Marin residents consume resources at a far greater rate than most industrialized nations, and that the worldwide use of resources is exceeding the earth's capacity to renew them. One way to measure the use of natural resources against the planet's actual biocapacity and ability to renew those resources is the "ecological footprint." It can be calculated for individuals, regions, countries, or the entire earth and is expressed as the number of global acres (acres with world average biological productivity) that it takes to support one person. As Figure 3 shows, the average American uses 24 global acres per capita, while the average Marin resident requires 27 global acres. Other western democracies, such as France, Germany, and Italy, have footprints of 13, 12, and 9.5 global acres per person, respectively. According to the Global Footprint network, if every person lived the lifestyle of one American, we would need five planets to sustain us.

Figure 3 Ecological Footprint Comparison

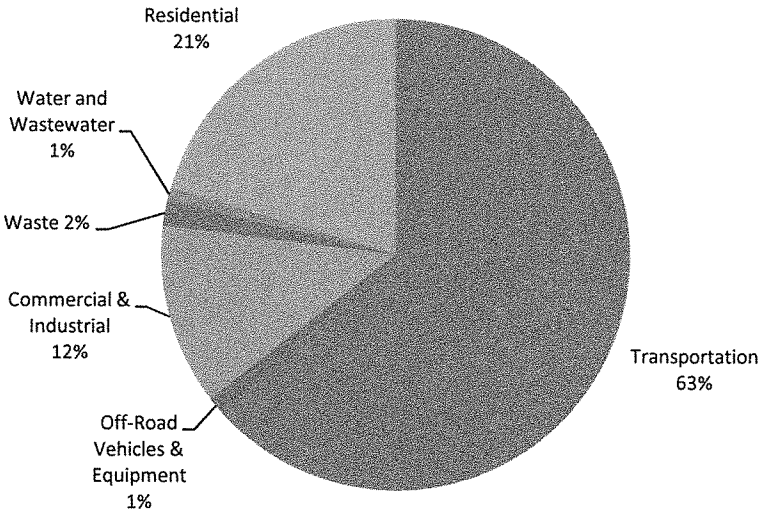


Source: *Redefining Progress*, Sustainable Sonoma County, Worldwide Fund for Nature, as quoted in the Marin Countywide Plan, adopted November 6, 2007.

In 2006, Marin County developed a strategic plan to reduce annual GHG emissions to 15% below 1990 levels by 2020. In 2007, the County re-inventoried their greenhouse gas emissions. Figures 4 shows the distribution of countywide GHG emissions by sector in 2010 and emission trends between 1990 and 2005. Total countywide greenhouse gas emissions were estimated to have increased by approximately 6% between 1990 and 2005, from 3,005,674 to 3,188,522 tons CO2e.[11] This 6% rate of increase can be used as a proxy to estimate the increase in Fairfax's emissions between 1990 and 2005, since actual data are unavailable. The results of Fairfax's 2005 and 2010 GHG Inventories are included in Section 2.2 of this plan.

While the County has taken important steps to reduce greenhouse gas emissions, a large portion of Marin County is operated and governed by the 11 local jurisdictions and numerous special districts. It is therefore important that the municipalities, such as Fairfax, participate in developing local emission reduction measures and policies.

Figure 4 Marin Countywide Emissions by Sector (2010)



[11] "Marin County Re-Inventory c
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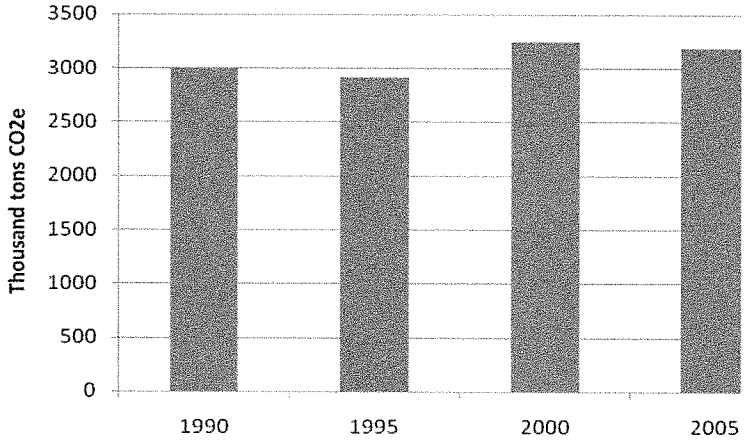
Figure 5 Marin County Emissions 1990-2005



Marin Climate and Energy Partnership – A Multi-Jurisdictional Approach

Created in 2007, the mission of the Marin Climate & Energy Partnership (MCEP) is to reduce greenhouse gases emission levels to the targets of Marin County and local municipalities, consistent with the standards set by AB32. The eleven Marin Cities and towns, the County of Marin, the Transportation Authority of Marin, and the Marin Municipal Water District are members. The Marin Climate and

Energy Partnership provided staff support and technical expertise for the development of this inventory. Funding for this project was provided in part by the Marin County Energy Watch (MCEW), a joint project of Pacific Gas and Electric Company (PG&E) and the County of Marin.[12]

One of MCEP's first projects was to work with International Council for Local Environmental Initiatives (ICLEI) – Local Governments for Sustainability, a nonprofit organization, to develop GHG emissions inventories for the partner jurisdictions. With Bay Area Air Quality Management District grant funding, MCEP also worked on programs related to reducing energy use in municipal buildings, establishing a green purchasing collaborative, reducing energy use in residential and commercial buildings, reducing emissions from private and municipal vehicles, and reducing energy use and emissions from waste.

In 2009, MCEP developed a green building strategic plan and green building policies which resulted in the Marin Green Building, Energy, Retrofit & Solar Transformation (BERST) model ordinance. The Marin Community Foundation provided funding for this effort, as well as funds to develop climate action plans for six partner jurisdictions. Partner members have agreed to use their adopted climate action plans to identify mutual measures to reduce community-wide greenhouse gas emissions and develop policies and programs to support priority measures. The Town has worked closely with the MCEP to complete this climate action plan, and to implement a coordinated approach to local and regional emissions reduction targets and climate action planning goals.

In 2012-2013, MCEP conducted a re-inventory of greenhouse gas emissions for ten cities and towns in Marin County. A comparison of the results of these inventories is available at the MCEP website at www.marinclimate.org.

1.6 The Unique Role of Fairfax

Fairfax, while emitting a small portion of the global GHGs, is in a position to play a more significant role in addressing this problem than many communities of its size for several reasons. First, as described above, we are in a region in which we emit an outsized portion of these gases per capita. At the same time, Fairfax has been a leader in environmental consciousness in many important ways, and prides itself on having been instrumental in the creation of Marin Clean Energy and Safe Routes to Schools, and in our preservation of a rich small-town community life. Fairfax citizens have resources, both in time and stable property values, and in volunteerism and civic engagement. Fairfax has the opportunity to leverage these strengths to become an example for the U.S., and for the world, of a relatively affluent U.S. community making a real difference in our community's ecological footprint.

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[12] MCEW is funded by California utility ratepayers under the auspices of the California Public Utilities Commission.

A few of the challenges/opportunities unique to Fairfax include the following:

- The largest sector of GHG emissions in our Town arise from transportation. We can improve these by continued focus on affordable housing (so that people who work in town can live here, rather than commuting long distances). We can continue our support of live/work, so that people who live in Fairfax can avoid frequent commutes elsewhere in the Bay Area by working from our homes. Continued increase in the use of bicycling, walking and public transportation will lower our footprint.
- Housing stock in Fairfax tends to be older, often poorly insulated or with aging infrastructure such as heating and water heating. However, citizens are continually improving their houses for a variety of their own reasons, and if these improvements are done properly they can greatly decrease energy consumption. A combination of education, cultural shift, availability of modern technologies, availability of low-cost financing, and regulation can accelerate these improvements.
- Fairfax, as the gateway to West Marin, shares in the awareness that we need to be resilient to such events as power shortages/outages, severe weather, and disruption of transportation corridors. There is a well-recognized overlap between the actions taken to improve resiliency and those that can improve our footprint.
- Fairfax prides itself on being active in the issues of the day nationally and globally. Were our town to make a significant, measurable improvement in our global footprint, this could be noticed in such venues as global climate talks. Fairfax could show the way to breaking the gridlock in such discussions, in which less-developed countries point to the affluent U.S. as continuing to consume more than our fair share. As a community seeking to redefine life from one of consumption to one based more on enjoyment of the simple pleasures of community, we could show that consumption and environmental damage can be decoupled from economic well-being.
- Fairfax is presently thought of by some homeowners and those in the construction trades as being heavily regulated. Whether accurate or not, this is a public perception that limits the extent to which further regulations will be supported by the voting public, or be followed. On the other hand, the Town has numerous forward-thinking policies in place that can help homeowners and renters to live more efficiently, economically and comfortably. For example, insulation of walls is exempt by statute from being considered a "substantial remodel", thus allowing insulation to be installed quite economically; another example is exemption from permit fees for solar installation. Were the Town to strongly publicize these policies, perception might be shifted toward seeing building regulations in a more favorable light.
- Town government often appears limited in its actions by lack of funding. Yet the flow of discretionary spending by townspeople toward buying the highest quality food and supporting local suppliers is enormous. Similarly, while the Town is limited in funding to improve infrastructure directly through public works, the flow of capital toward improvement of houses is strong in the community. Every time building officials offer a constructive suggestion, or point out a regulation, that causes a construction project to upgrade the efficiency of a home, it has

long-term benefits to all parties including homeowners, renters, the Town and the planet. Again, a shift in perception could maximize this synergy.

- In order to shift public perception and encourage grass-roots action toward a brighter energy and emissions future, the General Plan proposes actively and continually providing the public with a high-profile GHG-Meter of some of the important numbers contributing to GHG emissions.

2.0 FAIRFAX'S GREENHOUSE GAS EMISSIONS

2.1 FAIRFAX'S PROFILE

Located in Marin County approximately thirteen miles north of the Golden Gate Bridge in beautiful Upper Ross Valley, Fairfax is a small town with a land area of 2.1 square miles. According to the U.S. Census, the population of Fairfax in 2010 was 7,441 and there were 3,585 housing units. The California Department of Finance estimates the population of Fairfax in 2005 was 7,237.[13] Fairfax enjoys a temperate climate, with cool, wet, and almost frostless winters and dry summers. The town is located in climate zone 2, and experienced an estimated 3,649 heating degree days and 292 cooling degree days in 2005. The year 2010 was relatively cooler, with 4,027 heating degree days and 168 cooling degree days.[14] Primarily a residential community, Fairfax has a vibrant downtown with unique shops, restaurants and well-known music venues. It is an environmentally conscious community and is considered the most progressive of Marin's eleven incorporated cities. Historic development patterns in Fairfax created a town with a distinct center, providing a good public transit hub within walking and bicycling distance of most of the town's inhabitants. Fairfax has retained a village-like quality, with distinct neighborhoods, and large areas of surrounding visible open space.

The Town has public and private schools for grades K-8, a post office, a library, police and fire stations, and a Town Hall. With abundant parks and open space, there are many recreational opportunities within town, and Fairfax is known as a mountain biking and hiking haven. The Town is home to many local artists and musicians. Although some residents work in Fairfax, a majority commute to jobs in Marin County, San Francisco and other locations.

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[13] California Department of Finance, "E-4 Population Estimates for Cities, Counties, and the State 2001-2010, with 2000 & 2001 Census Counts," August 2011. To make comparisons to U.S. Census data, this is the average between California Department of Finance estimates for January 1, 2005, and January 1, 2006.

[14] Climate Zone information is supplied by the California Energy Commission, http://www.energy.ca.gov/maps/renewable/Climate_Zones_by_City.pdf, accessed 9/14/12. Heating and cooling degree days data for the North Coast Drainage Division is supplied by NOAA Satellite and Information Service, National Climatic Data Center, U.S. Department of Commerce, http://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp, accessed 9/14/12. A heating degree day (HDD) is a measurement designed to reflect demand for energy needed to heat a facility, while a cooling degree day (CDD) is used to reflect the demand on energy needed to cool a building. Degree days are calculated using daily temperature readings and a base temperature (typically 60 or 65 degrees). For example, a typical January day in Fairfax has an average temperature of 47 degrees. For such a day we can approximate the HDD as (65 - 47) = 18.

2.2 2005 AND 2010 GREENHOUSE GAS EMISSIONS INVENTORIES

In 2009, Fairfax completed a Greenhouse Gas Inventory report for the baseline year of 2005, which was subsequently updated in 2013 when the Town prepared a second inventory of 2010 emissions. In April 2012, the Fairfax Town Council adopted the 2010-2030 General Plan, which lays out a path to achieve greenhouse gas reductions in local government operations and throughout the community and directs the Town to develop a Climate Action Plan to achieve those reductions. The Town has adopted a greenhouse gas reduction target of 20% below 2005 levels by the year 2020, a target that exceeds the State goal (a goal comparable to the State goal would be 15% below 2005 levels).

The 2010 GHG inventory measures the progress the Town has made on reducing greenhouse gas emissions between 2005 and 2010 and illustrates where more work needs to be done. In some cases, changes were made to the baseline year calculations in order to ensure an apples-to-apples comparison of emissions from 2005 and 2010. The inventory quantifies greenhouse gas emissions from a wide variety of sources, from the energy used to power, heat and cool buildings, to the fuel used to move vehicles and power off-road equipment, to the decomposition of solid waste and treatment of wastewater. Emissions are arranged by sector to facilitate detailed analysis of emissions sources and comparison of increases and decreases between 2005 and 2010. It is important to note that the inventory provides a snapshot of two years and does not intend to imply there is necessarily a trend line between those years. Total emissions may have gone up or down during the years between 2005 and 2010.

Calculating GHG emissions for a town must be done indirectly, because it is not possible to directly measure the town's contribution to this atmospheric component; not all emissions for which the town is responsible even occur within the town. The inventory utilizes methodologies developed by the Bay Area Air Quality Management District and ICLEI for quantifying community-scale emissions. In general, the inventory follows the standards outlined in the draft International Local Government GHG Emissions Analysis Protocol and, where appropriate, the LGO Protocol, with additional guidance from the Air District with respect to quantifying emissions from the transportation, off-road, water and wastewater sectors. The inventory uses 2005 as the baseline year, as this year is increasingly becoming the standard for such inventories. Due to lack of city-specific data, the 1990 baseline year utilized by the State of California is usually too difficult for most local governments to meet and would not produce the most accurate inventory.

The encouraging news is that Fairfax reduced community greenhouse gas emissions 4.6% between 2005 and 2010, from 36,166 metric tons in 2005 to 34,516 metric tons in 2010 – a reduction of 1,650 metric tons CO_2e. Reductions occurred in all sectors. On a percentage basis, the greatest declines occurred in the waste (-34%), water (-31%) and off-road (-15%) sectors. In absolute terms, the greatest reductions were made in the transportation (610 metric tons CO_2e), waste (559 metric tons CO_2e) and residential

(198 metric tons CO_2e) sectors. For more detailed analysis of the factors related to decreases in emissions the reader is referred to the 2010 Fairfax Greenhouse Gas Emissions Inventory. Below is a summary of the Town's community and local government sectors used in this plan to categorize emission reductions and the subsequent inventory results.

Community emissions are quantified according to these seven sectors:

Residential. The residential sector includes emissions generated by the use of electricity, natural gas and propane in our homes.

Commercial & Industrial. This sector includes emissions generated by the use of electricity and natural gas in commercial and industrial buildings. Emissions generated by schools, governments, and public agencies are included in this sector.

Transportation. The transportation sector includes emissions from on-road vehicles travelling on local roads within the town limits.

Off-Road Vehicles & Equipment. This sector includes emissions from vehicles and equipment used for construction and lawn and garden activities.

Waste. This sector includes emissions generated by the decomposition of solid waste and deposited in landfills located outside the town's borders.

Water. The water sector inventories emissions generated by the use of electricity in treating, conveying and distributing water from the water source to water users in the community.

Wastewater. This sector includes emissions generated by the treatment of wastewater as well as electricity used by the wastewater treatment plant.

Local government operations emissions are categorized according to six primary sectors: buildings; streetlights and park lighting; water delivery facilities such as irrigation systems; vehicle fleet, including police and public works vehicles; government-generated solid waste, including public trash cans and street sweepings; and employee commute.

Community Inventory Results

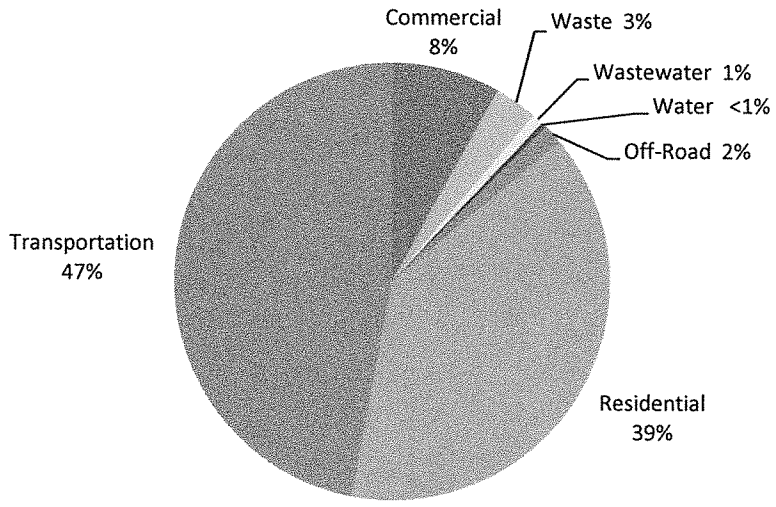
In 2005, the Fairfax community emitted approximately 36,166 metric tons of CO_2e. As shown in Table 3 and Figure 6, the transportation sector was the largest emitter of greenhouse gas emissions in both 2005 and 2010 (representing 47% of total emissions). Emissions from the residential sector produced the second highest quantity (38% in 2005 and 39% in 2010), followed by the commercial sector (8% in

2005 and 2010). Emissions were reduced in all sectors, with the greatest reductions occurring in the transportation sector (610 metric tons), waste sector (559 metric tons), and residential sector (198 metric tons).

Table 3 Community Emissions Summary by Sector, 2005 and 2010

Sector	2005 (metric tons CO_2e)	2010 (metric tons CO_2e)	Change (metric tons CO_2e)	% Change
Residential	13,670	13,472	-198	-1.5%
Commercial	2,888	2,770	-117	-4.1%
Transportation	16,842	16,232	-610	-3.6%
Off-Road	610	519	-91	-15.0%
Water	193	134	-59	-30.5%
Wastewater	295	280	-15	-5.0%
Waste	1,668	1,109	-559	-33.5%
Total	**36,166**	**34,516**	**-1,650**	**-4.6%**

Figure 6 Community Emissions by Sector, 2010



Local Government Operations Inventory Results

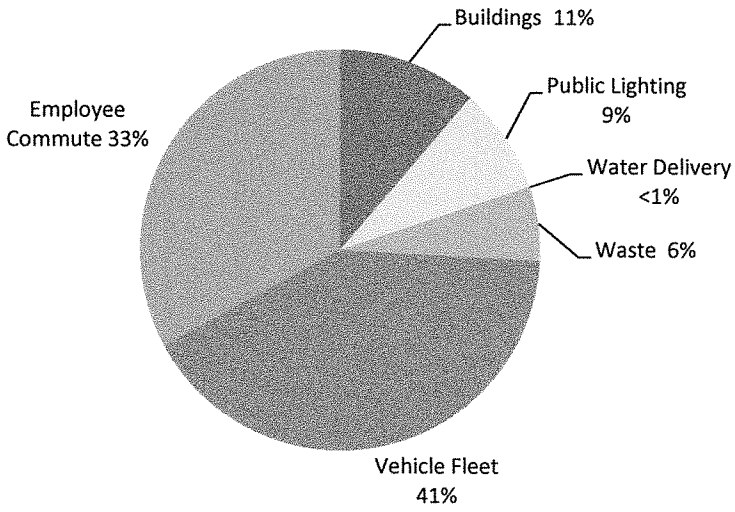
In 2005, Fairfax government operations emitted approximately 346 metric tons of CO_2e.[15] Emissions from government operations decreased in all sectors. As shown in Table 4, the greatest emissions reductions came from the public lighting sector, which experienced a reduction in emissions of 31 metric tons CO2e, or about 58%. Emissions were also reduced in the buildings and facilities sector (-28%), the vehicle fleet sector (-13%), the water delivery sector (-62%), the waste sector (-6%) and the employee commute sector (-24%). Figure 7 shows that the vehicle fleet sector was the largest emitter of greenhouse gas emissions in 2010 (41% of total emissions), followed by the employee commute sector (33%).

Table 4 Government Operations Emissions by Sector, 2005 and 2010

Sector	2005 (metric tons CO_2e)	2010 (metric tons CO_2e)	Change (metric tons CO_2e)	% Change
Buildings & Facilities	40.3	29.0	-11.4	-28%
Vehicle Fleet	123.2	106.6	-16.6	-13%
Public Lighting	53.6	22.3	-31.3	-58%
Water Delivery	0.09	0.03	-0.06	-62%
Waste	16.3	15.4	-0.9	-6%
Employee Commute	112.8	85.3	-27.5	-24%
Total	**346.3**	**258.6**	**-87.7**	**-25%**

[15] This number includes all Scope 1 emissions from the on-site combustion of fuels in facilities and vehicles, Scope 2 emissions from the purchase of electricity, and Scope 3 emissions from waste generated by local government operations and emissions associated with employee commute patterns.

Figure 7 Government Operations Emissions by Sector, 2010



2.3 FORECAST FOR 2020 EMISSIONS

To illustrate the potential emissions growth based on projected trends in energy use, driving habits, job growth, and population growth from year 2010 going forward, this plan includes an emissions forecast for the year 2020. Under a business-as-usual (BAU) scenario, Fairfax's emissions will grow by approximately 2.2% between 2010 and 2020, from 34,516 to 35,288 metric tons CO_2e. Table 5 shows the result of the forecast by sector and in comparison to baseline 2005 emissions. Since this takes into account the 4.6% reduction in emissions between 2005 and 2010, emissions are projected to be approximately 2.4% below 2005 levels by 2020. A variety of different reports and projections were used to create the emissions forecast, as profiled below.

Table 5 BAU Forecast for 2020 Emissions

Sector	2005 (metric tons CO_2e)	2020 (metric tons CO_2e)	Percent Change from 2005 to 2020
Residential	13,670	13,790	0.9%
Commercial	2,888	3,104	7.5%
Transportation	16,842	16,294	-3.3%
Off-Road	610	533	-12.6%
Water	193	138	-28.6%
Wastewater	295	288	-2.3%
Waste	1,668	1,140	-31.7%
TOTAL	**36,166**	**35,288**	**-2.4%**

For the residential, off-road, water, wastewater and waste sectors, population and households projections for Fairfax, as adopted by the Association of Bay Area Governments (ABAG) in 2013, were used to estimate growth in energy and resource demand. ABAG estimates the Fairfax population will grow from 7,441 in 2010 to 7,648 in 2020, an increase of 2.8%.

Analysis contained within *California Energy Demand 2008-2018: Staff Revised Forecast*[16], a report by the California Energy Commission (CEC), shows that commercial floor space and the number of jobs have closely tracked the growth in energy use in the commercial sector. ABAG projects job growth will increase from 1,494 jobs in 2010 to 1,674 in 2020. Using this growth projection of 180 jobs, it was calculated that the growth in energy use in the commercial sector between 2010 and 2020 would be 12%.

For the Transportation Sector, the Metropolitan Transportation Commission (MTC) projects that vehicle miles traveled (VMT) within Fairfax and between Fairfax and other Bay Area destinations will increase ___% between 2010 and 2020.[17] The MTC forecast includes the emissions reductions expected to occur through implementation of Plan Bay Area, the long range integrated transportation and land-use/housing strategy developed for the San Francisco Bay Area in compliance with Senate Bill 375. Plan Bay Area is projected to reduce regional greenhouse gas emissions from passenger vehicles and light duty trucks 10.3% by 2020 and 16.4% by 2035.

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[16] http://www.energy.ca.gov/2007publications/CEC-200-2007-015/CEC-200-2007-015-SF2.PDF. (accessed 02/29/2010).

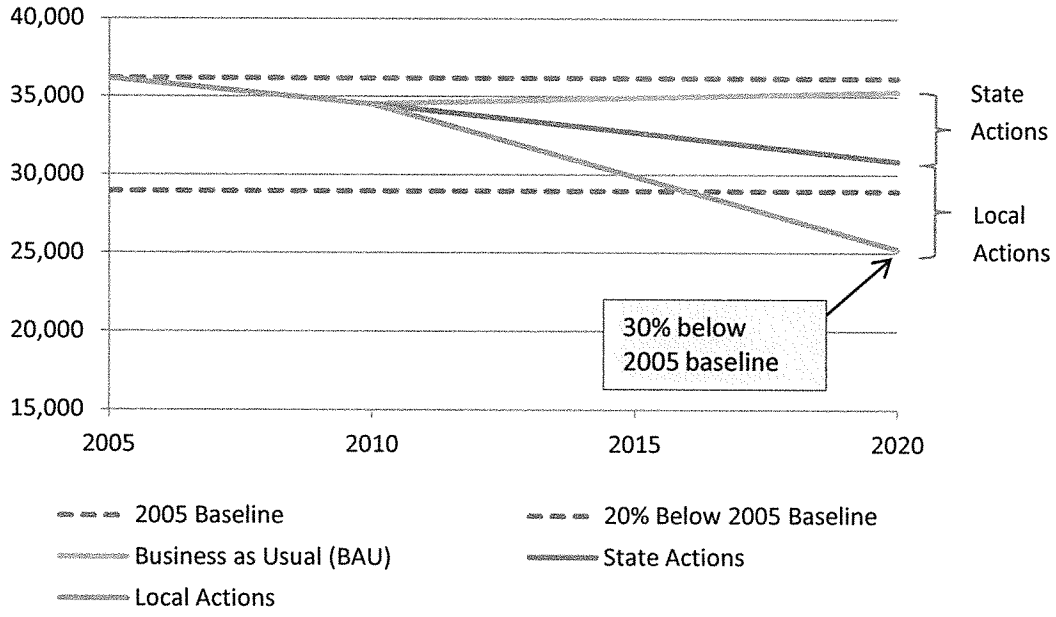
[17] Staff is currently waiting to receive this information from the Metropolitan Transportation Commission. As a proxy, this draft report utilizes the Novato VMT growth rate of 0.38% between 2010 and 2020.

As no significant expansion of government services is expected over the next ten years, government operations emissions are projected to remain consistent with 2010 levels under the BAU scenario.

2.3 GREENHOUSE GAS EMISSIONS REDUCTION TARGET

This Climate Action Plan supports the Town's emissions reduction target of 20% below 2005 levels by 2020, which exceeds the State's direction to local governments to reduce emissions by 15% below 2005 levels.[18] A target of 20% below 2005 emissions levels would limit community emissions to 28,933 metric tons in 2020. Figure 8 provides a comparison of the BAU forecast for 2020 to the 2005 baseline year and the 20% reduction target. Under the BAU forecast, emissions are expected to drop 2.4% below the 2005 baseline (it is important to recognize that this includes the estimated decrease in transportation emissions through implementation of Plan Bay Area). State actions, as described in Section 1.5, are projected to reduce emissions further, to 15% below the 2005 baseline. Local actions will be needed to reach Fairfax's goal of 20% below 2005 emission levels. If all local actions identified in this Climate Action Plan are fully implemented, Fairfax's emissions would drop to 30% below the 2005 baseline by 2020.

Figure 8 Emissions Reduction Target and Cumulative Impact of Emissions Reduction Measures



[18] California Air Resources Board, "Climate Change Scoping Plan," December 2008, p. 27. http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. (accessed 03/31/10).

3.0 ACTIONS TO REDUCE GREENHOUSE GAS EMISSIONS

3.1 SUMMARY OF GREENHOUSE GAS REDUCTION STRATEGIES

The local mitigation measures presented in this chapter, and as summarized in the tables below, achieve greenhouse gas emissions reductions in the community of 5,604 metric tons CO_2e. These reductions are in addition to the 1,650 metric tons CO_2e already realized in the community between 2005 and 2010 (see Table 3). When State reductions are added (see Table 2 for a breakdown of State actions), emissions in Fairfax would be approximately 30% below 2005 levels in year 2020 -- enough to allow the Town to exceed its reduction target of 20% below the 2005 baseline.

Government operations represent a subset of community emissions. Within government operations, the Town could achieve reductions of 60.7 metric tons CO_2e by implementing the mitigation measures described in this chapter and detailed in Appendix A. This reduction would be in addition to the 87.7 metric tons that occurred between 2005 and 2010 (see Table 4). Emissions from government operations in 2010 were 25% below 2005 levels. By taking additional action, government operations emissions are projected to be approximately 43% below 2005 levels by year 2020.

Table 6 Mitigation Measures for Community Emissions

Section		GHG Reductions (metric tons CO_2e)
NAT	Natural Systems and Sequestration	14
TLU	Transportation and Land Use	605
EN	Green Building, Energy Efficiency and Renewable Energy	2,052
WST	Waste Reduction, Recycling and Zero Waste	998
WAT	Water and Wastewater	224
EDU	Education and Citizen Involvement	1,650
Total Local Community Actions		**5,544**
Local Government Operation Actions (see Table 7)		**61**
State Actions		**4,417**
TOTAL GHG Reductions 2010-2020		**10,022**
2005 Emissions		36,166
Projected 2020 Emissions with State and Local Actions Implemented		25,266
% Reduced Below 2005 Levels in Year 2020		*30%*

Table 7 Mitigation Measures for Government Operations Emissions

Section		GHG Reductions (metric tons CO_2e)
NAT	Natural Systems and Sequestration	7.1
TLU	Transportation and Land Use	7.5
EN	Green Building, Energy Efficiency and Renewable Energy	36.1
PUR	Green Purchasing	0.7
WST	Waste Reduction, Recycling and Zero Waste	9.2
WAT	Water and Wastewater	0.1
TOTAL GHG Reductions 2010-2020		**60.7**
2005 Emissions		346.3
Projected 2020 Emissions with Local Actions Implemented		197.9
% Reduced Below 2005 Levels in Year 2020		*43%*

3.2 Natural Systems and Sequestration

The natural environment has been extensively altered by human civilization, often with little consideration for how natural systems function, depriving us of the important benefits they offer. Clearing and draining of wetlands, forestlands, grasslands and other open space for agricultural production or urban development decreases or eliminates the capacity of those natural systems to store carbon. The carbon dioxide stored in soil, trees and other vegetation is released into the atmosphere when forestland and open space is converted to other uses. Restoration of these natural areas, and establishment of new ones, has the potential to tie up or sequester greenhouse gas emissions in the form of soil and wood carbon.

This section of Fairfax's Climate Action Plan highlights carbon sequestration through the restoration and establishment of natural areas. Calculation assumptions and methodologies for the emissions reduction measures highlighted in Tables 8 and 9 are detailed in the Appendix.

Recommended Actions

NAT-1. Continue to enforce policies and programs that regulate the removal and replacement of significant trees (done by Fairfax Tree Committee). (GP CON-5.2.1)

NAT-2. Support efforts to develop and implement a community-wide tree planting program for streets and parks to significantly increase the carbon storage potential of trees and other vegetation in the community (possibly connect with Tree City USA).

NAT-3. To the extent possible, require new development to be planned around existing trees and require new or replacement tree planting where increased intensity of use, development or activity results in increased GHG emissions.

NAT-4. Support the preservation and creation of conservation areas that provide carbon sequestration benefits, such as those with tree cover.

NAT-5. Encourage the creation of community gardens, including possible use of surplus Town properties (one community garden is managed by Fairfax Volunteers, near the library).

Table 8 Natural Systems and Sequestration: Community Mitigation Measures

	Emissions Reduction Measure	GHG Reductions (metric tons CO_2e)
1	**Community Tree Planting.** Plant new trees on private property for a net gain of 200 trees.	14
GHG Reduction		**14**

Table 9 Natural Systems and Sequestration: Government Operations Mitigation Measures

	Emissions Reduction Measure	GHG Reductions (metric tons CO_2e)
2	**Public Tree Planting.** Plant new trees on public property for a net gain of 100 trees.	7.1
GHG Reduction		**7.1**

3.3 TRANSPORTATION AND LAND USE

Transportation and land use development are strongly interrelated. The more suburban the development (i.e., low density housing that causes residents to live further from urban centers), the less viable are mass transit systems and other alternative modes of transportation, such as walking or biking, and the more dependent residents become on the automobile. Studies have shown that people who live near transit drive up to 30% less than suburban residents and that low-density suburban development generates twice as much GHG emissions per capita than a more dense urban development pattern.[19] As a result, the transportation sector is one of the largest sources of GHG emissions in Marin

[19] California Air Pollution Control Officers Association, "Quantifying Greenhouse Gas Mitigation measures," August 2010.

County, and the county ranks among the highest in the U.S. in terms of per capita GHG emissions (Figure 3).

Fairfax recognizes that major changes in travel behavior will be needed to reduce GHG emissions in Fairfax. Through its General Plan, the Town has committed to promoting the development and expansion of public and alternative transportation systems to better connect jobs, housing, schools, and shopping and recreational facilities. The Town seeks to reduce dependence on single occupancy vehicles by encouraging cycling and walking and supporting public transit, and has set a goal to achieve at least 20% of trips made by walking or biking by 2020. In addition to reducing vehicle miles traveled, the Town will be able to reduce its GHG emissions from the transportation sector as Plug-in Hybrids (PHEVs), fully electric vehicles (EVs) and electric bicycles become more prevalent.

Recommended Actions

TLU-1. Promote compact and efficient development, such as orienting new development and providing bike racks, covered bicycle parking, and associated safe routes. (GP C-5, C-6.1)

TLU-2. Promote mixed-use development to provide housing and commercial services near the business center thereby reducing the necessity of driving. (GP C-6.1.2, CON-2.1.1.1)

TLU-3. Encourage a "balanced" community, where residents do not have to travel long distances for service needs. Promote the development of workforce housing for local employees and second units for in-home providers of childcare, healthcare, and others. (GP Housing Element, CON-1.1.2.1, CON-1.1.2.2)

TLU-4. Adopt planning policies and zoning designations that promote live/work situations. (GP CON-1.1.2.1)

TLU-5. Locate higher density development along transit corridors. (GP C-6.1.3)

TLU-6. Identify and designate Transit Oriented Development (TOD). (GP H-3.1.2.1)

TLU-7. Make reductions in vehicle miles traveled (VMT) and the use of alternative transportation high-priority criteria in the evaluation of policy, program and project alternatives. As part of any traffic study, require GHG emission analysis. (GP CON-1.1.4.4)

TLU-8. Improve the efficiency of traffic flow along Sir Francis Drake. (GP C-5.2.2, CON-2.1.1.4)

TLU-9. Encourage bicycling and walking as a safe and efficient means to travel into and around Fairfax and the adjacent towns/cities:

(a) Provide and maintain bike lanes and bike routes as identified in the Fairfax General Plan, the Bicycle and Pedestrian Master Plan, and Safe Routes to Schools. (GP C-1.3.2, C-5.6.2)

(b) Improve bicycle and pedestrian safety at intersections and install bicycle loop detectors at signalized intersections to help cyclists trip the traffic signal. (GP CON-2.1.1.5)

(c) Install traffic calming measures to control speeding and improve pedestrian and cyclist safety. (GP C-2.3, C-2.6, TC-3.2)

(d) Establish a classification for second units with parking restrictions, accessible without use of an automobile. (GP LU-8.1.2.1)

(e) The Town shall consider bicycle and pedestrian related development a priority. (GP TC-3.2.1.1)

(f) Implement "Complete Streets" policies (AB1358) to ensure the needs of bicyclists, pedestrians, and the disabled are considered in the transportation element of any new capital improvement or development project. (GP TC-3.2.2.2, C-3.2.4.2)

(g) Install sidewalks and paths where feasible to provide a continuous pedestrian network. (GP C-5.1.3, C-5.4.2, C-5.7.1, TC-3.2.4.1, TC-3.2.15.1)

(h) Provide increased bicycle parking in heavily used areas, particularly downtown. (GP C-5.6.3, C-6.4.2, C-8.1.1TC-3.2.2.1, TC-3.2.4.3)

(i) Create a bicycle staging area including bathrooms, showers and lockers, possibly in partnership with local businesses. (GP C-5.8.1, TC-3.2.16.1, TC-3.2.16.2)

(j) Promote "Share the Road" strategies to improve bicycle safety and improve compliance with traffic laws. (GP C-5.1.4)

(k) Participate in programs that encourage bicycling and walking, such as Non-motorized Transportation Pilot Program, Safe Routes to School (AB57, but this program originated in Fairfax), and the Fairfax Bike Spine (GP C-5.2.3)

(l) Expand bicycle access to buses by providing bike parking at bus stops. (GP C-5.6.3)

(m) Work with Marin County Bicycle Coalition (MCBC) to promote safe bicycling for everyday transportation and recreation in Fairfax. (GP C-6.3.4)

(n) Support and promote locally grown products and stores, such as shopping at farmers markets and participating in "Buy Local" campaigns (i.e., Fairbuck).

(o) Educate and encourage residents about the environmental benefits of travelling by foot and bike through events such as Bike to Work Day, International Walk and Bike to School Days, and Streets For People. (GP C-6.3.4)

TLU-10. Support and promote public transit.

(a) Work with neighboring jurisdictions, local and regional transit providers (i.e., Marin Transit, Golden Gate Transit), and the Transportation Authority of Marin (TAM) to increase both the frequency and types of transit services available to Fairfax residents, employees and visitors. (GP C-1.1.1, C-1.7.1, C-1.8.1, CON-2.1.1.3)

TLU-11. Support and promote ridesharing and car sharing programs.

(a) Encourage the creation of a system to facilitate informal carpools for Fairfax commuters. (GP C-6.3.6)

(b) Educate community members about ridesharing programs, such as SchoolPool Marin and 511 Rideshare. (GP C-6.3.4)

(c) Work with private or governmental groups as appropriate to develop a community car sharing program, when determined to be feasible. (GP C-6.3.6)

(d) Consider participating in a Bike Sharing program as part of a larger network of bike sharing stations in Marin County.[20]

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[20] Marin County Bicycle Share Feasibility Study, Transportation Authority of Marin. http://www.marinbike.org/FINAL%20Bike%20Share%20Feasibility%20Study.pdf, accessed September 4, 2013

(e) Educate residents and employees about the health and environmental benefits of walking, cycling, taking public transit and ridesharing, and provide information to assist in these modes of travel (e.g., information available in public places and employment centers regarding bus schedules, pedestrian pathways, bikeways and ridesharing programs). (GP C-6.3.4)

TLU-12. Encourage the use of fuel-efficient and low GHG-emitting vehicles and driver behaviors.

(a) Encourage private development to provide parking and charging stations for hybrid, electric, and carpool vehicles. (GP C-7.1.2)

(b) Adopt and implement a policy requiring limitations on idling for commercial vehicles, construction vehicles, buses and other similar vehicles beyond state law, where feasible.

(c) Develop a managed parking program that "right-prices" parking spaces and reduces unnecessary driving. (GP C-6.2.1)

TLU-13. Purchase or lease low or zero-emissions vehicles and the most fuel efficient models possible for the Town fleet, including police patrol cars and construction vehicles. (GP C-7.1.1)

TLU-14. Provide Town employees with incentives to use alternatives to single occupant auto commuting, such as transit incentives, bicycle facilities, ridesharing services and subsidies, flexible schedules and telecommuting when practical. (GP C-6.3.5, C-6.3.9)

TLU-15. Increase ownership of plug-in electric vehicles (EV) by providing EV charging station infrastructure, either meter or free to users, in the Town Center area and requiring property owners and developers to install EV charging stations in all new development and substantial improvement projects. (GP C-7.1.2, CON-1.2.2.1, CON-1.2.2.2)

TLU-16. Provide the public with a GHG-Meter showing whatever among this progress is measurable in a meaningful way. This could include, if possible, counts of motor vehicles entering town through the major streets; counts of electric vehicles registered to Fairfax addresses, or counts of ride-shares arranged through exchanges. (GP CON-1.1.2, CON-1.3.1.1)

TLU-17. Identify national and local programs (Bay Area Air Quality Management District's "Spare the Air" days and Ozone Strategy, Marin County's Greenhouse Gas Reduction Plan, Cities for Climate Protection Campaign, California Air Resources Board) supporting conservation, renewable resources and GHG reduction, and participate as appropriate. (GP C-6.3.7, CON-1.1.4.2, CON-1.1.4.3, CON-1.1.4.5, CON-2.3.1.1, CON-2.3.1.3)

Table 10 Transportation and Land Use: Community Mitigation Measures

Emissions Reduction Measures		GHG Reductions (metric tons CO_2e)
3	**Bicycle and Pedestrian Transportation.** Increase walking and biking as a means to travel to local destinations.	311
4	**School Transportation.** Increase use of alternative transportation (walking, biking, school bus, carpooling, public transportation) to travel to and from schools.	72
5	**Public Transportation.** Increase use of public transportation for commuting.	88
6	**Carpooling.** Increase carpooling and ridesharing for commuting.	46
7	**Bike Sharing.** Implement a bike sharing program.	55
8	**Carpool Parking.** Provide carpool parking spaces as a means to encourage carpooling.	10
9	**Electric Vehicle Parking.** Provide electric vehicle (EV) parking spaces to increase ownership of plug-in electric vehicles.	9
10	**Market Price Parking.** Develop a managed parking program that "right-prices" parking spaces and reduces unnecessary driving.	5
11	**Vehicle Idling.** Require limitations on idling for heavy duty vehicles.	9
GHG Reduction		**605**

Table 11 Transportation and Land Use: Government Operations Mitigation Measures

Emissions Reduction Measures		GHG Reductions (metric tons CO_2e)
12	**High-Efficiency Town Vehicles.** Replace Town vehicles with the most fuel-efficient models possible, including police patrol cars and construction vehicles.	7.3
13	**Town Employee Commute Incentives.** Provide Town employees with incentives to use alternative transportation as a means to travel to work.	0.2
GHG Reduction		**7.5**

Calculation assumptions and methodologies for the emissions reduction measures highlighted in Tables 10 and 11 are detailed in the Appendix.

3.4 GREEN BUILDING, ENERGY EFFICIENCY AND RENEWABLE ENERGY

The two fundamental means for reducing emissions from electricity and natural gas use are decreasing consumption through both efficiency and behavioral change, and switching from fossil fuels to renewable sources. According to the U.S. Department of Energy, buildings account for approximately 39% of total energy use, over 12% of the total water consumption, 68% of total electricity consumption, and 38% of all carbon dioxide emissions annually in the United States.

Increasing the efficiency of buildings is the most cost-effective approach for reducing greenhouse gas emissions. Programs that require minimum energy efficiency upgrade for home remodeling, such as increasing insulation and sealing heating ducts, have demonstrated energy savings of up to 20%. More aggressive "whole house" retrofits can result in even greater energy savings. Many improvements are "low-hanging fruit" that can be made inexpensively and without remodeling, yet be extremely cost-efficient; these include use of efficient solid-state lighting, and use of advanced shower heads and irrigation controllers.

New construction techniques and building materials, known collectively as "green building," can significantly reduce the use of resources and energy and creation of waste in our homes and commercial buildings. Green construction methods can be integrated into buildings at any stage, from design and construction to renovation and deconstruction. The Town may also adopt energy efficiency standards for new construction and remodels that exceed existing State mandates.

A large part of the environmental footprint of building projects occurs in the disposal of waste; refer to Section 3.6 on Waste Reduction, Recycling and Zero Waste for information on this.

It is important to note that the Town purchases Marin Clean Energy 100% renewable Deep Green electricity for all Town facilities, including streetlights, at a cost of approximately $3,300 per year over the Light Green option. This action alone currently results in an estimated greenhouse gas reduction of 66 metric tons, and reduces government operation emissions 19% below 2005 emissions levels.[21]

Recommended Actions

EN-1. Implement the green building ordinance, requiring state-of-the-art, energy-efficient construction techniques for all new and remodel construction. Consider adopting Marin

[21] This estimate is based on 2010 electricity consumption and the 2010 PG&E emission factor.

Green BERST recommendations for energy efficiency requirements, which are scaled to the project size and valuation. (GP CON-1.1.3.1, CON-2.1.3.1, CON-2.2.1.1, CON-7.1.2.2)

EN-2. Develop a town-wide green building promotional campaign. Educate Town staff and policy makers about best practices; provide checklists and specification guidelines for contractors; post green building information and resources on the Town's website. (GP CON-1.1.3.2)

EN-3. Consider incentives to development projects that exceed adopted green building standards.

EN-4. Publish information on the Town website on how to obtain an energy audit and energy reducing strategies for homeowners and businesses. (GP CON-1.1.3.2, CON-1.3.1.2)

EN-5. Continue to provide incentives to homeowners and business owners who install energy efficiency upgrades (e.g. waiving permit fees).

EN-6. Adopt an ordinance to require the Town to inform property owners of recommended energy upgrades at time of property sale or substantial remodel, such as weather stripping doors and windows and stopping air leaks (FCAC).

EN-7. Support efforts of PG&E and the MEA to maximize residential and business subscription rates for energy efficiency programs and to promote conservation and renewable energy use. (GP CON_1.1.4.1)

EN-8. Support efforts of MCE to increase the renewable content of the electricity provided to Fairfax residents and businesses. (GP CON-1.1.4.1)

EN-9. If available, participate in a countywide or regional Property Assessed Clean Energy program to assist homeowners in funding installation of energy efficiency upgrades and renewable energy systems.

EN-10. Adopt policies and incentives to encourage residents and businesses to install solar and renewable energy systems, including solar panels to generate electricity and solar water heating systems, and to construct solar ready buildings.

EN-11. Complete energy efficiency upgrades to Town facilities as recommended by the Marin Energy Management Team. (GP CON-1.2.1.1, CON-1.2.1.2, CON-6.1.2.3)

EN-12. Continue to replace street lights and parking lot lights with energy-efficient technologies, such as LED lighting.

EN-13. Encourage local businesses to use LED lighting in their retail outlets, and offer ways for those businesses to show customers that these lights are in use, e.g. a window decal.

EN-14. Design new and remodeled public facilities to meet Leadership in Energy and Environmental Design (LEED) Silver requirements, or its equivalent, and, at a minimum, to not require any additional energy use over existing facilities. (GP-CON-1.2.1.2)

EN-15. Continue to maintain the solar electric generation atop the Pavilion, and consider other venues. (GP CON-1.2.1.1)

EN-16. Continue to purchase Marin Clean Energy Deep Green 100% renewable electricity for all Town operations.

EN-17. Promote the adaptive reuse of historic buildings in the downtown which would allow for the preservation of buildings and structures important to the character, setting, and feeling of Fairfax. (CON-8.2.1.3)

EN-18. Provide the public with a GHG-Meter showing whatever among this progress is measurable in a meaningful way. This could include the per-home or per-capita electricity consumption

in Fairfax; the per-home or per-capita natural gas consumption; and the per-home or per-capita water consumption. (GP CON-1.3.1.1)

Table 12 Green Building, Energy Efficiency and Renewable Energy: Community Mitigation Measures

Emissions Reduction Measures		GHG Reductions (metric tons CO_2e)
14	**Energy Efficiency for New Construction.** Achieve energy efficiency for new residential and commercial buildings beyond those required under State building codes.	4
15	**Energy Efficiency in Existing Buildings.** Utilize building construction standards, regulatory incentives, public financing programs, and public information campaigns to achieve energy efficiency for existing residential and commercial buildings.	255
16	**Energy Audits.** Require energy audits for residential and commercial buildings at time of sale.	23
17	**Marin Clean Energy.** Consume electricity produced primarily from renewable and greenhouse gas-free sources.	1,729
18	**Renewable Energy.** Utilize building construction standards, regulatory incentives, public financing programs, and public information campaigns to install solar and other renewable energy systems for residential and commercial buildings.	41
GHG Reduction		**2,052**

Table 13 Green Building, Energy Efficiency and Renewable Energy: Government Operations Mitigation Measures

Emissions Reduction Measures		GHG Reductions (metric tons CO_2e)
19	**Municipal Energy Efficiency Projects.** Complete energy efficiency upgrades to Town facilities as recommended by the Marin Energy Management Team.	15.6
20	**Street Lights.** Replace streetlights with LED lamps.	10.5
21	**Marin Clean Energy.** Continue to purchase Marin Clean Energy Deep Green 100% renewable electricity for all Town operations.	9.9
GHG Reduction		**36.1**

Calculation assumptions and methodologies for the emissions reduction measures highlighted in Tables 12 and 13 are detailed in the Appendix.

3.5 GREEN PURCHASING

By adopting environmentally preferable purchasing standards and policies, Fairfax can measurably reduce its GHG emissions, while benefiting from reduced toxic exposures, pollution prevention, and, in many instances, reduced operating costs. Often, purchases that are environmentally preferable are also fiscally preferable. These include Energy Star-certified appliances, high-efficiency lighting and heating ventilation and air conditioning (HVAC) units, duplexing printers, and more.

Many durable manufactured goods – from computers to motor vehicles — embody much of the energy used (and carbon emitted) over their life span in their initial production. Optimizing purchasing schedules according to ongoing needs assessment, rather than a fixed replacement schedule, can lower the environmental burden and cost.

Recommended Actions

PUR-1. Prioritize purchases of products and services with superior environmental performance and purchase Energy Star-rated office equipment and appliances.

PUR-2. Implement operational policies to reduce energy use and conserve resources, such as setting the printer's default option to duplex printing. Shut off computer monitors and imaging equipment at night.

PUR-3. Engage Town staff in support and implementation of green purchasing goals and processes, such as by providing an easy reference binder for finding "green" products and distributors.

PUR-4. Continue to purchase office paper with high recycled content. (GP CON-7.2.1.2)

PUR-5. Work with Town businesses to provide plans and programs for non-toxic solutions for cleaning products, solvents, insecticides, herbicides. (GP CON-4.2.3.1, CON-4.2.3.2, CON-4.2.3.4)

Table 14 Green Purchasing: Government Operations Mitigation Measures

	Emissions Reduction Measure	GHG Reductions (metric tons CO_2e)
22	**Green Purchasing.** Purchase energy-efficient office equipment and implement operational policies to reduce energy use and conserve resources.	0.7
GHG Reduction		**0.7**

Calculation assumptions and methodology for the emissions reduction measure highlighted in Table 14 are detailed in the Appendix.

3.6 Waste Reduction, Recycling and Zero Waste

The reduction of waste, as well as the reuse and recycling of products, is key to reducing impacts on the environment. It is necessary to rethink what has traditionally been regarded as garbage and treat all materials as valued resources instead of items to discard. This requires shifting consumption patterns, more carefully managing purchases, and maximizing the reuse of materials at the end of their useful life.

The Town of Fairfax is a member of the Marin Hazardous and Solid Waste Joint Powers Authority (JPA), which works with private waste haulers and facility operators to implement recycling programs and achieve state-mandated targets for waste diversion rates. Marin County has a high rate of diversion, with a current rate of about 72% (this includes the green waste).

In 2009, the JPA completed a zero-waste feasibility study that concluded that between 75% and 80% of the material that goes to the landfill can be diverted. Currently the JPA is targeting the diversion of food waste and demolished building materials to increase the county's diversion rate. The JPA has embraced an aggressive goal for achieving zero waste based upon realizing 80% diversion of waste from disposal by 2012 and achieving zero waste by 2025. Fairfax passed a resolution in 2007 setting a goal of zero waste by 2020. Plastic bags have been banned from Fairfax stores and restaurants since May 2009, after a referendum was passed by 79 percent of voters.

The JPA supports the collection and processing of green waste and food waste to create electricity from methane gas. The waste is processed in anaerobic digesters for soil amendments and the production of biogas. Biogas is the gas produced by anaerobic digestion of organic matter and consists of 60-80% methane (natural gas), 30-40% carbon dioxide, and other trace gases such as hydrogen sulfide, ammonia and hydrogen. The predominance of methane means it can be used as a fuel source.

The JPA proposes that the member agencies endorse an Extended Producer Responsibility resolution and sign the California Product Stewardship Council pledge to shift California's product waste management system from one focused on government funded and ratepayer financed waste diversion to one that relies on extended producer responsibility (EPR) in order to reduce public costs and drive improvements in product design that promote environmental sustainability.

One successful example of targeting the increased diversion of construction debris is the "Roofs to Roads" program begun in 2011. Under this program, roofing shingles are trucked to a plant in Alameda where they are turned into a renewable asphalt base or hot mix additive for paving. Locally, Fairfax Hardware hosts the Away Station, which allows reusable building materials to be donated and then purchased by others.

In late 2011, AB341 was signed into State law. This bill builds on the success of California's landmark 1989 recycling legislation (AB 939), which required each city and county to cut their garbage in half by the year 2000, by now directing CalRecycle to increase statewide diversion to 75% by 2020. More specifically, AB341 seeks to expand recycling to every multi-family dwelling and business. At present, businesses and multifamily dwellings recycle at far lower rates than the rest of the state.

Recommended Actions

WST-1. Enact ordinances that reduce the amount of waste created by residences and businesses. (GP CON-7.1.1.1, CON-7.1.1.3, CON-7.1.1.4, CON-7.1.2.1.

WST-2. Endorse an Extended Producer Responsibility resolution as proposed by the JPA.

WST-3. Provide education about reducing waste and available recycling services. (GP CON-7.1.2.3, CON-7.2.1.1)

WST-4. Adopt and implement an ordinance to increase construction and demolition waste diversion for construction, demolition and renovation projects, as proposed in the JPA's model ordinance. (GP CON-7.1.2.2)

WST-5. Adopt and implement a multi-family dwelling and business recycling ordinance. (GP CON-7.1.2.1)

WST-6. Review and revise the Town's franchise agreement with its waste hauler to ensure waste reduction and diversion rates are maximized. (cf. GP CON-7.1.2.5)

WST-7. Promote commercial and residential composting.

(a) Partner with Sustainable Fairfax, Master Gardeners and others to provide education and resources to residents on backyard and curbside composting.

(b) Continue to work with Marin Sanitary Service (MSS) to promote commercial and residential food waste collection in Fairfax and to create centrally located facilities to compost all green and food waste and process it into biogas.

(c) Inform residents about the free community compost pile (soil created from green waste in Zamora) located next to Contratti Field, provided by MSS per the Fairfax contract.

(d) Explore creating "community compost centers" in town ROW, easements, near trails, within neighborhoods. (GP CON-7.1.1.3)

(e) Continue to implement the Source Reduction and Recycling Element of the California Integrated Waste Management Act. (GP CON-7.1.2.4)

WST-8. Provide the public with a GHG-Meter showing whatever among this progress is measurable in a meaningful way. In terms of waste reduction, available metrics could include the tons of waste hauled out of Fairfax from curbside pickup; the tons of waste hauled away in dumpsters; and the portion of waste separated for recycling (distinguishing green waste from other recyclables). (GP CON-1.3.1.1)

WST-9. Promote "Take Back Day", at which MSS as per agreement with the Town collects e-waste, provides paper shredding, and collects prescription drugs. (GP CON-7.1.1.4)

WST-10. Continue to make available and educate the public about hazardous waste collection. (GP CON-7.1.1.4)

WST-11. Work with Sustainable Fairfax to provide waste sorting/diversion stations at local events such as Streets For People, Fairfax Town Picnic and others.

WST-12. Team with Sustainable Fairfax to educate business in the use of effective recycling systems.

WST-13. Expand and, importantly, maintain the receptacles for sorting recyclables in public buildings and sidewalks. (GP CON-7.1.1.3)

Table 15 Waste Reduction, Recycling, and Green Waste: Community Mitigation Measures

Emissions Reduction Measure		GHG Reductions (metric tons CO_2e)
23	**Food and Green Waste.** Divert 94% of food and green waste from landfill.	372
24	**Construction and Demolition Waste.** Divert 94% of construction and demolition waste from landfill.	65
25	**Paper Waste.** Divert 94% of paper waste from landfill.	562
GHG Reduction		**998**

Table 16 Waste Reduction, Recycling, and Green Waste: Government Operations Mitigation Measures

Emissions Reduction Measure		GHG Reductions (metric tons CO_2e)
26	**Food and Green Waste.** Divert 94% of food and green waste from landfill.	4.5
27	**Construction and Demolition Waste.** Divert 94% of construction and demolition waste from landfill.	1.4
28	**Paper Waste.** Divert 94% of paper waste from landfill.	3.4
GHG Reduction		**9.2**

Calculation assumptions and methodologies for the emissions reduction measures highlighted in Tables 15 and 16 are detailed in the Appendix.

3.7 WATER AND WASTEWATER

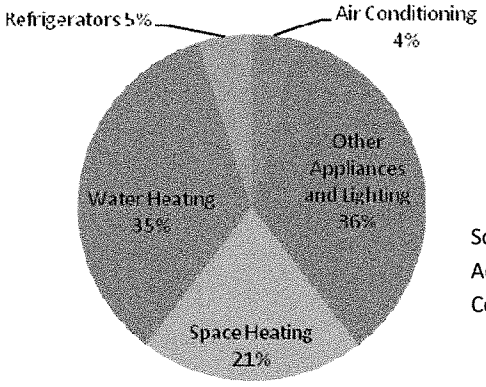
Water demand in California is increasing because of population expansion. In addition, demand for water for irrigation rises with warmer temperatures. The actual impacts of the climate-induced change in water quality, quantity and demand will depend on the changes in water policy and operations, and on the water use patterns of all communities.

The Marin Municipal Water District (MMWD) supplies clean drinking water to a 147 square-mile area of south and central Marin. MMWD's water comes from three main sources: local reservoirs, the Russian River in Sonoma County and recycled water.

Fairfax falls within MMWD's jurisdiction and all properties in Fairfax are subject to the agency's water conservation regulations. The water conservation requirements, particularly irrigation efficiency, are fairly complex, and the Town relies on MMWD to provide technical review and oversight on water conservation and direction in regard to drought-tolerant landscaping. The Water Conservation Act (SBX 7-7) requires the State to achieve a 20% reduction in urban per capita water use by the year 2020. In December 2010, MMWD updated their regulations to comply with CALGreen, the State's new Green Building code. The new CALGreen code requires every new building to reduce indoor and outdoor water use by 20%. MMWD has also adopted water-efficient landscaping requirements that apply to all newly constructed and rehabilitated developer-installed residential landscapes of 1,000 square feet or greater, as well as homeowner residential projects of 2,500 square feet or greater.

At the end of fiscal year 2009-2010, MMWD water usage had fallen 8.7% below 2005 levels. Additional water conservation measures could further reduce greenhouse gas emissions in Fairfax. The most effective way to reduce emissions from water use is by reducing hot water use, as an estimated 35% of energy used in homes is for water heating.

Figure 9 Energy Used in California Homes (2005)



Source: U.S. Energy Information Administration, 2005 Residential Energy Consumption Survey

Recommended Actions

WAT-1. Establish a town goal of 20 percent reduction in use of potable water by 2015. (GP CON-4.1.1.1)

WAT-2. Assess, maintain and repair existing plumbing fixtures, pipes, and irrigation systems in all Town buildings and facilities to minimize water use, including landscaping, public rest rooms and parks, and other recreational facilities. As feasible, upgrade and retrofit agency plumbing and irrigation systems with state-of-the-art water conserving technology.

WAT-3. Promote education on plant species native to northern California and Marin County, and encourage homeowners to use drought-tolerant plants and install rain gardens (Master Gardeners and MMWD).

WAT-4. Publicize water heater and other household appliances upgrade incentives. (GP CON-4.1.1.2)

WAT-5. Conduct water audits on remodels and new business and homes.

WAT-6. Adopt a retrofit program to encourage or require installation of water conservation measures in existing businesses and homes, such as Property Assessed Clean Energy (PACE) program.

WAT-7. Provide education about water conservation and available outreach programs and incentives (work with Sustainable Fairfax).

WAT-8. Allow for the use of grey water for irrigation and other suitable uses to decrease the amount of potable water need by the community. (GP CON-4.1.1.4, CON-4.1.1.5)

WAT-9. Provide the public with a GHG-Meter showing water usage per-capita or per-household in Fairfax. (GP CON-1.3.1.1)

Table 17 Water and Wastewater: Community Mitigation Measure

Emissions Reduction Measures		GHG Reductions (metric tons CO_2e)
29	**Indoor Water Use.** Reduce indoor water use by 20%.	211
30	**Outdoor Water Use.** Reduce outdoor water use by 20%.	9
31	**Rainwater Catchment.** Install rain gardens and other rainwater storage systems.	0.1
32	**Greywater.** Install greywater systems for irrigation.	3
GHG Reduction		**224**

Table 18 Water and Wastewater: Government Operations Mitigation Measure

Emissions Reduction Measure	GHG Reductions (metric tons CO_2e)

33	**Reduce Water Use.** Reduce water use by 20%.	0.1
GHG Reduction		**0.1**

Calculation assumptions and methodologies for the emissions reduction measures highlighted in Tables 17 and 18 are detailed in the Appendix.

3.8 EDUCATION AND CITIZEN INVOLVEMENT

Given the strong currents of citizen involvement and volunteerism in Fairfax, as well as the fact that the majority of GHG emissions are related to use of energy and resources by citizens and households, the General Plan, in Objective CON-1.3, points toward education as a primary means to achieve meaningful emissions reductions. The first of the programs within this section of the Plan is an ambitious one, the creation and ongoing maintenance of a public "GHG-Meter" showing frequently-updated indicators of the Town's overall GHG emissions. Additionally, the Town will actively collaborate with and support other local organizations, such as Resilient Neighborhoods and Sustainable Fairfax, whose missions include reduction of GHG emissions.

The Greenhouse Gas Emissions Meter (GHG-Meter)

The purpose of the GHG-Meter would be to raise awareness of multiple activities by which GHG emissions are being produced, with a focus on those that individuals and households can incrementally improve. If successful, the GHG-Meter could promote ongoing discussion and meaningful action to reduce emissions. Other educational programs outlined in the General Plan seek to guide citizens toward specific resources and actions by which they might directly reduce their GHG emissions.

While ambitious, if the GHG-Meter were successful it might serve as a model and inspiration for other communities within Marin to do something similar, possibly leading to a friendly competition and sharing of techniques among towns.

The "GHG-Meter" is taken to refer collectively to what might be several locations/presentations of regularly updated information. For example, there could be a permanent sign erected in one or more locations in town, such as in Peri Park, showing graphs or other presentations and updated monthly. There could also be a web page (on the Town's website and/or other locations on the web) that showed the same information with greater detail, with links to other educational materials. Access to the information via mobile devices, and a presence within the social media sphere could foster the goal of making GHG emissions the subject of widespread awareness based upon factual, locally-based information.

Table 19 Possible Aggregate Information to be Displayed by the GHG-Meter

Data	Where Obtained	Frequency Updated
Electrical usage	PG&E and/or MCE	Monthly
Natural gas usage	PG&E	Monthly
Water usage	MMWD	Bi-Monthly
Percentage of electricity from renewable sources	PG&E and/or MCE	Monthly
Solar generation installed in Fairfax	PG&E and/or MCE	Annually?
Electric vehicles registered in Fairfax	DMV	Annually?
Waste hauled to landfill	MSS	Bi-Monthly?
Waste hauled for recycling	MSS	Bi-Monthly?
Proxy for Vehicle Miles Traveled	Traffic counters located on key roads into the town	Bi-Monthly?

Arranging for the above information to be obtained on a regular basis is a daunting task, which the General Plan assigns to FCAC and Planning and Building Services. In order to attempt this, FCAC will seek partners, possibly including MCEP, MCE, Sustainable Fairfax, the Marin Community Foundation, CPUC, and others, as well as the organizations from which the data itself must be regularly obtained.

Presentation of these data, as is often the case with information about energy use, must be accessible to citizens despite the considerable level of detail required to accurately describe it. It will be important to collaborate with web designers, graphics designers, and others to effectively communicate with the public. The smoothing of raw data and adjustment by season and other factors are considerations that will require expertise beyond that likely available within the town, so this also suggests that collaborations be pursued.

Collaboration with Resilient Neighborhoods

This intriguing local organization[22] organizes small groups of households (about ten typically), called EcoTeams, and facilitates these teams following a process to reduce their carbon footprint. From their website:

> You and your EcoTeam meet 5 times, you calculate your carbon footprints, then choose from a menu of actions that reduce household CO_2 emissions by at least 5,000 pounds per household. You'll learn about rebates available now for energy efficient home improvements. Even if you've already "done a lot," you'll discover many new earth-friendly strategies. Once complete, data from teams will be provided to local governments to show that residents are doing their part to help with climate change.

Resilient Neighborhoods has expressed interest in collaborating with the Town to create more EcoTeams in Fairfax. The community-based orientation of this approach resonates well with the GHG-Meter and other recommended actions in this plan.

Partnership with Other Local Organizations

Sustainable Fairfax, the other "Sustainables" throughout Marin, and the Zero Waste Committee can contribute greatly to the Town's community and government efforts to reduce greenhouse emissions and to facilitate innovate and action-oriented programs, some of which are currently ongoing.

Marin Climate & Energy Partnership

Founded in 2007, the Marin Energy & Climate Partnership (MCEP) is a partnership of the eleven Marin cities and towns, the County of Marin, the Transportation Authority of Marin, and the Marin Municipal Water District. The agencies work together to reduce greenhouse gas emissions in government operations and throughout the local communities. MCEP has developed greenhouse gas inventories and climate action plans for its member cities and has implemented a wide range of greenhouse gas reduction programs, such as green building regulations, electric vehicle charging stations, LED streetlights, zero waste initiatives, and green purchasing policies. More information is available at the MCEP website at www.marinclimate.org.

Marin County Energy Watch (MCEW) Partnership

The MCEW brings together five elements to provide energy efficiency services and resources to residential, commercial, and public agencies and schools in Marin County.

- California Youth Energy Services (CYES) provides no-cost green house calls to homeowners and renters, regardless of income level. The professionally-trained staff provides energy assessments

[22] http://resilientneighborhoods.org/

and installs free energy and water-saving equipment. CYES serves single family dwellings, 2-4 duplexes, and multi-family units.

- Marin Energy Management Team (MEMT) acts as "energy manager" for public sector agencies including local governments, school districts and special districts, and specifically addresses the difficulty of reaching smaller public sector institutions. Services include audits, technical assistance, engineering, assistance in financing and obtaining incentives, specifying and managing projects, energy accounting and reporting, procurement, peer meetings, and training workshops. MEMT also integrates other state, utility, and private energy efficiency programs, filling resource gaps, and addressing specific barriers as needed to provide as comprehensive and seamless a delivery of services as possible.
- Smart Lights is designed to help small businesses become more energy-efficient. The program offers free start-to-finish technical assistance and instant rebates to help defray the cost of upgrading and/or repairing existing equipment. Smart Lights can help with comprehensive lighting retrofits, refrigeration tune-ups, controls, and seals replacement, replacing domestic hot water heaters, and referrals to appropriate HVAC programs.
- Energy Upgrade California is an energy efficiency program that provides rebates and resources to upgrade single family and 2-4 unit multi-family dwellings to save energy and water.

Table 20 Education and Citizen Involvement: Community Mitigation Measure

Emissions Reduction Measure		GHG Reductions (metric tons CO_{2e})
34	**Resilient Neighborhoods.** 500 households successfully participate in the Resilient Neighborhoods program.	1,650
GHG Reduction		**1,650**

Calculation assumptions and methodology for the emissions reduction measure highlighted in Table 20 are detailed in the Appendix.

3.9 ADAPTATION TO THE EFFECTS OF CLIMATE CHANGE

As the climate changes, so must Fairfax. To effectively address the challenges that a changing climate will bring, the Town must not only reduce its greenhouse gas emissions, but be prepared to respond to the expected impacts of climate change. Many of the mitigation measures incorporated in this CAP will help the community prepare for the effects of climate change. Reducing water use will ease competition for limited water supplies expected from higher temperatures and reduced snowmelt, while reducing electricity use will help ease demand for diminishing hydroelectric power. Other expected effects from climate change – such as a higher frequency of large damaging fires and pest and insect epidemics – must be anticipated through adequate public safety, emergency, and public health responses.

Recommended Actions

ADPT-1. Incorporate the likelihood of climate change impacts into Town emergency planning and training. (GP S-4, esp. S-4.5)

ADPT-2. Partner with neighboring municipalities and regional agencies to develop and implement regional adaptation programs. (GP S-4.1.1.6, S-4.1.1.10, S-4.1.1.11, S-4.1.1.12, S-4.3.2.1 and others)

ADPT-3. Encourage federal, state and local agencies to be pro-active and supportive of efforts to combat the expected rise in sea levels.

ADPT-4. Coordinate internally and with water districts, wildlife agencies, flood control and fire districts, Marin County, and other relevant organizations. Address human health and the health and adaptability of natural systems, including the following:

(a) Water resources including expanded rainwater harvesting, water storage and conservation techniques, water reuse, and water use and/or irrigation efficiency. (GP CON-4.1.1)

(b) Biological resources including land acquisition, creation of marshlands/wetlands as a buffer against sea level rise and flooding, and protection of existing natural barriers. (GP CON-4.2.2)

(c) Cultural resources including documenting and monitoring the condition of archaeological and historical sites as they are stressed and/or impacted by climate change (i.e., in flood plains). (GP CON-8.2, though not specific regarding flooding or climate change mitigation)

(d) Public health including heat-related health plans, vector control, safe water, and improved sanitation.

(e) Environmental hazards including storm surge barriers and fire protection. (GP S-2 and S-3)

4.0 PLAN IMPLEMENTATION

Fairfax recognizes that responding to and preparing for climate change is a critical step toward a sustainable future. The Town's early actions to reduce its contribution to climate change reflect the Town's history and commitment to decrease the impacts of day-to-day activities on the natural environment while enhancing its vibrant quality of life. Mitigating climate change will require everyone – residents, businesses, government agencies and nonprofit organizations – to work together to implement this plan.

This plan provides a strategy to achieve emission reductions that will achieve the Town's target of 20% below 2005 emissions by the year 2020. A wide range of programs that exceed the Town's reduction goal have been included to allow for the evaluation and prioritization of potential programs and capital improvement projects as new program and funding opportunities arise. Successful implementation of the plan will require staff and the Town Council to identify and commit resources to climate change mitigation activities, and to monitor and report on progress towards meeting emissions reduction goals.

4.1 STRATEGY FOR IMPLEMENTATION

The General Plan calls in program CON-1.1.1.1 for formation of a Fairfax Climate Action Committee (FCAC). The FCAC is listed in the General Plan as being responsible for certain programs. Therefore the FCAC needs to become a functional committee, with members prepared to focus specifically on the implementation of the CAP. Some programs within the CAP will be the primary responsibility of FCAC, whereas for others (e.g. promotion of bicycling), FCAC will only monitor their progress and attempt to translate that progress into GHG-reduction terms.

GPIC will monitor and report on the FCAC's progress, as it does with other Town committees responsible for portions of the General Plan implementation.

IMP-1. The Town will continue to update the baseline Greenhouse Gas Emissions Inventory every five years.

IMP-2. FCAC will review and update the Climate Action Plan to reflect the results of GHG inventories, to comply with state regulations and to incorporate other new information.

IMP-3. Continue and expand public and private partnerships that support implementation of the CAP, including membership in the MCEP. Partnerships with MCEP, MCE, CPUC, PG&E, MMWD, Marin Sanitary and others will be essential for obtaining the data needed for implementation of the GHG-Meter.

IMP-4. Identify funding sources for recommended actions, and pursue local, regional, state and federal grants as appropriate.