2009

Climate Change Action Plan

Climate Change Action Plan

City of Novato

December 2009

CITY OF NOVATO

CLIMATE CHANGE ACTION PLAN

DECEMBER 2009

CITY COUNCIL

Mayor Jeanne MacLeamy
Mayor Pro Tem Carole Dillon-Knutson
Council Member Pat Eklund
Council Member Madeline Kellner
Council Member Denise Athas

SUSTAINABILITY COMMITTEE

Former Mayor Jim Leland
Councilmember Pat Eklund

CITY STAFF

Michael Frank, City Manager
Jennifer Goldfinger, Assistant to the City Manager
Kathy Robinson, Management Analyst

CONSULTANT TO THE CITY

PMC
500 12th Street, Suite 240
Oakland CA 94607
510-272-4491
www.pmcworld.com

TABLE OF CONTENTS

Appendices

Appendix A– Relationship of Existing Policies and Programs to Proposed Mitigation Measures

Appendix B– Measures Considered But Not Included in Novato's Climate Change Action Plan

Appendix C– Methodology and Assumptions for Measures

List of Figures

List of Tables

DISCLAIMER

This material is based upon work supported by the Department of Energy under Award Number DE-SC0001297. This report was prepared as an account of work sponsored by an agency of the United States government. Neither the United States government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States government or any agency thereof. This document was prepared for use with a project named "Development of Energy Efficiency and Conservation Strategies and Climate Change Action Plan" for the City of Novato. It is not suitable for interpretation or use on other projects.

EXECUTIVE SUMMARY

CLIMATE CHANGE AND LOCAL RISKS

As established by scientific consensus, the world's population is releasing greenhouse gases as byproducts resulting from fossil fuel combustion, waste disposal, energy use, land-use changes, and other human activities. Greenhouse gases are now being released more quickly than the earth's natural systems can absorb them, which has exacerbated the natural greenhouse effect and thus increased the heat trapped at the earth's surface. In short, humans have accelerated the natural warming process of the earth and are impacting the planet's climate system, creating hazardous threats that will impact the planet and humanity at large.

Locally, climate change will impact the City of Novato and is anticipated to degrade residents' quality of life. Impacts to Novato include rising sea levels, unpredictable weather, the increased occurrence of wildfires, negative impacts to wildlife, deteriorating public health, and decreased water supply. Motivated by these local and other more encompassing global challenges, the City has initiated deliberate steps to address climate change.

THE CITY OF NOVATO'S PROACTIVE EFFORTS

The City of Novato is taking preemptive steps to mitigate the impacts of climate change and lessen the City's contribution of greenhouse gases to the atmosphere. This Climate Change Action Plan (Plan or CCAP) is the City's first such plan that compiles all existing and potential activities to address climate change. The CCAP is a culmination of an array of all related sustainability initiatives taken by the City to date and will provide a coordinated strategy and direction for all related efforts that follow. The Plan will essentially function as the climate change cornerstone for the City, achieved through goals and measures that will direct all future efforts to decrease greenhouse gas emissions and prepare for the impacts of climate change. The CCAP also ensures that the City's future activities and development patterns conform to California climate change legislation.

Primary past efforts taken within the City that have directly shaped the CCAP include numerous meetings, projects, and workshops of the Sustainability Committee, City staff, the community, businesses, and private organizations from April 2008 through November 2009. Other local initiatives that shaped the Plan include local green building ordinances, existing regulations requiring sustainable development standards, and existing City practices and accomplishments such as green procurement policies and upgrades of all traffic signals to more energy-efficient models.

LOCAL EFFORTS IN A REGIONAL CONTEXT

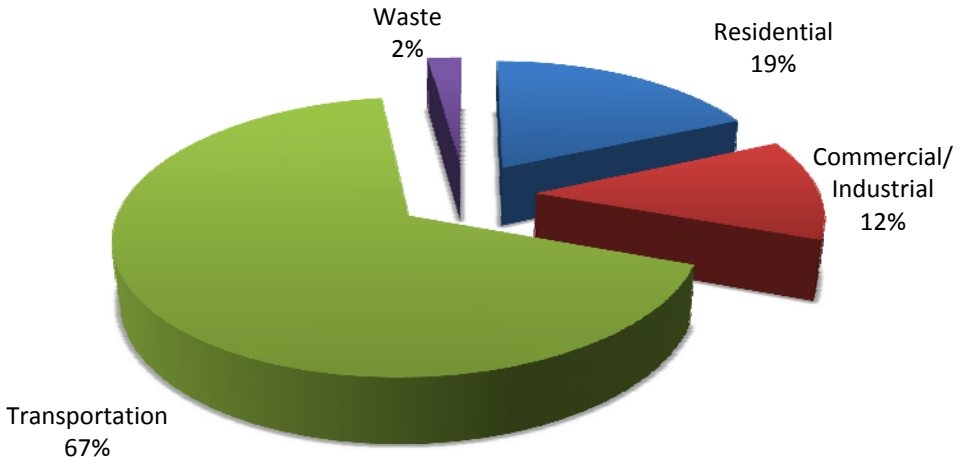
Jurisdictions in Marin County have recognized the value of a coordinated regional approach and have taken joint regional action to establish a platform and tools for local action. Since March of 2007, Novato has been part of the Marin Climate and Energy Partnership (MCEP), a local partnership of regional leaders that facilitates efforts to address climate change. Through MCEP, member jurisdictions have

gained access to grant funds and other leveraged funds that have enabled MCEP to hire staff and create tools to equip local jurisdictions in their climate change efforts. With other Marin jurisdictions, the City of Novato also joined the Cities for Climate Protection Campaign, through which the City was able to prepare a baseline inventory of greenhouse gas emissions.

2005 Greenhouse Gas Inventory and Forecast

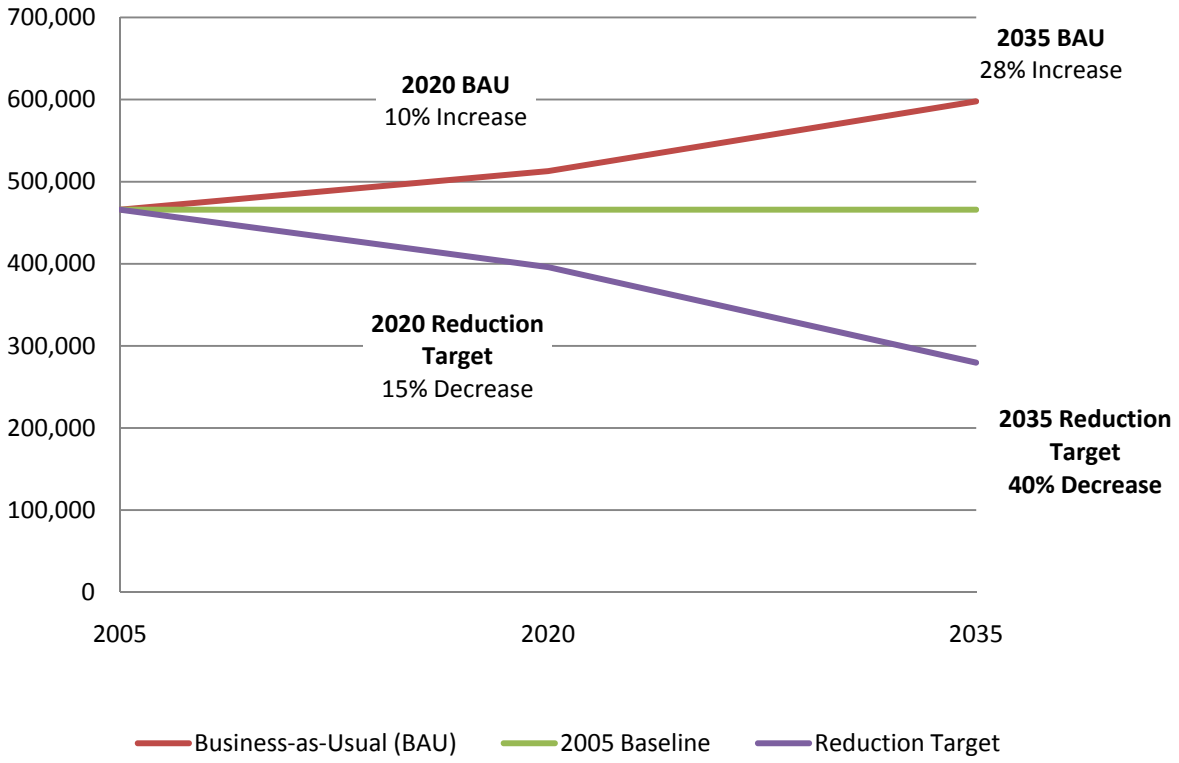
The City conducted a greenhouse gas (GHG) inventory for municipal and community-wide sources for the baseline year of 2005. The inventory established a baseline against which future changes in emissions can be measured and provides an understanding of the sources of GHG emissions and the best strategies for emissions reductions. Community-wide total emissions by sector are shown in **Figure ES-1.**

Figure ES-1 2005 Green house Gas Emissions (CO2e) from Community-wide Sources



Using data in the 2005 inventory, the City forecast emissions in 2020 and 2035, estimating a "business-as-usual" scenario if no actions are taken to address current energy consumption trends. The City compared the business-as-usual scenario with state emissions reduction goals, as shown in **Figure ES-2.** On April 14, 2009, the Novato City Council adopted an emissions reduction target of 15% below 2005 levels by 2020, which is consistent with the State's direction to local governments in the Assembly Bill (AB) 32 Scoping Plan. The City Council directed staff to develop the Climate Change Action Plan to achieve or exceed this target. During preparation of this Plan, the team established a target for 2035 consistent with the Governor's Executive Order S-3-05 to achieve an 80% statewide reduction by 2050.

Figure ES-2 Comparison of Business-as-Usual Forecast to Baseline and Reduction Target



In order to achieve state reduction targets and lower the projected 2035 business-as-usual forecast to meet 2020 and 2035 state targets, the City must take dramatic and deliberate action.

Climate Change Action Plan Reductions

The magnitude of recommended state reductions relative to Novato's emissions forecast will require significant action at the local, regional, and state level. The Climate Change Action Plan outlines the City's strategies to achieve these reduction targets locally and consolidates local actions with regional and state strategies in one plan to analyze their effectiveness in reducing Novato's contribution to global climate change. This approach recognizes the importance of large-scale coordination and confronts the fact that many important reduction strategies are almost entirely out of the hands of the local government and dependent on state action.

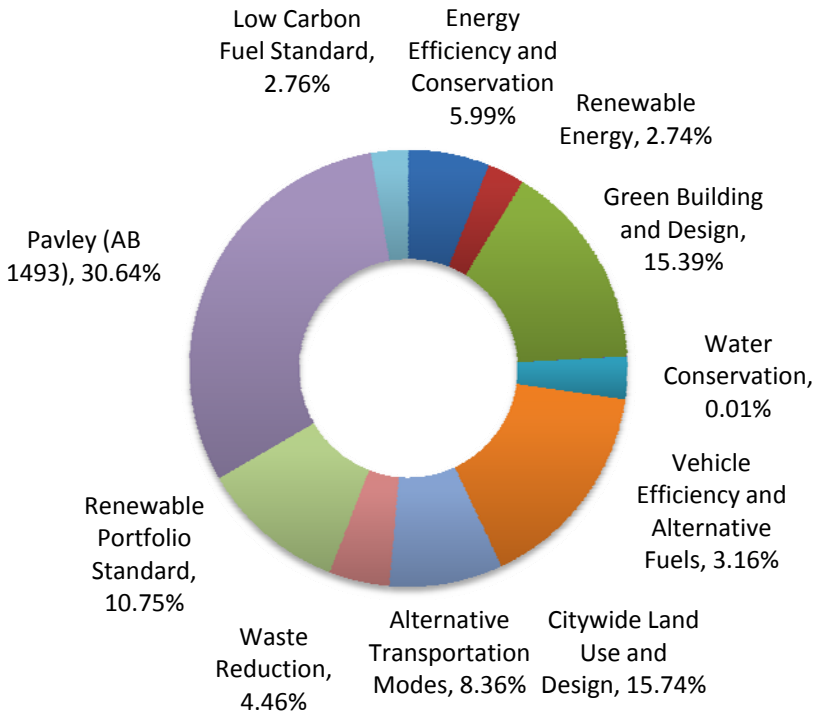
This Plan is organized into ten goals, including eight mitigation goals and separate goals for adaptation and implementation. Novato's local actions to reduce emissions in this CCAP fall into three categories: energy use, transportation, and waste. The eight mitigation goals are assigned to these three categories and include mitigation measures that will result in quantifiable greenhouse gas emissions reductions for each goal. The total reductions in emissions that result from these goals are depicted below in **Table ES-1**. The remaining two goals address adaptation and implementation; they are not quantifiable.

Table ES-1 GHG Reductions by Goal

	Goal	2020	2035
	CCAP Goals and Measures		
1	Energy Efficiency and Conservation	-2,199	-2,235
2	Renewable Energy	-5,446	-10,881
3	Green Building and Design	-4,015	-14,396
4	Water Conservation	-19	-21
5	Vehicle Efficiency and Alternative Fuels	-5,327	-7,148
6	Citywide Land Use and Design	-31,311	-42,326
7	Alternative Transportation Modes	-16,631	-36,746
8	Waste Reduction	-8,877	-11,567
	Local Reductions	**-73,825**	**-125,320**
	Percentage Change from 2005 Levels	**-5.77%**	**1.42%**
	State Actions		
	Low Carbon Fuel Standard	-5,501	-24,727
	Pavley (AB 1493)	-61,122	-123,634
	Renewable Portfolio Standard	-28,874	-60,702
	Total State Reductions	**-95,497**	**-209,063**
	Business-as-Usual Emissions	**512,858**	**597,813**
	Total Reductions (Local + State)	**-169,322**	**-334,383**
	Net Emissions	**343,535**	**263,430**
	Percentage Change from 2005 Levels	**-26.26%**	**-43.46%**

State actions that will lead to emissions reductions include the Low Carbon Fuel Standard, AB 1493 (Pavley), and the Renewable Portfolio Standard. When these state reductions are assessed, 2020 business-as-usual emissions projections in Novato would be reduced by approximately 28%. Implementation of each of the CCAP's proposed measures in combination with the state actions would allow the City to surpass its reduction target of 15% of baseline by 2020. Further, the City's 2020 target is consistent with AB 32; therefore, implementation of the goals and measures would be consistent with the State's goals for local governments. **Figure ES-3** depicts the percentage of reduction for each category for the 2020target year, showing the importance of both local and state actions in implementing these reduction targets.

Figure ES-3 2020 Reductions by Goal



Next Steps

To achieve these reductions, the City must take concerted action; while the type of action required for success is a natural extension of the City's existing activities and priorities, the CCAP nonetheless necessitates that the City go above and beyond its normal practice. The Plan outlines recommended responsibilities for implementation of each measure and provides cost estimates.

This Climate Change Action Plan is being completed concurrently with and will be integrated into the City's General Plan Update. The new General Plan will reference this Plan for actions to implement reductions in greenhouse gases. By creating this CCAP as a separate document that is not part of the General Plan, the CCAP can be updated on a more regular basis than the General Plan, ensuring that the General Plan and Novato's climate efforts are always up to date. Regular updates and modifications to this Plan will be required to respond to new emerging knowledge, statewide regulations, policies, and best practices for reducing greenhouse gas emissions. Maintaining this flexibility in the CCAP will be critical to its ultimate success.

Achievement of the reductions established in this CCAP requires timely implementation complemented with the initiative of each resident, employee, and business of Novato. This coordinated and comprehensive approach will help the City protect the earth and the local community for generations to come and ensure that Novato is positioned to excel in spite of anticipated challenges resulting from climate change.

CHAPTER 1 – INTRODUCTION

PURPOSE AND BACKGROUND

The City of Novato understands that climate change has the potential to significantly affect Novato's residents and businesses, as well as other communities around the world. The City of Novato also recognizes that local governments play a strong role in reducing greenhouse gas emissions and mitigating the potential impacts of climate change. A range of actions can dramatically reduce these emissions from the local community and government operations including increasing energy efficiency in buildings and vehicle fleets, bolstering the use of clean, renewable energy sources, establishing land use and transportation plans that reduce vehicle use, and encouraging waste reduction. The benefits of these measures include lower energy bills, improved air quality, economic development, reduced emissions, and an enhanced quality of life throughout the community.

Although Novato has taken significant steps in the past to address climate change, this is the City's first plan that compiles existing and potential activities, projects, and programs to address climate change. The Novato Climate Change Action Plan (Plan or CCAP) is the beginning of an ongoing planning process that assesses, prepares, mitigates, and adapts to climate change. The purpose of this Plan is to identify how the City will achieve (or exceed) its greenhouse gas emissions reduction target. The Plan provides goals and associated measures, also referred to as climate change mitigation measures, in the sectors of energy use, transportation, land use, and solid waste. In addition, this Plan provides goals and measures for climate change adaptation and plan implementation.

These measures, included in Chapters 4 through 6, are the result of collaborative meetings, discussions, workshops of the Sustainability Committee, City staff, the community, businesses, and organizations from April 2008 through November 2009. The Sustainability Committee hosted public workshops to engage all interested parties in strategic brainstorming of activities, projects, and programs for inclusion in this Plan. In early 2009, City staff and the Sustainability Committee released an administrative draft Plan that included goals and measures based on the public participation process and ongoing efforts of the Marin Clean Energy Program and the Institute for Local Government's (ILG) California Climate Action Network Best Practices Framework. In June 2009, the City was awarded an Energy Efficiency and Conservation Block Grant (EECBG) from the United States Department of Energy for the development of an Energy Efficiency and Conservation Strategy and the implementation of projects or activities that had demonstrated reductions in energy use and greenhouse gas emissions. The City set aside a portion of its EECBG funds to hire PMC Consultants to complete the preparation of this Plan in September–December 2009. The Sustainability Committee reviewed the final measures in November 2009. The City Council approved the Plan for submittal to the Department of Energy as part of the City's Energy Efficiency and Conservation Strategy in December 2009.

This Plan provides the City's strategic plan to respond to and prepare for climate change locally. This Plan emphasizes actions that will reduce the impacts of climate change, primarily through mitigation. In addition, this Plan acknowledges that not all the effects of climate change can be prevented or reversed and adaptation to climate change will be required. The challenge will be to reduce or mitigate the effects to the lowest level possible.

Specifically, this Plan does the following:

- Identifies sources of greenhouse gas emissions generated within the City of Novato's jurisdictional/political boundary and estimates how these emissions may change over time.
- Outlines ways in which the City can prepare for and adapt to the consequences of climate change.
- Discusses the various outcomes of reduction efforts and how these reduction efforts can be implemented and advertised.
- Provides energy use, transportation, land use, and solid waste strategies to reduce Novato's greenhouse gas emissions levels to 15% below 2005 levels by 2020.
- Mitigates the impacts of Novato on climate change by reducing greenhouse gas emissions consistent with the direction of the State of California through the Global Warming Solutions Act (AB 32), Governor's Order S-03-05, and Public Resources Code Section 21083.3. [The California Environmental Quality Act Guidelines encourage the adoption of policies or programs as a means of addressing comprehensively the cumulative impacts of projects. See CEQA Guidelines, §§ 15064, subd. (h)(3), 15130, subd. (c).]
- Provides substantial evidence that the emission reductions estimated in the Climate Change Action Plan are feasible.

Relationship to the General Plan

The City of Novato is taking a proactive approach by developing this Climate Change Action Plan concurrently with its General Plan Update. Addressing climate change in this manner defines Novato as a local government leader for climate action planning. Instead of including the text of this Plan in the General Plan, the General Plan will integrate and reference this Plan. This approach will allow the Climate Change Action Plan to be updated on a more regular basis than the General Plan, ensuring that the General Plan and Novato's climate efforts are always up to date. This flexibility is especially important considering that climate action planning is an evolving discipline subject to new research findings, technological improvements, policy guidance, and regulations dealing with climate change.

BACKGROUND: CLIMATE CHANGE SCIENCE

Climate change and global warming are hot topics in mainstream American culture, resulting in books, public education campaigns, and a myriad of 'eco-friendly' consumer products. American society is growing an awareness linking energy, climate change, and our individual behavior to the environment and economy.

Although used interchangeably, there is a difference between the terms "climate change" and "global warming." According to the National Academy of Sciences, climate change refers to any significant, measurable change of climate lasting for an extended period. It can be caused by natural factors and human activities alike. Global warming, on the other hand, is an average increase in the temperature of the atmosphere caused by increased greenhouse gas emissions from human activities. The use of the term climate change is becoming more prevalent because it encompasses all changes to the climate, not just temperature. Additionally, the term climate change conveys temporality, implying that climate change can be slowed or reversed with efforts such as this Plan and efforts of other local, state, national, and world leaders.

Climate change is now a widely accepted fact among scientists, with the only uncertainty remaining about how climate change will affect the earth's systems over time. Although much of the attention to the topic is global in scale, it is important to realize that climate change affects every community at the local level.

How Are Greenhouse Gases Measured?

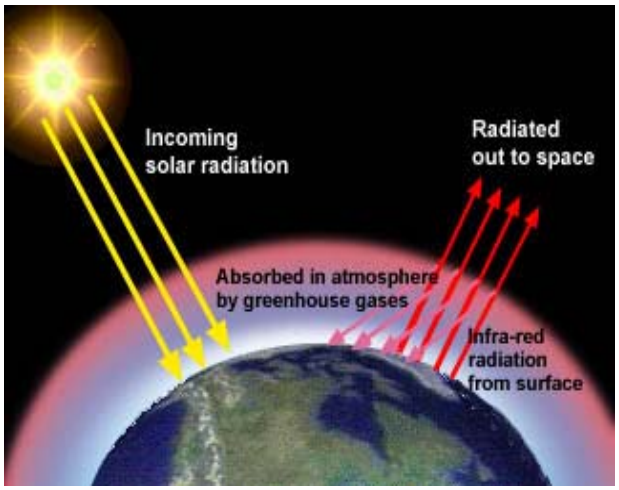
"Carbon dioxide equivalent" is a way to equalize the different potencies of the six internationally recognized greenhouse gases (carbon dioxide, methane, nitrous oxides, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride). For example, methane (CH4) has 21 times the potency of carbon dioxide (CO2); therefore, 21 metric tons CO2e could be 21 metric tons of carbon dioxide or 1 metric ton of methane.

To fully understand global climate change, it is important to recognize the naturally occurring "greenhouse effect" and to define the greenhouse gases (GHG) that contribute to this phenomenon. Our planet relies on the natural greenhouse effect. This effect results when the atmosphere captures heat that radiates away from the earth toward space. By retaining heat and warming the planet's surface, this process makes life possible on earth. Several gases in the atmosphere function as barriers and trap heat within the planet's atmosphere, including water vapor, carbon dioxide, methane, nitrous oxides, and chlorofluorocarbons. These gases function similar to glass on a greenhouse; the glass panes of a greenhouse allow sunlight to pass into the building but trap heat within it, preventing heat from escaping.[1] (Refer to **Figure 1-1**.) Greenhouse gases are transparent to certain wavelengths of the sun's radiant energy, allowing them to penetrate deep into the atmosphere or all the way to the earth's surface. Clouds, ice caps, and particles in the air reflect about 30% of this radiation, but oceans and land masses absorb the rest (70% of the radiation received from the sun) before releasing it back toward space as

[1] National Aeronautical and Space Administration, "NASA Facts Online," 2007, http://www.gsfc.nasa.gov/gsfc/service/gallery/fact_sheets/earthsci/green.htm. Accessed October 2009.

infrared radiation. GHG and clouds effectively prevent some of the infrared radiation from escaping; they trap the heat near the earth's surface where it warms the lower atmosphere. If this natural barrier of atmospheric gases were not present, the heat would escape into space, and the earth's average global temperatures could be as much as 61 degrees Fahrenheit cooler.[2]

Figure 1-1 The Greenhouse Effect



Source: Tufts University

While the greenhouse effect is a natural process, humans have accelerated the generation of greenhouse gas emissions beyond natural levels. This overabundance of greenhouse gases has led to a dangerous acceleration of the warming of the earth. There is an international consensus that humans have caused the emission of dangerous levels of greenhouse gases. These greenhouse gases are impacting the planet's climate system and posing dangerous large-scale threats to the planet and humanity at large. Climate change will impact all facets of life. Many of its effects are irreversible and are already impacting communities around the world. If current trends remain unchanged, likely effects of climate change include the following:[3]

- An increase in average temperatures by as much as 10 degrees Fahrenheit; an increase of average temperatures by only 6 degrees Fahrenheit will cause the full melting of all polar ice.
- Average sea levels will rise; estimates range from 2 to 3 feet under the most optimistic scenario (if immediate and drastic action is taken) to 8.5 to 35 feet if emission trends remain unchecked.
- Wildfires will increase in frequency by as much as 35–55%.
- Scarce water resources will dwindle. If current trends continue, the average April measurement of the Sierra snowpack will drop by 13 feet and lead to a loss of 36% of California's water supply.
- Public health impacts will result from increased air pollution and heat.

Numerous studies documented the human impact on emissions of greenhouse gases and warned against the severity of its consequences if no immediate action is taken. The most authoritative body on climate change is the United Nations Intergovernmental Panel on Climate Change (IPCC), a group of

[2] National Aeronautical and Space Administration, "NASA Facts Online," 2007, http://www.gsfc.nasa.gov/gsfc/service/gallery/fact_sheets/earthsci/green.htm. Accessed June 2007.

[3] Lawrence Berkeley Laboratory and NASA's Chief Climate Scientist (James Hansen of the Goddard Institute at Columbia University), 2007.

leading world experts, scientists, and government representatives. Work released by the IPCC has shown that most of the warming occurring in the climate system in the last 50 years is more than 90% likely to have been caused by human-induced greenhouse gas emissions. The IPCC has also warned that expected impacts of such emissions include the exposure of tens of millions of Americans to greater risk for injury, disease, and mortality due to increased pollution, heat levels, storms, and conditions favorable to the spread of disease. Further, between 15 and 40% of all North American plant and animal species are likely to become extinct by 2050.[4] Such bleak warnings provide an unavoidable imperative to initiate immediate action to avert the most catastrophic and irreversible of these impacts.

Background: Climate Change Impacts to California and Novato

Figure 1-2 shows projected climate change impacts to California from the high, medium, and low emissions scenarios predicted in 2006. It is important to note that indications that are more recent show that sea level rise is progressing at a significantly faster pace than what is described in this graphic. It is now likely that sea levels will rise by at least 16 inches by 2050 and 55 inches by 2100.

Potential consequences of climate change for the City of Novato include:

Rising Sea Levels: Sea level rise is attributed to the increase of average ocean temperatures and the resulting thermal expansion and the melting of snow and ice contributing to the volume of water held in the oceans. While many effects of climate change will impact Novato, sea level rise is one specific impact that has been extensively studied and quantified, and its effects mapped. The San Francisco Bay Conservation and Development Commission (BCDC) issued a report on sea level rise in April 2009, which states that sea levels in the Bay Area will rise 16 inches by mid-century and 55 inches by the end of the century. By mid-century, approximately 180,000 acres of the Bay Area could be flooded and 213,000 acres could be flooded by the end of the century, including 93% of both the Oakland and the San Francisco airports.

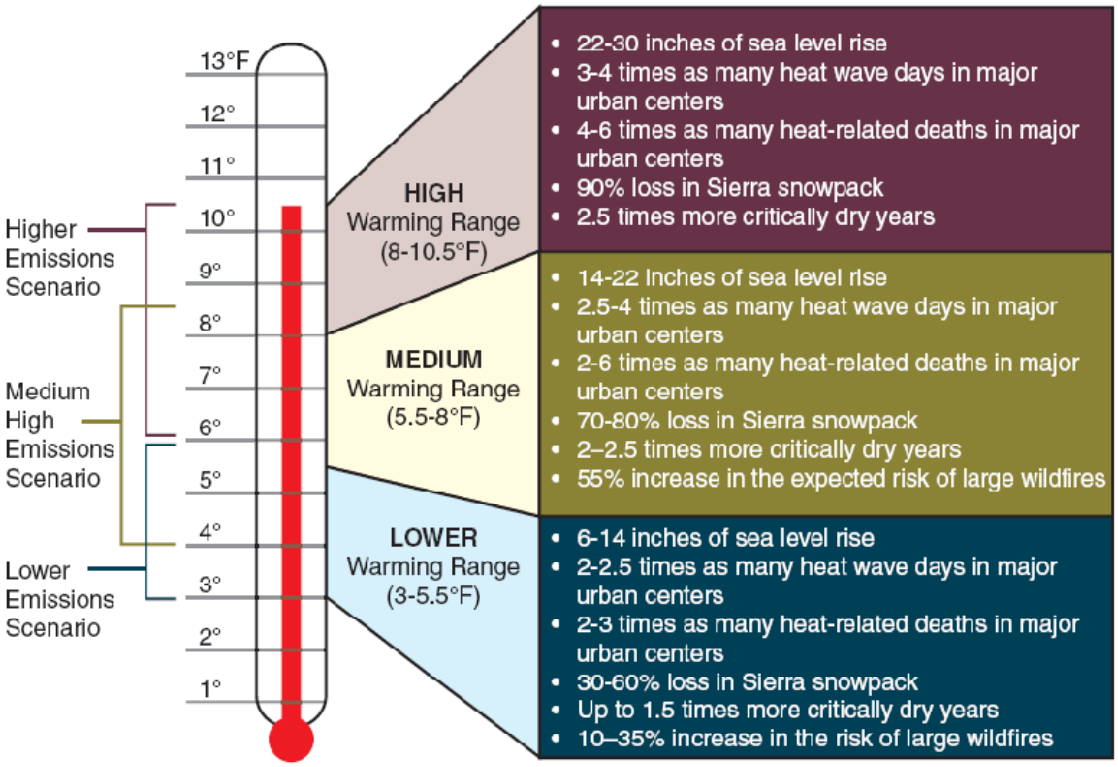
Not only will this affect land at risk because of proximity to the Bay, but it will also affect greater areas not previously at risk: with a 1-foot rise in sea level, the likelihood of the most extreme storm surge event will increase from once every 100 years to once every 10 years. This will lead to greater areas at risk to flooding, which cannot be easily mapped.[5] If anticipated flooding occurs, many communities could experience compromised wastewater treatment and infrastructure failure due to inundation from rising sea levels. The estimated economic value of shoreline development that could be impacted by a 55-inch rise in sea level is $62 billion. Other anticipated economic impacts relate to movement of goods

[4] International Panel on Climate Change, "Summary of Expected Global Warming Impacts", 2007.

[5] Bay Conservation and Development Commission, September 2008 (p. 2, http://www.bcdc.ca.gov/planning/climate_change/SLR_strategy.pdf) See this source for additional data.

and people in and around the Bay Area that would be disrupted by flooding of ports, airports, highways, and rail lines.[6]

Figure 1-2 Projected Global Warming Impact on California 2070–2099 (as compared with 1961–1990)



Source: Our Changing Climate: Assessing the Risks to California (2006), www.climatechange.ca.gov

The speed and amount of sea level rise will be determined by the increase in average temperatures and rate of melting of glacial ice. While there is a degree of uncertainty in projections, many original projections have been in reality more conservative than the actual impacts of climate change once they occurred. If current trends continue, some have predicted as much as a 10-foot sea level rise by 2025 and a 30-foot sea level rise by 2095.[7] As shown in **Figure 1-3**, the BCDC has mapped where a projected 1-meter rise in sea level will occur.

[6] San Francisco Bay Conservation and Development Commission. 2009. (April) Draft Staff Report. Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline. http://www.bcdc.ca.gov/proposed_bay_plan/bp_1-08_cc_draft.pdf. Accessed June 5, 2009.

[7] James Hansen cited in *Climate Code Red: The Case for a Sustainability Emergency,* David Spratt and Philip Sutton, published by Friends of the Earth, Australia, p. 16.

Unpredictable weather: The years of 1995–2005 had the warmest global temperature ever recorded in instrumental history (since 1850).[8] Higher temperatures will cause more rainfall than snowfall, which will impact water supplies not only for Novato but for every other user of water in the state. Combined with longer summer seasons, the increased temperature will reduce soil moisture levels, which necessitate increased irrigation, increase the need for air conditioning use, increase the rate and spread of wildfires, and stress the electrical infrastructure that serves the City. Increased flooding due to more intense and less predictable storms, along with sea level rise, will require proactive efforts in order to reduce the potential for damaging coastal flooding and erosion.

Increased rate of wildfires: Wildfire risk is based on a combination of factors including precipitation, winds, temperature, and vegetation, all of which are susceptible to increased warming. Wildfires are likely to grow in number and size throughout the state as a result of increased temperatures induced by climate change. Even under the "medium" warming scenario predicted by the Intergovernmental Panel on Climate Change (IPCC), wildfire risk will likely increase by 55% in California.[9]

Negative impacts on wildlife: Increased global temperatures and resource depletion exacerbated by climate change are causing disruptions in animal migration and plant pollination. As temperatures rise, species are moving north in California or to higher elevations. This change in migration disrupts the food chain and prevents some plant species from being pollinated. Water and food supplies are expected to be more variable and to shift as the seasons change on different time frames. With vegetation, reduction in soil moisture will result in early die-back of many plants, potentially leading to conflicts with animal breeding seasons and other natural processes. Many of the potential effects on wildlife are still being studied, but due to inability to adapt to new climates, the potential for severe species loss is prescient.

Deteriorating public health: Heat waves are expected to have a major impact on public health as well as decreasing air quality and increasing mosquito-breeding and mosquito-borne diseases. Vector control districts throughout the state are already evaluating how they will address the expected changes to California's climate. The elderly and young and those vulnerable populations that do not have the resources to deal with the costs and adapt to the changes that are expected to impact the community will need assistance. Social equity issues related to the unequal distribution of resources and increased costs to address community-wide health risks will need to be addressed proactively to reduce the potential for financial strain on the City.

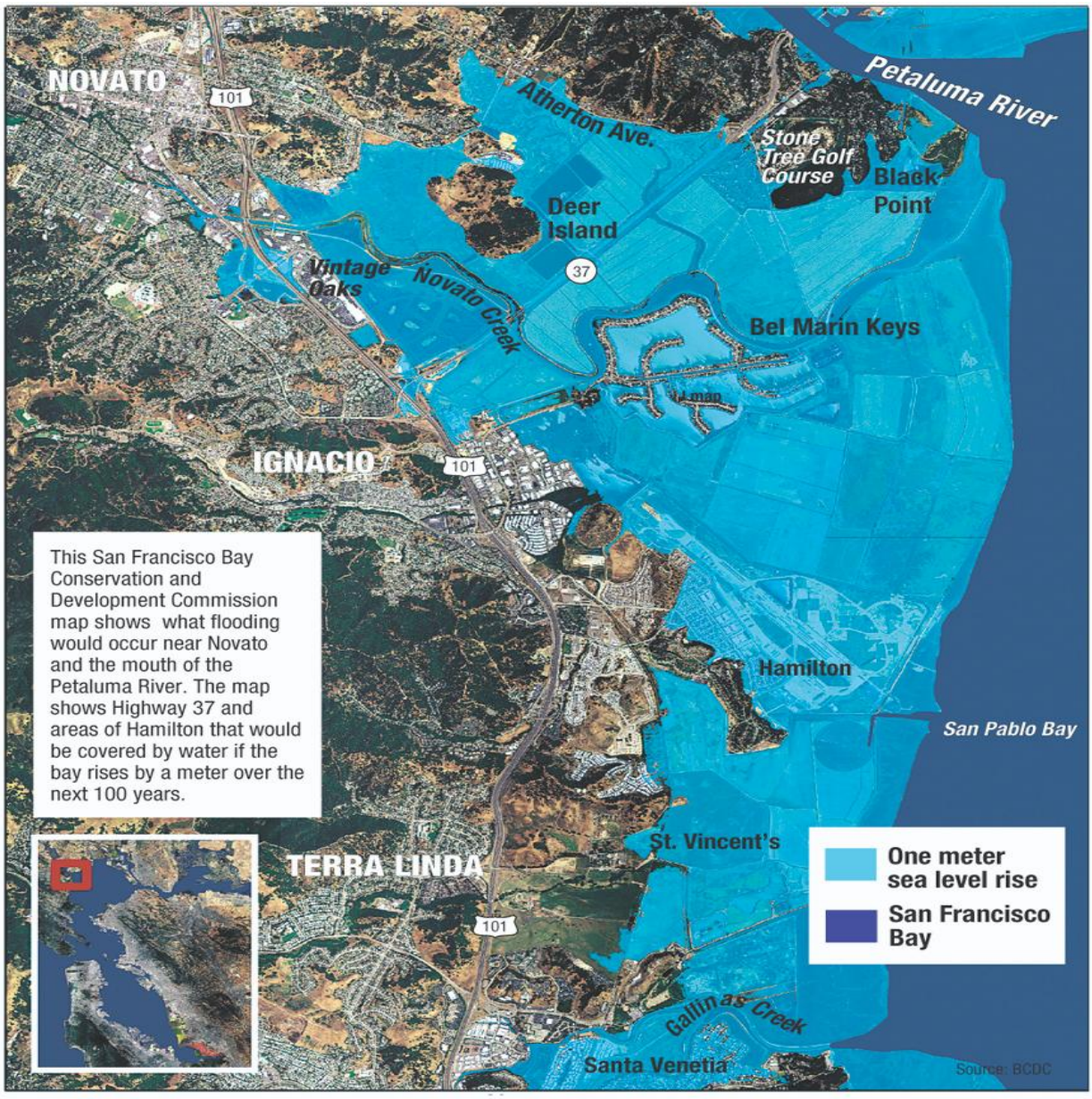
A decreasing supply of fresh water: Warmer average global temperatures cause more rainfall than snowfall, making the winter snowfall season shorter and accelerating the rate at which the snowpacks

[8] Rosenzweig, C., G. Casassa, D.J. Karoly, A. Imeson, C. Liu, A. Menzel, S. Rawlins, T.L. Root, B. Seguin, P. Tryjanowski, 2007: Assessment of observed changes and responses in natural and managed systems. *Climate Change 2007: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 79–131.

[9] California Climate Change Center, Our Changing Climate: Assessing the Risks to California, 2006. http://www.energy.ca.gov/2006publications/CEC-500-2006-077/CEC-500-2006-077.PDF. Accessed Dec. 3, 2008.

melt in the spring. With rain and snow events becoming less predictable and more variable, the rate of flooding could increase and the City's ability to maintain fresh water for consumption could decrease.

Figure 1-3 Sea Level Rise near Novato



Source: San Francisco Bay Conservation and Development Commission. 2009. (April) Draft Staff Report. Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline.

Background: Regulation of Climate Change

California Governor Arnold Schwarzenegger, the State Attorney General, the California legislature, and the residents of California lead the nation in addressing climate change with the hope that through collective action at the local level, global changes in the way we use resources and develop as a society will change and ultimately reduce the impacts of climate change on the human and natural environment.

State Direction for Climate Change

California has a long history of proven leadership in addressing climate change that spans the last 20 years. In 1988, before the world had even arrived at a consensus on the causes of climate change, Assembly Bill (AB) 4420 (Sher, Chapter 1506, Statutes of 1988) designated the California Energy Commission (CEC) as the lead agency for all climate change issues in California. Since this time, there has been a flurry of initiatives in California to address climate change. These initiatives have strengthened the ability of entities in California to engage in accurate data collection and have created ambitious targets and regulations that will directly lead to reductions in greenhouse gas (GHG) emissions. Not only have California's efforts earned it a role as the leader in the United States for climate planning strategies, but the state has received world attention and accolades for its tireless efforts.

Currently, the State of California is the 15th largest emitter in the world of all greenhouse gas emissions, ultimately accounting for 2% of all global emissions.[10] In June of 2005, Governor Schwarzenegger issued a landmark Executive Order establishing progressive greenhouse gas emissions targets for the entire state. Executive Order S-3-05 outlines the following goals:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020 reduce greenhouse gas emissions to 1990 levels;
- By 2050, reduce greenhouse gas emissions to 80% below 1990 levels.

To support these reduction targets, the California legislature adopted the California Global Warming Solutions Act of 2006, also known as AB 32. The law requires the California Air Resources Board (CARB) to develop regulatory and market mechanisms that will reduce greenhouse gas emissions to 1990 levels by 2020. In December 2008, CARB approved the AB 32 Scoping Plan outlining regulatory and market mechanisms to achieve the goal of AB 32. The plan cites local government action as an integral partner to achieving the State's goals.

In addition to AB 32 and SB 375, there have been numerous other actions taken in the state. The California Climate Action Registry (CCAR) was created by the State in 2000 through SB 1771 (Sher, Chapter 1018, Statutes of 2000). This organization is a nonprofit entity established to assist entities in California working to create GHG emissions baseline inventories. It originally provided a means for

[10] California Energy Commission (CEC). "Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004 (CEC-600-2006-013)," December 2006.

entities to voluntarily record greenhouse gas emissions in expectation of a program that would allow these to be credited as early reductions. In 2001, SB 527 (Sher, Chapter 769, Statutes of 2001) directed the CEC to provide specific guidance to the CCAR on issues including the development of GHG emissions protocols and the qualifications of third parties providing technical assistance and certification of inventories. Subsequently, in 2002, AB 1493 (Pavley, Chapter 200, Statutes of 2002) directed the California Air Resources Board (CARB) to create regulations that would lead to reductions in greenhouse gas emissions from passenger vehicles, light-duty trucks, and non-commercial vehicles sold in California. In 2006, SB 1368 (Perata, Chapter 598, Statutes of 2006) established greenhouse gas emission performance standards for longer-term financial investments in base-load electricity generation to catalyze the transition to cleaner energy use. This bill will also help utility companies transition to the cap-and-trade program that will be established by AB 32. Additional bills targeting climate change include SB 97 (Dutton, Chapter 185, Statutes of 2008), which requires the Governor's Office of Planning and Research (OPR) to develop guidelines for the California Environmental Quality Act (CEQA) pertaining to the mitigation of GHG emissions or the effects of GHG emissions.

Federal Direction for Climate Change

The federal government has yet to enact legislation for greenhouse gas emission reductions. However, even without mandates, new activity has been ushered in with the election of President Obama that is conducive to the reduction of GHG emissions and climate planning. Through the Energy Efficiency and Conservation Block Grant (EECBG) program, the U.S. Department of Energy (DOE) is providing a total of $3.2 billion to cities and counties to reduce fossil fuel emissions; reduce total energy use; improve energy efficiency in the transportation, building, and other appropriate sectors; and create and retain jobs. Using this money, jurisdictions across the United States are allocating funds to initiate climate change planning and achieve reductions in greenhouse gas emissions. The EECBG program is an initial indicator of increased federal involvement in the realm of climate planning.

The scale and pace at which the State of California is addressing this issue is even more of a reason Novato as a community should accelerate its efforts to combat climate change.

Chapter 2 – Novato's Early Actions to Reduce Greenhouse Gas Emissions

The City of Novato recognizes that climate change is a reality and that human activities are responsible for increasing the concentration of atmospheric greenhouse gases—the primary drivers of climate change. The City has established its commitment to reducing its contribution to climate change and preparing for the potential impacts from climate change through pursuit of strategic partnerships and early actions. Most notably, the City signed the U.S. Conference of Mayors Climate Protection Agreement, joined ICLEI – Local Governments for Sustainability (ICLEI), committed to the Marin Climate and Energy Partnership, and created a Sustainability Committee.

By 2007, all 11 jurisdictions in Marin County and the County itself joined the Cities for Climate Protection Campaign (CCP), a partnership administered by ICLEI. This partnership helps governments in their efforts to initiate and implement reductions in greenhouse gas emissions. Specifically, it calls on jurisdictions to determine current greenhouse gas emissions, set reduction targets, develop and implement local action plans to achieve targets, and monitor progress and report results. Each jurisdiction has the responsibility both to provide local leadership for achievement of local targets and to contribute to regional success. Toward these ends, jurisdictions within Marin County have recognized the value of a coordinated regional approach that will lead to larger, shared achievements and success. This approach leads to greater results at the regional scale and equips each jurisdiction with a broader tool set and support structure to achieve local goals.

In March of 2007, a partnership of regional leaders in government, business, and the community participating through Joint Venture Marin established the Marin Climate and Energy Partnership (MCEP). The MCEP became a forum and point of mobilization consisting of the Marin Municipal Water District, the Marin Energy Management Team, and the Marin County Board of Supervisors, leading to the attainment of a planning grant from the Marin Community Foundation. Following attainment of the grant, MCEP partnered with ICLEI and brought together representatives of all 11 Marin jurisdictions, the County, and the Transportation Authority of Marin to establish a framework for MCEP, goals, and a coordinated regional strategy to plan for and implement GHG reductions. Through these efforts, MCEP was awarded a planning grant for $75,000 from the Bay Area Air Quality Management District in the summer of 2008 and attained $2,000 contributions from partner cities and agencies. Using these funds, MCEP was able to hire a Countywide Climate Action Director. All member jurisdictions have signed Letters of Participation that commit jurisdictions to the ongoing development of coordinated climate action planning strategies and implementation plans.

In March 2008, the Novato City Council approved the formation of a Sustainability Committee to develop policies and strategies to move forward on the City's commitment to help meet the environmental challenges facing local government. The Committee's charge is to address all the facets of sustainability, including climate change. During its inaugural meeting in April 2008, the Committee developed a work program of sustainability activities and projects and prioritized development of a local action plan for climate protection and reduction of local greenhouse gas emissions. The Committee works closely with staff and reports regularly to the City Council.

Through the Cities for Climate Protection Campaign, the City of Novato prepared a baseline inventory of greenhouse gas emissions from City operations and community-wide sources. The objective of the greenhouse gas emissions inventory was to identify the sources and quantify the volumes of greenhouse gas emissions resulting from governmental operations as well as activities and operations taking place throughout the community of Novato in 2005. The inventory serves two purposes:

1. It creates an emissions baseline against which the City of Novato can set emissions reductions targets and measure future progress.

2. It allows an understanding of where the highest percentages of emissions are generated in the City of Novato's internal operations as well as in the community and therefore identifies the greatest opportunities for emissions reductions.

The results of the inventory are provided in **Chapter 3**. Based on the results of the inventory, the Sustainability Committee selected a reduction target of 15% below the baseline 2005 greenhouse gas emissions levels by 2020. The Committee chose this reduction target to affirm the City's commitment to developing greenhouse gas reduction measures and to maintaining consistency with state reduction targets.

As a result of its participation in the MCEP, local leadership, and community initiative, the City of Novato has achieved significant progress in implementing reductions in GHG emissions. Using the MCEP as a starting point, local leaders and community members in Novato have conducted continued sustainability and climate planning efforts that have contributed to overall regional success in GHG reductions. These significant climate planning efforts provide a strong foundation for measures contained in this Plan and will help the City easily transition into implementation. **Figure 2-1** below illustrates MCEP's climate action planning process, which is also consistent with ICLEI's process.

Figure 2-1 MCEP's Climate Action Planning Process

Source: Marin Climate and Energy Partnership, http://sites.google.com/site/marinclimate/Home

This Climate Change Action Plan for the City of Novato is the culmination of a myriad of City and regional initiatives. A brief overview of these initiatives is provided below. **Appendix A** provides an overview of the City's existing initiatives and identifies their relationship to the goals and measures in this Plan. Benefits from these activities have been numerous and include the increase of green building in the community, reductions in waste, and increased community participation in reductions in greenhouse gas emissions.

1. Green building – The City established green building standards in 2004, followed by adoption of a Residential Green Building Ordinance in 2005, a Multi-Family Green Building Ordinance in 2007, and a Non-Residential Green Building Ordinance in 2009. Under these ordinances, each project is required to satisfy green point criteria for approval.

2. Construction demolition requirements – In 2002 Novato's City Council approved an ordinance that requires all projects to recycle or reuse at least 50% of scrap materials generated by the project.

3. Residential and nonresidential recycling requirements – This program was initiated in 2001 and was the beginning of the City's climate change and sustainability efforts. Through the program, the City partnered with the Novato Sanitary District to implement a free household and electrical waste collection program. The City adopted a Zero Waste Resolution stating that the City will aim for 80% landfill diversion by 2012 and zero waste by 2025.

4. Travel demand reduction measures – Through 511.org, the City is working to provide additional commuting options for City employees and other employees who live in the Rowland Way/Plaza area.

5. Green purchasing policy – The Administrative Services Department of the City of Novato developed a citywide green purchasing policy in 2007. This policy was approved in April 2008 and implementation has been ongoing.

6. Clean renewable energy bonds – In partnership with the County and other cities in the County of Marin, the City applied for and received $2.5 million to fund the assessment of municipal facilities.

7. Sustainable landscaping – The City has partnered with North Marin Water District to implement water efficiencies in parks through such initiatives as xeriscaping projects.

8. LED traffic signals – The City's Public Works Department has installed new light-emitting diode (LED) traffic lights once yellow traffic lights burn out. All red and green traffic lights have been replaced with LED lights.

9. Water-efficient landscape criteria and water run-off policies

10. Low-emission vehicle facilities in private development

11. Hybrids in City fleet – The City has purchased hybrid vehicle for City operations.

12. City vanpool – The City provides a commuter van for eight City employees from Sonoma County.

13. Municipal facility retrofits – expanded implementation

14. 9/80 work schedule

15. Technology upgrade

16. Solar access requirements

17. Parking maximums, reductions

18. Parking design standards

19. Bicycle parking and end-of-trip facilities

The goals and measures included in this Plan represent best practices and new and innovative approaches to achieving ambitious GHG reductions. Not only will they help the City to achieve its climate change goals, but they will also benefit the business and citizens of Novato by encouraging the transition to a clean economy, a higher standard of living, and mitigation of the impacts of climate change.

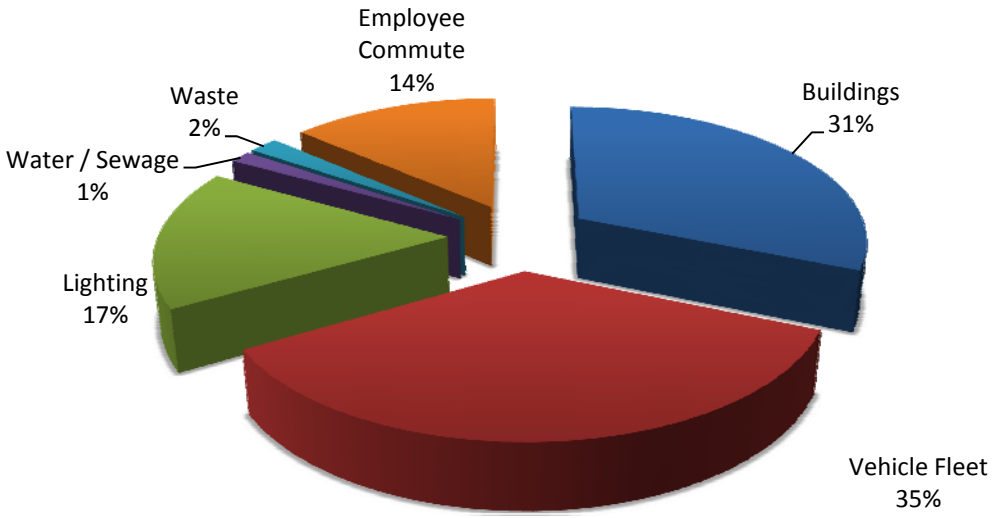
CHAPTER 3 – NOVATO'S GREENHOUSE GAS EMISSIONS

2005 GREENHOUSE GAS EMISSIONS INVENTORY

The City of Novato completed a greenhouse gas inventory for all municipal and community-wide activities for the baseline year of 2005. The inventory is an important first step for the City in its climate change efforts to create a baseline against which to measure future progress and to understand the biggest sources of emissions in order to find best opportunities for reductions. The full report is available on the City's website.

For the baseline year of 2005, municipal operations emitted approximately 2,329 metric tons (tons) of CO_2e.[11] As shown in **Figure 3-1** and **Table 3-1**, the City's vehicle fleet was the largest emitter, producing 35.4% of all municipal emissions. As shown in **Figure 3-2** and **Table 3-2**, community-wide activities (including municipal operations) emitted approximately 465,892 metric tons of CO_2e. The transportation sector generated the most emissions, creating approximately 313,130 metric tons of CO_2e, or 62.7% of total emissions. Transportation sector emissions are the result of diesel and gasoline combustion in vehicles traveling on local roads and state highways that pass through the jurisdictional boundaries of Novato.

Figure 3-1 2005 Greenhouse Gas Emissions (CO_2e) from City Operations



[11] 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.

Table 3-1 2005 Greenhouse Gas Emissions from City Operations by Sector

Sector	Greenhouse Gas Emissions (metric tons CO2e)	Greenhouse Gas Emissions (% CO2e)	Energy Equivalent (million Btu)	Cost ($)	% of Total Cost
Buildings	728	31.30%	12,883	$283,513.00	40.60%
Vehicle Fleet	826	35.40%	-	$208,611.21	29.90%
Lighting	384	16.50%	5,901	$183,304.00	26.20%
Water/Sewage	32	1.40%	487	$22,907.00	3.30%
Waste	44	1.90%	-	$ -	0.00%
Employee Commute	316	13.60%	4,084	$ -	0.00%
TOTAL	**2,329**	**100.00%**	**23,355**	**$698,335.21**	**100.00%**

Figure 3-2 2005 Greenhouse Gas Emissions (CO2e) from Community-wide Sources

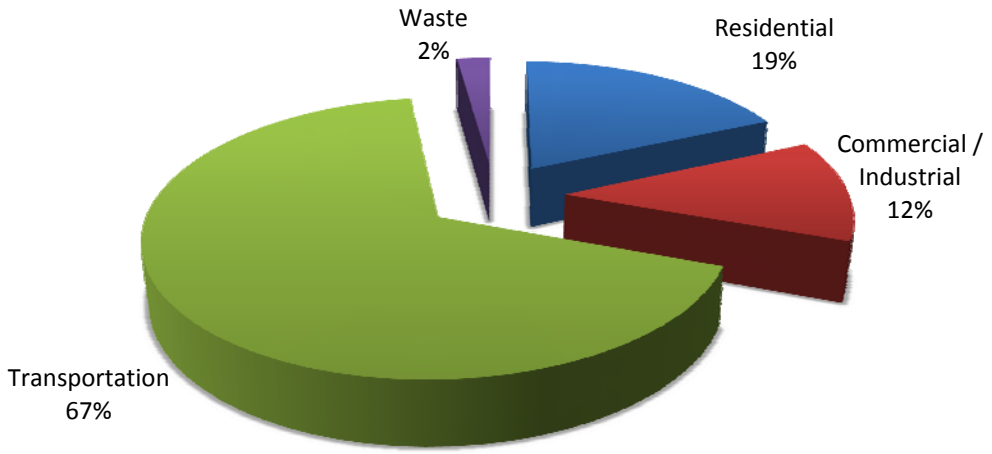


Table 3-2 2005 Community-wide Greenhouse Gas Emissions by Sector

Sector	Greenhouse Gas Emissions (metric tons CO2e)	Greenhouse Gas Emissions (% CO2e)	Energy Equivalent (million Btu)
Residential	85,418	18.30%	1,553,304
Commercial/Industrial	56,952	12.20%	937,517
Transportation	313,160	67.20%	1,321,996
Waste	10,361	2.20%	-
TOTAL	**465,892**	**100.00%**	**3,812,817**

2020 AND 2035 FORECAST FOR GREENHOUSE GAS EMISSIONS

To illustrate the potential emissions growth based on projected trends in energy use, driving habits, job growth, and population growth from the baseline year going forward, the inventory provides an emissions forecast for the year 2020. Forecasts also allow for the assessment of the effectiveness of various reduction strategies. Forecast years provide a snapshot of where annual emissions levels could be under various scenarios. Forecasting is completed by adjusting baseline levels of emissions consistent with household, population, commercial square footage, and transportation growth.

Why 2020 and 2035 Forecast Years?

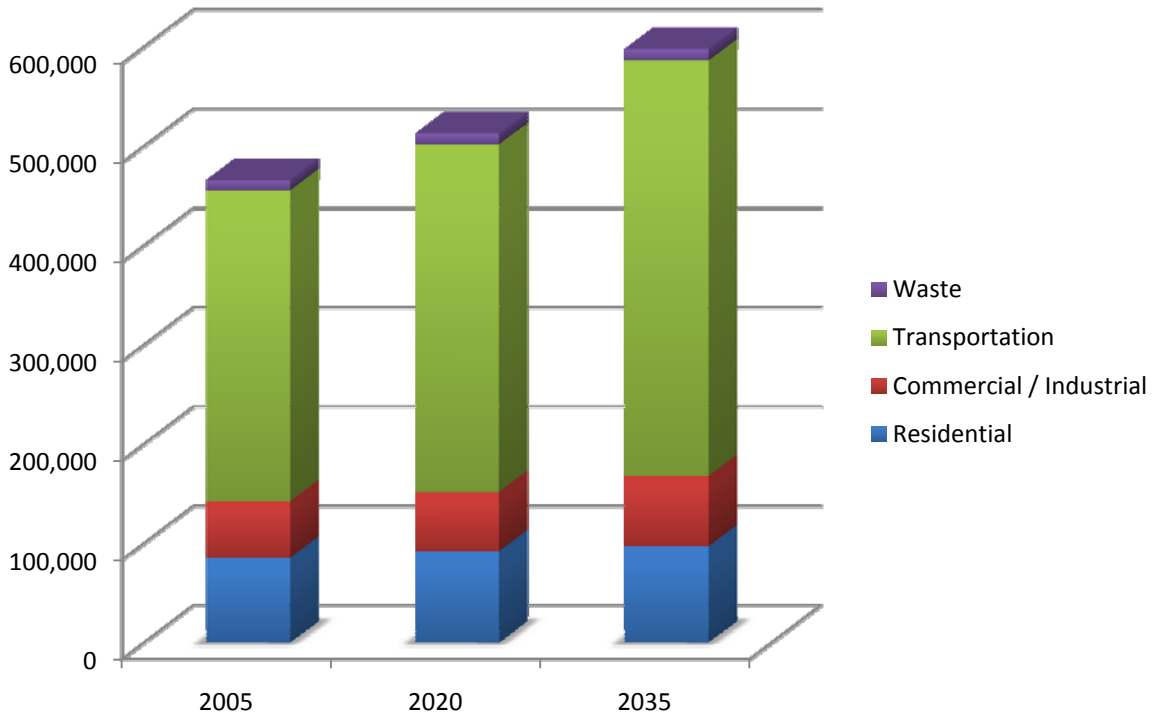
The year 2020 was chosen to create consistency with AB 32, the Global Warming Solutions Act of 2006, which recommends a local goal of 15% below current levels by 2020. The 2035 year was chosen to create consistency with the General Plan Update and ABAG projections for population, jobs, and housing growth.

The basis for all growth scenarios is a "business-as-usual" projection. A business-as-usual projection predicts how greenhouse gas emissions will increase if behaviors and efficiencies do not change from 2008 levels, yet population, households, and vehicle miles traveled in Novato continue to increase. Under a business-as-usual scenario, the City of Novato's emissions will grow by approximately 24.2% by the year 2020, from 465, 892 to 512,858 metric tons CO2e. **Table 3-3** and **Figure 3-3** show the results of the forecast. During development of this Plan, the forecast was extended to 2035 consistent with projections from the Association of Bay Area Governments (ABAG) and the expected buildout or horizon year of the General Plan Update in progress.

Table 3-3 Business-as-Usual (BAU) Greenhouse Gas Emissions Forecast – 2020 and 2035

GHG BAU Forecast	2005	2020	2035
Residential	85,419	91,845	97,061
Commercial/Industrial	56,952	59,763	70,627
Transportation	313,160	350,153	418,558
Waste	10,361	11,097	11,567
Total	**465,892**	**512,858**	**597,813**

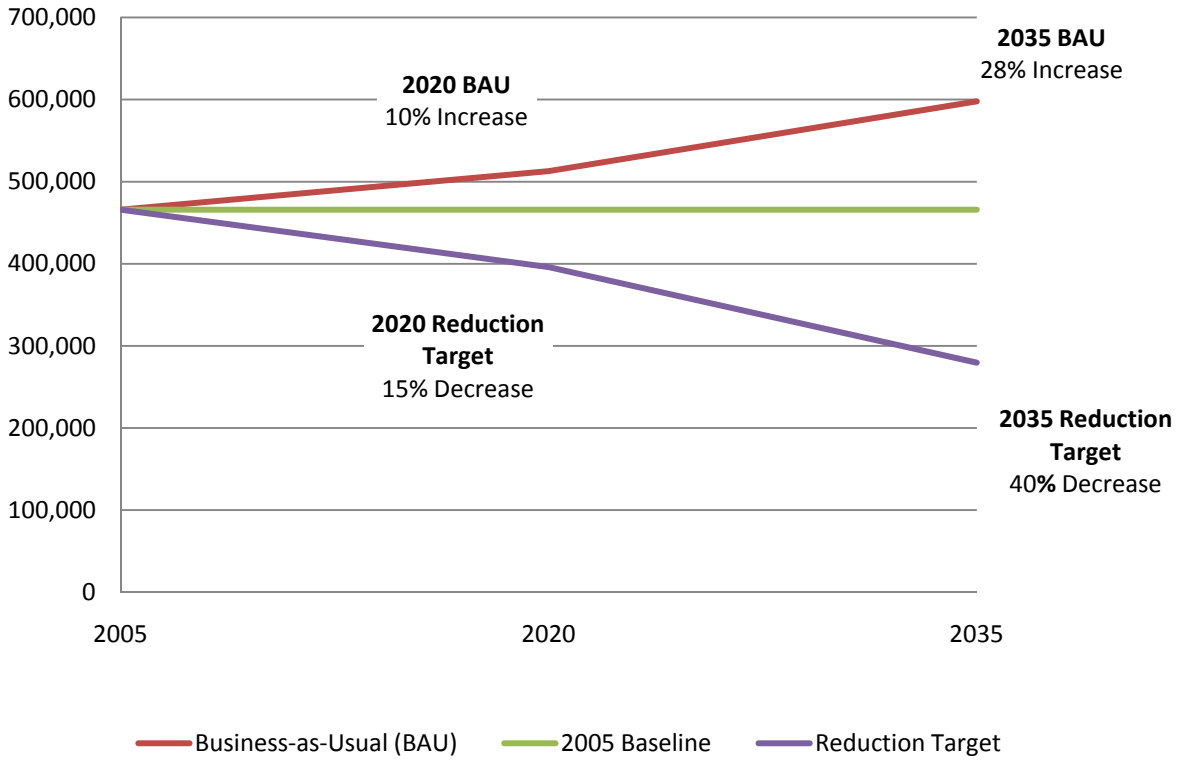
Figure 3-3 Business- as-Usual Emission Forecast by Sector – 2020 and 2035



GREENHOUSE GAS EMISSIONS REDUCTION TARGET

On April 14, 2009, the Novato City Council adopted an emissions reduction target of 15% below 2005 levels by 2020, which is consistent with the State's direction to local governments in the AB 32 Scoping Plan. The City Council directed staff to develop the Climate Change Action Plan to achieve or exceed this target. During preparation of this Plan, the team established a 40% reduction from baseline target for 2035 consistent with the Governor's Executive Order S-3-05 to achieve an 80% statewide reduction by 2050. **Figure 3-4** provides a comparison of the business-as-usual forecasts for 2020 and 2035 to the 2005 baseline year and the 15% reduction target. **Figure 3-4** is also a depiction of Novato's challenge in attempting to meet its reduction targets. Emissions will continue to increase along the business-as-usual scenario while reduction efforts are initiated. Achieving the target is therefore more than a 15% decrease – rather, it is a 25% reduction from 2020 emissions levels in Novato. In 2035, the gap between future growth and target reduction levels increases to 68%. In **Figure 3-4,** this gap is depicted by the difference between the top line and the bottom line, both of which show projected increases or desired decreases relative to the baseline (middle line).

Figure 3-4 Comparison of Business-as-Usual Forecast to Baseline and Reduction Target



CHAPTER 4 – MITIGATING CLIMATE CHANGE

This Plan is organized by ten goals, including eight mitigation goals, and separate goals for adaptation and implementation. This chapter summarizes the Climate Change Action Plan's goals and measures to mitigate Novato's contribution to climate change through the reduction of greenhouse gas emissions from sources within the city boundaries.

APPROACH TO MITIGATION GOALS AND MEASURES

The mitigation goals separate energy, transportation, and waste reduction strategies consistent with the baseline greenhouse gas (GHG) emissions inventory. Each goal is tied to a specific reduction of GHG emissions as well as energy, transportation, and waste reductions. GHG reductions are provided in supporting tables for each measure. Early efforts in the planning process provided a comprehensive list of options for reduction measures. Most of the early measures have been refined and captured in the goals and mitigation measures in this chapter. Those measures that were previously considered but excluded from this Plan are provided in **Appendix B**. Detailed energy, transportation, and waste reductions are provided by measure in **Appendix C**.

Goals and their corresponding measures follow in the chapter. Each measure is summarized in a table with the following supporting information:

- **2020 and 2035 GHG Reduction:** Total metric tons of estimated GHG emissions reduction.
- **Responsible City Department:** City department or agency responsible for implementation.
- **Supporting Departments or Agencies:** Additional City or non-governmental agencies that could assist.
- **Time Frame for Initiation:** Ongoing; Immediately (2010); Short = 1–3 years (2010–2013); Medium = 4–5 years (2014–2015); Long = 6–10+ years (2016–2020+).
- **Cost to City:** Low = under $10,000 (uses existing staff); Medium = $10,000 to $100,000 (existing staff can implement but will require reprioritization of workload); High = over $100,000 (requires new staff or contract position(s) to implement).
- **Funding Sources:** Preliminary suggestions of funding sources.
- **Program Description:** A description of the measure.
- **Recommended Approach for Implementation:** A description of existing activities that complement the measure in addition to specific steps anticipated to implement the measure.
- **Co-Benefits:** Measures are likely to provide benefits in addition to those expected by the goal. When applicable, these co-benefits are provided.

Summary of the GHG Reduction Potential by Sector

The eight mitigation goals presented in **Figure 4-1** below achieve reductions of 73,825 metric tons (MT) CO2e or approximately 6% below the 2005 baseline by 2020. (Also refer to **Figures 4-1, 4-2,** and **4-3**.) When state reductions are assessed, emissions in Novato would be reduced by approximately 26% from the 2005 baseline. Implementation of all proposed measures and the State's measures would allow the City to surpass its reduction target of 15% of baseline by 2020. The City's 2020 target is consistent with AB 32; therefore, implementation of the goals and measures would be consistent with the State's goals for local governments. **Tables 4-2** and **4-3** and **Figures 4-4** and **4-5** present the potential GHG emissions reductions (MT CO2e) for 2020 and 2035 by goal and then by sector. The following eight mitigation goals and supporting measures are actions that will be implemented locally. They are summarized in detail in this chapter. All ten goals, including the eight mitigation goals, and adaptation and implementation goals, and the supporting emissions reduction measures are summarized in **Table 4-4**.

Figure 4-1 GHG Mitigation Goals by Sector

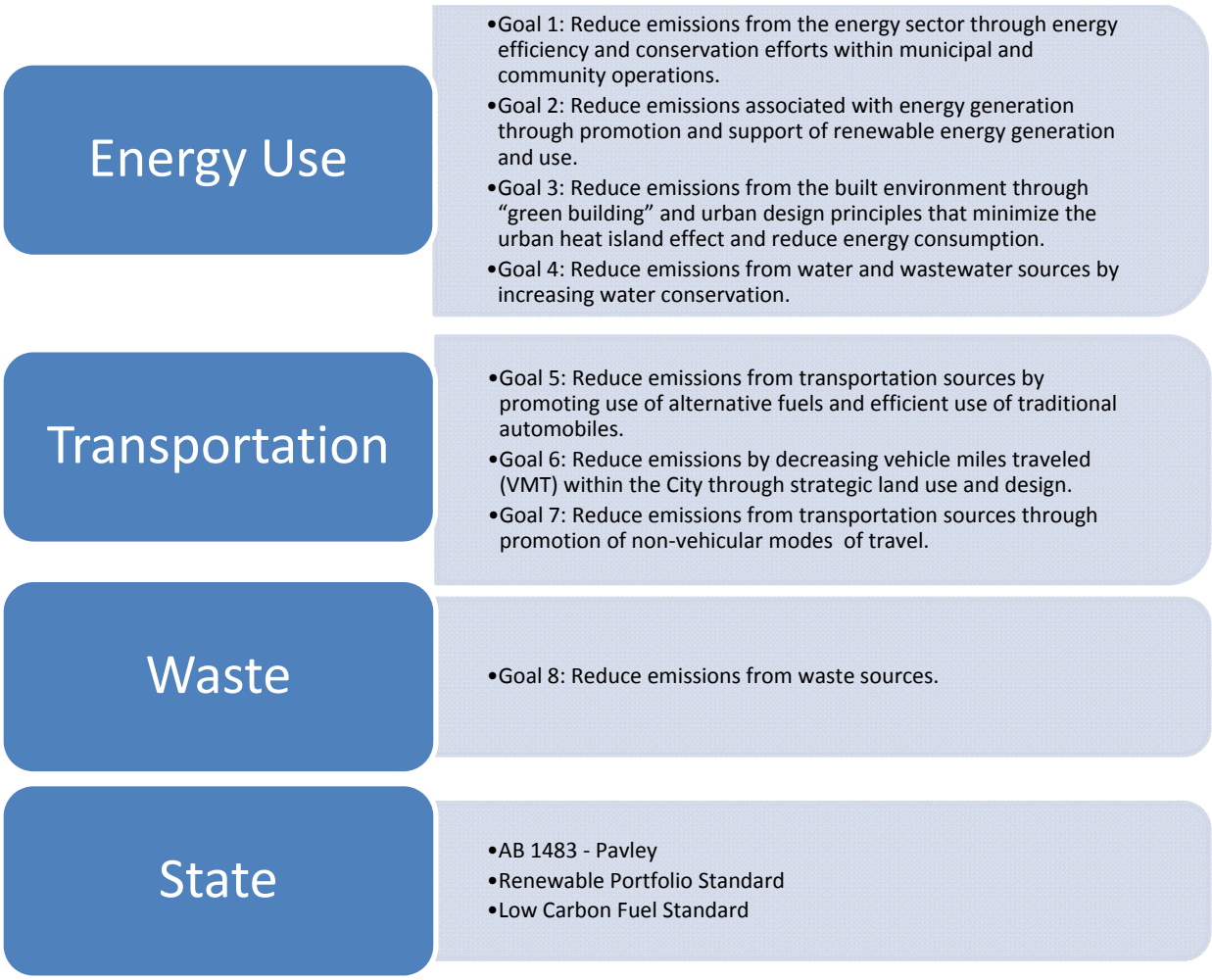


Table 4-1 GHG Reductions by Goal

	Local and State Goals	Forecast Year 2020 (Metric tons)	Forecast Year 2035 (Metric tons)
	Local Goals and Actions (CCAP_	(Metric tons)	(Metric tons)
1	Energy Efficiency and Conservation	-2,199	-2,235
2	Renewable Energy	-5,446	-10,881
3	Green Building and Design	-4,015	-14,396
4	Water Conservation	-19	-21
5	Vehicle Efficiency and Alternative Fuels	-5,327	-7,148
6	Citywide Land Use and Design	-31,311	-42,326
7	Alternative Transportation Modes	-16,631	-36,746
8	Waste Reduction	-8,877	-11,567
	Local Reductions	**-73,825**	**-125,320**
	Percentage Change from 2005 Levels	**-5.77%**	**1.42%**
	State Actions	**2020**	**2035**
	Low Carbon Fuel Standard	-5,501	-24,727
	Pavley (AB 1493)	-61,122	-123,634
	Renewable Portfolio Standard	-28,874	-60,702
	Total State Reductions	**-95,497**	**-209,063**
	Business-as-Usual Emissions	**512,858**	**597,813**
	Total Reductions (Local + State)	**-169,322**	**-334,383**
	Net Emissions	**343,535**	**263,430**
	Percentage Change from 2005 Levels	**-26.26%**	**-43.46%**

Figure 4-2 2020 GHG Reductions by Goal

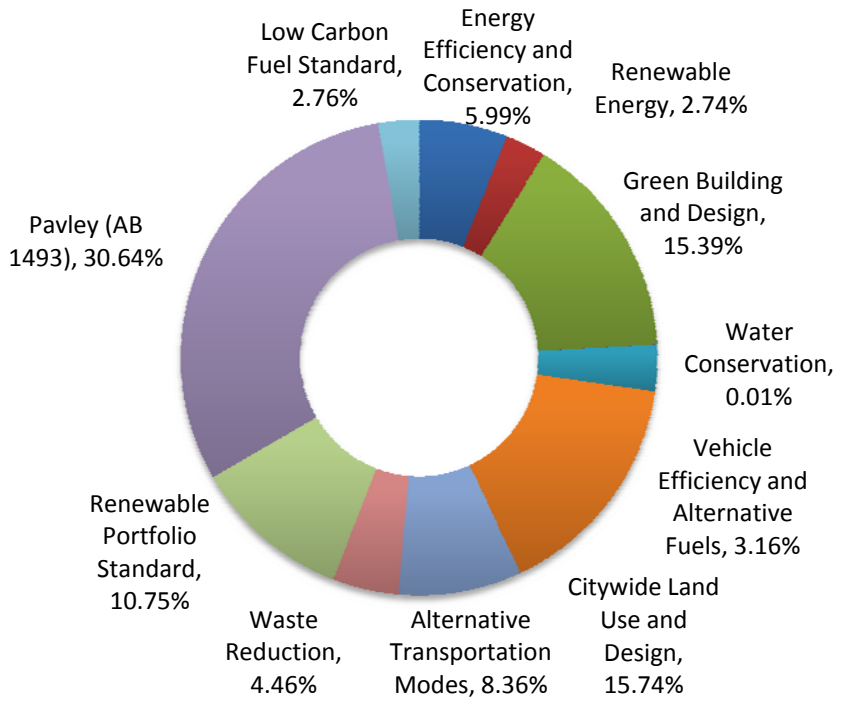


Figure 4-3 2035 GHG Reductions by Goal

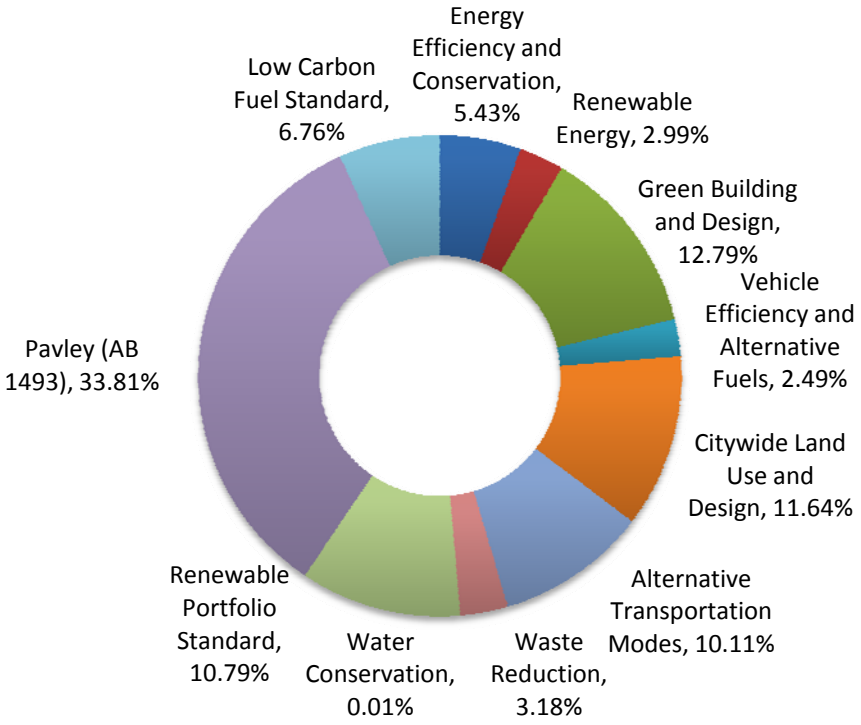


Table 4-2 2020 GHG Reductions by Sector and Source

Reductions by Sector	2005		2020	
	Baseline (Metric tons)	BAU (Metric tons)	With CAP (Metric tons)	With CAP & State (Metric tons)
Residential	30,274	91,845	87,792	69,676
Commercial	56,952	59,763	52,137	41,379
Transportation	313,160	350,153	296,884	230,261
Waste	10,361	11,097	2,219	2,219
Total	**465,892**	**512,858**	**439,032**	**343,535**
Percentage Change from Baseline	**---**	**10.08%**	**-5.77%**	**-26.26%**

Figure 4-4 2020 GHG Reductions by Sector

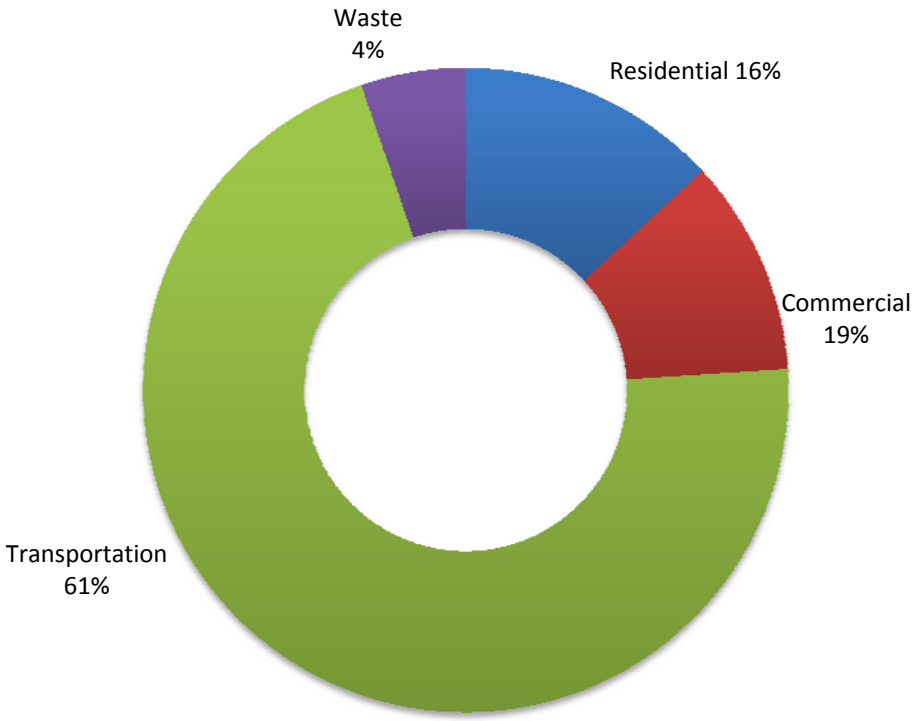


Table 4-3 2035 GHG Reductions by Sector and Source

Reductions by Sector, 2035	2005		2035	
	Baseline (Metric tons)	BAU (Metric tons)	With CAP (Metric tons)	With CAP & State (Metric tons)
Residential	30,274	97,061	87,505	49,606
Commercial	56,952	70,627	52,650	29,847
Transportation	313,160	418,558	332,338	183,977
Waste	10,361	11,567	0	0
Total	**465,892**	**597,813**	**472,493**	**263,430**
Percentage Change from Baseline	**---**	**28.32%**	**1.42%**	**-43.46%**

Figure 4-5 2035 GHG Reductions by Sector

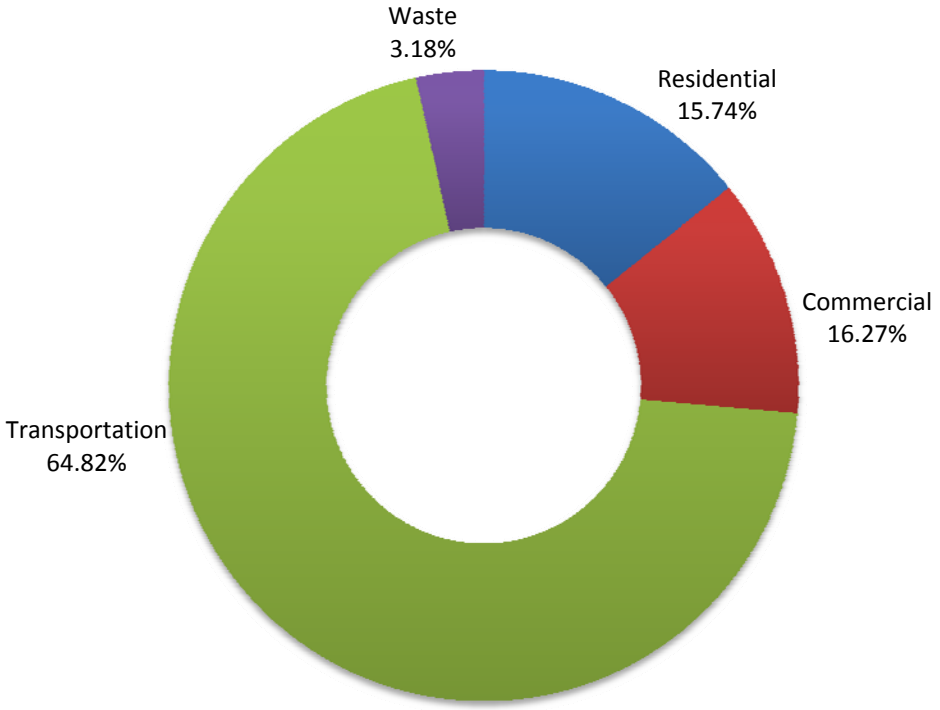


Table 4-4 2035 GHG Mitigation, Adaptation and Implementation Goals and Measures

Goal and Measure		2020 Emission Reduction (MT CO2e)	2035 Emission Reduction (MT CO2e)
GOAL 1	**Energy Efficiency and Conservation** **Reduce emissions from the energy sector through energy efficiency and conservation efforts within municipal and community operations.**	**Total: 2,204 MT CO2e**	**Total: 2,234 MT CO2e**
Mitigation Measure 1	Work with the Marin General Services Authority to complete replacement of incandescent and mercury vapor street, parking lot, and other municipal outdoor lights with LED or other energy-efficient alternatives.	214 MT CO2e	214 MT CO2e
Mitigation Measure 2	Reduce energy use in buildings by a minimum of 30% through energy retrofits to buildings and facilities.	247 MT CO2e	277 MT CO2e
Mitigation Measure 3	Energy Efficiency Protocols: Establish energy efficiency protocols to reduce energy consumption through behavior and operational changes.	148 MT CO2e	148 MT CO2e
Mitigation Measure 4	Low-Income Households Programs: Expand and better integrate programs for low-income households such as the distribution of CFL lights and water-conserving showerheads.	1,498 MT CO2e	1,498 MT CO2e
Mitigation Measure 5	Public Outreach: Promote residential and commercial energy efficiency and conservation through energy bill inserts, public service announcements, recognition programs, and other forms of public outreach.	97 MT CO2e	97 MT CO2e
GOAL 2	**Renewable Energy** **Reduce emissions associated with energy generation through promotion and support of renewable energy generation and use.**	**Total: 5,445 MT CO2e**	**Total: 10,881 MT CO2e**
Mitigation Measure 6	Municipal Renewable Energy: Install cost-effective renewable energy systems on all buildings and facilities and purchase remaining electricity from renewable sources.	82 MT CO2e	185 MT CO2e
Mitigation Measure 7	Community Renewable Energy Facilitation: Identify and remove barriers to small-scale, distributed renewable energy production within the community.	5,363 MT CO2e	10,696 MT CO2e

Goal and Measure		2020 Emission Reduction (MT CO2e)	2035 Emission Reduction (MT CO2e)
GOAL 3	**Green Building and Design** **Reduce emissions from the built environment through "green building" and urban design principles that minimize the urban heat island effect and reduce energy consumption.**	**Total: 4,106 MT CO2e**	**Total: 14,397 MT CO2e**
Mitigation Measure 8	Green Building Standards: Continue to implement the City's Green Building Program. Expand program to require a minimum of 15% above California's Title 24 energy standards, as amended.	1,289 MT CO2e	10,463 MT CO2e
Mitigation Measure 9	Cool Paving Materials: Require the use of high albedo material for future outdoor surfaces such as parking lots, median barriers, roadway improvements, and sidewalks in order to reduce the urban heat island effect and save energy.	782 MT CO2e	1,759 MT CO2e
Mitigation Measure 10	Increase Tree Cover: Increase tree cover of structures and other improvements in the City through implementation of the City's Urban Forestry Plan, including updated landscaping requirements to ensure strategic placement of plantings to shade east and west walls of structures.	1,945 MT CO2e	2,175 MT CO2e
GOAL 4	**Water Conservation** **Reduce emissions from water and wastewater sources by increasing water conservation.**	**Total: 19 MT CO2e**	**Total: 22 MT CO2e**
Mitigation Measure 11	Water Conservation: Conserve water through improved efficiency.	18 MT CO2e	21 MT CO2e
Mitigation Measure 12	Municipal Water Use: Implement programs to reduce the use of potable water in municipal facilities.	1 Metric Ton CO2e	1 Metric Ton CO2e
GOAL 5	**Vehicle Efficiency and Alternative Fuels** **Reduce emissions from transportation sources by promoting use of alternative fuels and efficient use of traditional automobiles.**	**Total: 5,327 MT CO2e**	**Total: 7,147 MT CO2e**
Mitigation Measure 13	Vehicle Idling: Improve traffic flow and reduce VMT within the City.	3,262 MT CO2e	4,068 MT CO2e
Mitigation Measure 14	Vehicle Trips: Facilitate programs aimed at reducing vehicle trips.	1,269 MT CO2e	1,489 MT CO2e
Mitigation Measure 15	Low Emission Vehicle Infrastructure: Improve infrastructure for low emission vehicles.	582 MT CO2e	1,163 MT CO2e
Mitigation Measure 16	City Low Emission Vehicles: Increase the use of alternative fuel vehicles to reduce vehicle GHG emissions.	214 MT CO2e	427 MT CO2e

Goal and Measure		2020 Emission Reduction (MT CO2e)	2035 Emission Reduction (MT CO2e)
GOAL 6	**Citywide Land Use and Design Reduce emissions by decreasing Vehicle Miles Traveled (VMT) within the City through strategic Land Use and Design.**	**Total: 32,606 MT CO2e**	**Total: 45,015 MT CO2e**
Mitigation Measure 17	Require mixed-use, infill development at higher densities to ensure the provision of a mix of housing, employment, and commercial services within the community.	1,245 MT CO2e	3,585 MT CO2e
Mitigation Measure 18	Jobs/Housing Balance: Attract a variety of employment opportunities, including higher-paying jobs, for those who live, or are likely to live, in the community.	28,665 MT CO2e	37,067 MT CO2e
Mitigation Measure 19	Affordable Housing: Continue support of affordable housing ordinance and programs.	1,401 MT CO2e	1,674 MT CO2e
Mitigation Measure 20	Pedestrian Convenience: Promote walking through design standards and amenities that concentrate uses, reduce the need for vehicular travel, and enhance the pedestrian experience.	1,295 MT CO2e	3,689 MT CO2e
GOAL 7	**Alternative Transportation Modes Reduce emissions from transportation sources through promotion of non-vehicular modes travel.**	**Total: 16,632 MT CO2e**	**Total: 36,746 MT CO2e**
Mitigation Measure 21	Nonresidential Bicycle Facilities: Increase bicycle-parking requirements for new and significantly retrofitted nonresidential projects to a minimum rate of 1:20 vehicle spaces. Bicycle parking shall be divided between short-term facilities (bike racks) and long-term facilities (bike lockers or other covered facilities). Continue implementing requirements for showers, lockers, and changing space in all large nonresidential facilities.	5,252 MT CO2e	22,012 MT CO2e
Mitigation Measure 22	Multi-Family Bicycle Parking: Increase bicycle-parking requirements for new multi-family residential construction. Short-term facilities shall be provided at a minimum rate equal to 10% of vehicle spaces. Long-term facilities shall be provided at a ratio of one long-term bicycle parking space for every unit. Long-term facilities shall consist of one of the following: a bicycle locker, a locked room with standard racks and access limited to bicyclists only, a standard rack in a location that is protected from the elements and monitored by video surveillance 24 hours per day. Alternatively, spaces may be provided in designated space within the units' garage/carport.	18 MT CO2e	45 MT CO2e

Goal and Measure		2020 Emission Reduction (MT CO2e)	2035 Emission Reduction (MT CO2e)
Mitigation Measure 23	Complete Streets: Adopt "complete street" standards to facilitate multi-modal access for those trips that cannot be completed by walking alone.	806 MT CO2e	2,008 MT CO2e
Mitigation Measure 24	Parking Standards: Revise parking standards to disincentivize single-occupant vehicles and promote non-vehicular travel for developments in commercial, multi-unit residential, or mixed-use developments near transit. Account for design elements that promote non-vehicular travel such as proximity to transit, proximity to employment centers, bicycle facilities, and location near transit.	10,248 MT CO2e	12,250 MT CO2e
Mitigation Measure 25	Public Transit: Work with transit providers to plan, fund, and implement additional transit services that are cost-effective and responsive to existing and future transit demand.	242 MT CO2e	362 MT CO2e
Mitigation Measure 26	Safe Routes to School: Collaborate with the Transportation Authority of Marin to expand Safe Routes to School Programs, including a walking school bus program to provide a supervised, safe, and timely commuting alternative for children.	3 MT CO2e	3 MT CO2e
Mitigation Measure 27	Municipal Travel: Encourage employees to utilize alternative forms of transportation for commutes and work-related trips.	63 MT CO2e	66 MT CO2e
GOAL 8	**Waste** **Reduce emissions from waste sources.**	**Total: 8,877 MT CO2e**	**Total: 11,567 MT CO2e**
Mitigation Measure 28	Zero Waste: Implement the adopted Zero Waste Resolution.	8,877 MT CO2e	11,567 MT CO2e
GOAL 9	**Novato will become resilient to Climate Change** **Improve the city's resilience to reduce vulnerability to extreme events resulting from Climate Change.**	**Not Quantifiable**	**Not Quantifiable**
Adaptation Measure 1	Incorporate climate change threats, impacts, projections, adaptation needs, and strategies into the General Plan, hazard mitigation plans, emergency response and preparedness plans, development plan review, capital project planning, and other ongoing activities as appropriate.	Not Quantifiable	Not Quantifiable
Adaptation Measure 2	Identify and reassess regional climate change vulnerabilities.	Not Quantifiable	Not Quantifiable
Adaptation Measure 3	Prepare for sea level rise.	Not Quantifiable	Not Quantifiable

Goal and Measure		2020 Emission Reduction (MT CO2e)	2035 Emission Reduction (MT CO2e)
Goal 10	**Implement the Climate Action Plan** **The Climate Change Action Plan will be implemented to reduce Novato's greenhouse gas emissions by a minimum of 15% from the 2005 baseline by 2020 and by a minimum of 40% by 2035.**	**Not Quantifiable**	**Not Quantifiable**
Implementation Measure 1	Monitor and report on the City's progress annually.	Not Quantifiable	Not Quantifiable
Implementation Measure 2	Update the baseline greenhouse gas emissions inventory every five years.	Not Quantifiable	Not Quantifiable
Implementation Measure 3	Continue and expand partnerships that support implementation of the Climate Change Action Plan.	Not Quantifiable	Not Quantifiable
Implementation Measure 4	Maintain funding to implement the Climate Change Action Plan.	Not Quantifiable	Not Quantifiable
Implementation Measure 5	Integrate climate action planning with other activities and programs in the City.	Not Quantifiable	Not Quantifiable
Implementation Measure 6	Review and update the Climate Change Action Plan regularly, at a minimum of every 5 years.	Not Quantifiable	Not Quantifiable

Local Climate Change Mitigation Goals and Measures

GOAL 1: ENERGY EFFICIENCY AND CONSERVATION

Reduce emissions from the energy sector through energy efficiency and conservation efforts within municipal and community operations.

Energy currently accounts for over 30.5% of emissions within Novato. Implementation of this goal will result in significant energy reductions from Novato's existing building stock. Many of the homes and commercial businesses in the City were built before the establishment of California's strict energy efficiency standards (Title 24). This goal represents a way to target this key building sector.

Measure 1: Work with the Marin General Services Authority to complete replacement of incandescent and mercury vapor street, parking lot, and other municipal outdoor lights with LED or other energy-efficient alternatives.	
2020 GHG Reductions:	214 MT CO2e
2035 GHG Reductions:	214 MT CO2e
Responsible City Department:	Public Works City Manager
Supporting Departments or Agencies:	Marin County General Services Authority Republic Electric, Pacific Gas & Electric Company
Time Frame for Initiation:	Immediately; Short term
Cost to City:	High (streetlights) TBD (other outdoor lights)
Funding Source(s):	PG&E Turnkey Streetlight LED program CEC loan programs

Description

This measure quantifies the effect of replacing all incandescent and mercury vapor streetlights and other outdoor municipal lights with energy-efficient models. The City is tentatively planning to allocate funds from the Energy Efficiency and Conservation Block Grant (EECBG) program, but based on initial estimates, these funds will support a small portion of the City's streetlight replacements. Completion of this measure assumes additional action and investment is taken by the City to replace the remaining lights not funded by the EECBG program. The City has replaced red and green traffic signal lights with LED bulbs. Yellow traffic signal lights are replaced on an ad hoc basis as lights burn out.

Recommended Approach for Implementation

To complete this measure, the City must:

- Complete replacement of the 3,280 incandescent and mercury vapor street, parking lot, and other municipal outdoor lights with LED or other energy-efficient alternative through PG&E's Turnkey Program or a similar program. For example, PG&E's Turnkey Program allows the City to

pay PG&E the cost of replacing and upgrading lights with LED equivalents and accepts responsibility for all aspects of replacement, recycling old lights, labor costs, and all other costs associated with replacing lights. Other than the one-time payment for participation in the program, the City will not bear any additional financial burdens. The City can leverage funds from multiple sources to participate in this program, including rebates from PG&E, EECBG funds, and loans provided by the California Energy Commission. PG&E will work with the City to obtain funding and secure loan mechanisms for participation in the program.

- Complete replacement of the remaining yellow traffic signal lights in the community using existing departmental funds dedicated for replacement.

CO-BENEFITS

In addition to GHG reductions, LEDs also provide better light quality than standard sodium lamps and provide better visibility of colors. Additionally, the long 10–12 year life of LEDs significantly reduces maintenance costs.

GOAL 1: ENERGY EFFICIENCY AND CONSERVATION

Reduce emissions from the energy sector through energy efficiency and conservation efforts within municipal and community operations.

Measure 2: **Reduce energy use in buildings by a minimum of 30% through energy retrofits to buildings and facilities.**	
2020 GHG Reductions:	247 MT CO2e
2035 GHG Reductions:	277 MT CO2e
Responsible City Department:	Public Works, Parks, City Manager
Supporting Departments or Agencies:	Marin Energy Management Team Marin Climate & Energy Partnership
Time Frame for Initiation:	Ongoing; Short term
Cost to City:	Varies – Medium
Funding Source(s):	General Fund, State/federal grants or loans BAAQMD grant

PROGRAM DESCRIPTION

The Marin Energy Management Team (MEMT) is active in auditing and retrofitting municipal buildings. Between 2005 and the end of 2009, MEMT audited and implemented energy efficiency recommendations for the City's Corporation Yard and Hamilton Community Center, Senior Center, Teen Center, and Gym. The City completed these recommended lighting retrofits in 2009, resulting in 70,275 kWh in savings, or a 2.2% reduction below the 2005 baseline. Audits have also been completed for the City's decorative light strings, Police Facility, and Computer Services. Implementation of these retrofits will result in an additional reduction of 142,413 kWh, reducing energy use to 4.4% below baseline, for a total reduction of approximately 6% below baseline. The MEMT has also successfully assisted the City

with their application for Clean Renewable Energy Bonds for solar projects, and the City is now nearing completion on three solar projects.

This measure requires the City to continue working with the MEMT and other organizations to reduce building energy use by 30% through increased energy efficiency and conservation. It assumes that all energy audit recommendations will be completed by 2020, including HVAC replacements, vending machine upgrades, and LED Christmas light purchases.

Recommended Approach for Implementation

The City is currently on track to implement this measure through its participation in the MEMT. All estimates for energy reductions are based on the assumption that all audit recommendations are implemented.

To complete this measure, the City should:

- Continue to participate in the MEMT and encourage the continued auditing of municipal facilities through the BAAQMD grant.
- Implement municipal upgrades based on MEMT audit findings and align planned projects with audit results. This will ensure that any money the City invests in facility or operational upgrades is also directed toward energy efficiency savings. For instance, in February 2009, the City implemented a Technology Upgrade Plan, which consolidated an update of 26 old servers to 8 energy-efficient units, using equipment that is Energy Star Gold-rated. This upgrade supported a necessary level of City performance and functions, but has also resulted in energy savings for the City.
- Consider prioritization of municipal projects and upgrades based on the energy findings in the energy audits. The City should explore how audits can be used as a weighted form of credit in the prioritization of projects for funding, all else being equal. Audits can be used as an additional criterion in municipal upgrades.

Co-Benefits

The retrofits and upgrades will result in cost savings to the City, which will be returned to the General Fund.

GOAL 1: ENERGY EFFICIENCY AND CONSERVATION

Reduce emissions from the energy sector through energy efficiency and conservation efforts within municipal and community operations.

Measure 3: **Energy Efficiency Protocols: Establish energy efficiency protocols to reduce energy consumption through behavior and operational changes.**	
2020 GHG Reductions:	148 MT CO2e
2035 GHG Reductions:	148 MT CO2e
Responsible City Department:	Public Works Information Technology
Supporting Departments or Agencies:	-
Time Frame for Initiation:	Immediately
Cost to City:	Medium
Funding Source(s):	General Fund

Program Description

This is the first part of a multitiered approach to reduce energy consumption and associated GHG emissions in municipal facilities through the implementation of energy efficiency protocols to reduce the energy demands of City buildings and facilities.

Recommended Approach for Implementation

This program includes:

1) Establishing energy efficiency protocols for building custodial and cleaning services and other employees, including efficient use of facilities, such as turning of lights and computers, thermostat use, etc.;

2) Incorporating energy management software, electricity monitors, or other methods to monitor energy use in municipal buildings; and

3) Implementing off-peak scheduling of pumps, motors, and other energy-intensive machinery where feasible.

Co-Benefits

In addition to GHG reductions, this measure also results in decreased operational costs.

GOAL 1: ENERGY EFFICIENCY AND CONSERVATION

Reduce emissions from the energy sector through energy efficiency and conservation efforts within municipal and community operations.

Measure 4: **Low-Income Households Programs: Expand and better integrate programs for low-income households such as the distribution of CFL lights and water-conserving showerheads.**	
2020 GHG Reductions:	1,498 MT CO2e
2035 GHG Reductions:	1,498 MT CO2e
Responsible City Department:	Affordable Housing Program Community Development Redevelopment Agency
Supporting Departments or Agencies:	Community Action Marin Federal Low-Income Household Energy Assistance Program, U.S. Department of Energy PG&E
Time Frame for Initiation:	TBD (dependent on grants the City applies for)
Cost to City:	Low
Funding Source(s):	Grants (TBD)

Program Description

This program will target low-income households, recognizing that monetary constraints provide significant barriers to purchasing and implementing energy-efficient technologies. By conducting such proactive outreach, the City will equip all segments of the community to work together, enjoy significant cost savings on energy and water bills, and help the City achieve its GHG reduction targets. As shown below, the reductions result from serving merely 10% of the City's low-income population. With expansion of the program, a far greater proportion of this population could be served and greater energy savings achieved.

Recommended Approach for Implementation

The federal Low-Income Household Energy Assistance Program (LI-HEAP) distributes funding for low-income weatherization services as do the U.S. Department of Energy and PG&E. LI-HEAP is an energy assistance and conservation program that serves low-income individuals and families with essential funding for their energy costs, especially during the winter season. Locally, this program is administered by Community Action Marin. In addition to receiving energy bill assistance one time per year, clients receive energy and conservation education, information on free home weatherization measures, and referral to other energy programs that may include free or reduced-cost energy-efficient appliances. For customers whose primary heating source is wood or propane, LI-HEAP can provide assistance with these payments in lieu of PG&E bills. LI-HEAP also provides information and referral to other services for which applicants may qualify.

The City, in partnership with Community Action Marin, PG&E, or other organizations, could expand the program to include distribution of CFL lights, water-conserving showerheads, or other energy efficiency or conservation improvements. The City can initially utilize the California Youth Energy Services program that is implemented by Marin Energy Watch Partnership to implement this measure. This program already distributes low-flow showerheads and faucet aerators, can be utilized to target low-income households in the City, and has already visited over 500 Novato homes and installed over 5,400 compact fluorescents and 1,000 showerheads and aerators at no cost to homeowners. It is likely that some coordination time from City staff would be necessary to determine applicant eligibility; however this time is negligible and would most likely be covered by grants. Further funding may be available if the City implements this program in conjunction with another entity.

To implement this program, the City needs to take the following steps.

- Establish program parameters. The scope of the program needs to be determined and the City should identify whether the program will take on a simple, universal approach to provide specific energy efficiency products (such as light bulbs) or if it will be a more tailored program that responds to user needs and integrates features such as home energy audits. The scope will determine the costs of the program.

- Investigate partnership opportunities. The City needs to determine the most effective approach to encourage energy efficiency in low-income households and designate the appropriate body to do so. There could be a range of approaches, including:

    - Integration with the efforts of the California Youth Energy Services.

    - Integration as a component of existing City or County programs such as the Below Market Rate Housing Program or LI-HEAP.

    - Creation of a new City program targeted to energy efficiency in low-income households.

    - Partnership with a local private entity, such as Sustainable Novato, in which the City contributes funds for private implementation of the program.

    - Partnership with PG&E in its existing programs.

    - Tailoring a program specifically to match grant opportunities.

- Explore funding sources. The amount of funding the City will have to contribute will largely depend on the grants the City chooses to pursue, partnerships the City chooses to explore, and the scope of the program. By partnering with an outside organization, the City could realize additional cost savings in applying for and obtaining a program grant.

CO-BENEFITS

This measure will help to ensure that all residents have the ability to respond to climate change equally. and that low-income residents save money on their energy bills.

GOAL 1: ENERGY EFFICIENCY AND CONSERVATION

Reduce emissions from the energy sector through energy efficiency and conservation efforts within municipal and community operations.

Measure 5: **Public Outreach: Promote residential and commercial energy efficiency and conservation through energy bill inserts, public service announcements, recognition programs, and other forms of public outreach.**	
2020 GHG Reductions:	92 MT CO2e
2035 GHG Reductions:	97 MT CO2e
Responsible City Department:	Administration Community Development
Supporting Departments or Agencies:	To Be Determined (TBD)
Time Frame for Initiation:	Ongoing
Cost to City:	Low
Funding Source(s):	Partnerships Grants

PROGRAM DESCRIPTION

This measure directs the implementation of a community-wide public outreach and education campaign to inform residents, businesses, and consumers about the way that individuals can reduce their energy costs and GHG emissions. This includes informing the public about the benefits of installing energy-efficient indoor and outdoor lighting and alerting them to the availability of free energy audit programs, and financial and other incentives that are available to assist residential and commercial energy audits and retrofits.

The City will utilize the programs that have been initiated by the County of Marin Community Development Agency and PG&E through the Marin Energy Watch Partnership to conduct this effort. Projects are already under way through the partnership that can be targeted to educate residents and businesses about reducing energy consumption.

RECOMMENDED APPROACH FOR IMPLEMENTATION

To initiate this effort, the City will meet with the Marin Energy Watch Partnership to discuss existing initiatives through Smart Lights and California Youth Energy Services. These two programs, which are already oriented to education and facilitation of energy efficiency measures, will be used to educate the public, facilitate access to energy-saving technologies and measures, and help the public understand more broadly ways to reduce energy costs and GHG emissions.

GOAL 2: RENEWABLE ENERGY

Reduce emissions associated with energy generation through promotion and support of renewable energy generation and use.

Measure 6: **Municipal Renewable Energy: Install cost-effective renewable energy systems on all buildings and facilities and purchase remaining electricity from renewable sources.**	
2020 GHG Reductions:	82 MT CO2e
2035 GHG Reductions:	185 MT CO2e
Responsible City Department:	Public Works
Supporting Departments or Agencies:	TBD
Time Frame for Initiation:	Medium
Cost to City:	Low – Medium to initiate TBD – Implementation
Funding Source(s):	TBD – General Fund, fees, grants, loans

Program Description

This is one component of a multitiered approach to reduce conventional energy consumption and associated GHG emissions in municipal facilities through the installation of renewable energy systems on City buildings to serve energy demands.

Recommended Approach for Implementation

This measure assumes that 20% of total electricity used by the City by the target year of 2035 will be from renewable energy systems. This percentage is assumed to be phased in, with the City achieving 10% of total production from renewable energy systems by 2020.

The mix of sources of this renewable energy production will be determined by opportunities and constraints that require further investigation. Implementing this measure requires that the City explore the feasibility of and opportunities for production of renewable energy from solar, wind, and biomass power. The study would focus on incorporating more renewable energy sources into City facilities and services.

Until an initial feasibility study is completed, it is difficult to make accurate estimations of the initial cost and greenhouse gas emissions reductions. For instance, using solar as the power source of sewer pump stations would cost an average $9 per watt for systems above 2 kW. Based on this fee, it would cost approximately $1 million to replace all existing water pumps identified in the 2005 greenhouse gas inventory. However, this does not account for the actual feasibility of implementing such a system in Novato, nor does it balance prioritization for facilities upgrades.

Once the feasibility study is complete, the City would investigate leveraging opportunities. For instance, funding is available through the California Solar Initiative for solar and wind facilities. Local governments

can also borrow money at low interest rates for solar system installation. All of these factors will need to be accounted for by the City in determining the best approach for measure implementation.

Co-Benefits

In addition to GHG reductions, implementation of this measure also is a visible symbol to the community that the City is leading by example. Maximizing solar panel usage on City facilities increases visibility and awareness of solar power.

GOAL 2: RENEWABLE ENERGY

Reduce emissions associated with energy generation through promotion and support of renewable energy generation and use.

Measure 7: **Community Renewable Energy Facilitation: Identify and remove barriers to small-scale, distributed renewable energy production within the community.**	
2020 GHG Reductions:	5,363 MT CO2e
2035 GHG Reductions:	10,696 MT CO2e
Responsible City Department:	City Manager's Office Community Development
Supporting Departments or Agencies:	Public Works
Time Frame for Initiation:	Immediately
Cost to City:	Medium – Municipal Financing Program TBD – other components
Funding Source(s):	General Fund Energy Efficiency and Conservation Block Grant

Program Description

The goal of this measure is to reduce GHG emissions from residential and commercial energy use by facilitating the development of small-scale distributed renewable energy production.

Recommended Approach for Implementation

This measure builds on existing City efforts. It requires a full integration of City activities in order to achieve comprehensive reductions in energy consumption throughout the community.

The measure primarily can be accomplished as follows:

- Adoption of incentives, such as permit streamlining and fee waivers, as feasible. This is an integral part of measure implementation. Allowing for easy and affordable approval processes for the installation of solar panels within the community is perhaps the easiest way the City can

achieve this measure. The City could explore options like eliminating the electrical permit fees for solar photovoltaic (PV) panels. The City could also create a simplified application procedure for the private installation of renewable energy facilities and even provide a simple one-sheet guide for the application process.

- Amendments to development codes, design guidelines, and zoning ordinances, as necessary. The Zoning Code already provides solar access requirements in Section 19.20.110. The City should also review other existing regulations to remove obstacles and simplify the provision of solar and other renewable energy facilities. Further, the City should investigate and utilize a range of incentives (such as expedited processing or reduced permit fees) to encourage the installation of solar panels on carports and over parking areas or on project buildings for commercial projects and new large-scale residential developments.

- Creation of an "AB 811" or municipal financing program for small and large projects. This program will facilitate the private implementation of renewable energy production by providing a secure, low-interest finance mechanism that specifically funds the installation of energy efficiency improvements on private property. The City is currently investigating partnership opportunities for creation of such a program using its EECBG funds. The time frame and implementation of this program are largely dependent on the outcomes of other grants and programs pursued at a regional level. The City should reserve a portion of its EECBG funds to ensure it is able to fund such a program at the local level when regional partnerships become available.

GOAL 3 GREEN BUILDING AND DESIGN

Reduce emissions from the built environment through "green building" and urban design principles that minimize the urban heat island effect and reduce energy consumption.

Measure 8: **Green Building Standards: Continue to implement the City's Green Building Program. Expand program to require a minimum of 15% above California's Title 24 energy standards, as amended.**	
2020 GHG Reductions:	1,289 MT CO2e
2035 GHG Reductions:	10,463 MT CO2e
Responsible City Department:	Building Division
Supporting Departments or Agencies:	Marin Green BERST
Time Frame for Initiation:	Ongoing
Cost to City:	Minimal
Funding Source(s):	General Fund, Grants

Program Description

This measure requires new and major renovations of residential and nonresidential development in the City to be built to green building standards. ("Green" building is the practice of designing, constructing, operating, maintaining, and removing buildings in ways that conserve natural resources and reduce their impact on climate change.) The City adopted green building standards for nonresidential buildings in March 2009, multi-family buildings in May 2007, and residential buildings in September 2005. These standards rely on extensive checklists whereby developers may select from various green building practices or purchases. It is recommended that the City's Green Building Ordinance be amended to require that the applicant exceed California's Title 24 standards as part of these checklists, which in part can be achieved by taking advantage of shade, prevailing winds, landscaping, and sun screens to reduce energy use. This added requirement will ensure that new buildings achieve quantifiable energy and greenhouse gas reductions as included in this Plan. As the ordinances now stand, building owners may choose from a variety of options, all of which have variable energy and greenhouse gas reductions, if any.

Recommended Approach for Implementation

The City could implement this measure by utilizing the model ordinance being developed by Marin Green Building Energy Retrofit and Solar Transformation (BERST). Marin Green BERST is tasked specifically with helping all Marin jurisdictions adopt green building regulations and with recommending parameters for comprehensive energy efficiency and renewable energy retrofit programs for existing buildings.

On September 18, 2009, Marin Green BERST provided a list of initial recommendations for the model green building ordinance to the City of Novato. The recommendations provide higher thresholds of regulation than Novato's existing ordinances in some cases, and in many cases, provide regulations that are more specifically targeted to energy efficiency and reference requirements to exceed California's Title 24 standards by 15–30% (depending on the type, size, and valuation of the project). Marin Green BERST is in the process of developing final regulations based on these initial recommendations. Once Marin Green BERST provides the model ordinance, the City can easily implement this measure by adopting those regulations that provide greater energy efficiency requirements. The measure will then be implemented on an ongoing basis through project review.

While the City will not have to provide any costs for development of the ordinance, implementation of the new ordinance will require supplemental staff training in LEED certification and GreenPoint Rated processes that will be referenced in the new ordinance. Training on Leadership in Energy and Environmental Design (LEED) and GreenPoint Rated processes would require a day-long training session with costs from $3,000 to $5,000 in staff time and materials.

Co-Benefits

Green buildings not only save energy and water, they are healthier for inhabitants and often more affordable to operate.

GOAL 3 GREEN BUILDING AND DESIGN

Reduce emissions from the built environment through "green building" and urban design principles that minimize the urban heat island effect and reduce energy consumption.

Measure 9: **Cool Paving Materials: Require the use of high albedo material for future outdoor surfaces such as parking lots, median barriers, roadway improvements, and sidewalks in order to reduce the urban heat island effect and save energy.**	
2020 GHG Reductions:	782 MT CO2e
2035 GHG Reductions:	1,759 MT CO2e
Responsible City Department:	Community Development
Supporting Departments or Agencies:	Public Works
Time Frame for Initiation:	Medium
Cost to City:	No impact to City funds
Funding Source(s):	Entitlement fees

Program Description

California has required white-colored material for flat roofs since 2005. Under this reduction measure, it is assumed that 30% of the City's urban area will be replaced with high albedo materials as a requirement for new developments. Surfaces can include parking lots, sidewalks, driveways, and roads.

Pavements and roofs typically constitute over 60% of urban surfaces (roof 20–25%, pavements about 40%). "Cool" roofs and pavements are made of materials with higher solar reflectivity (high albedo), which counters the urban heat island effect and reduces air conditioning use. Dark pavement and roofs absorb heat from the sun, creating higher urban temperatures and increasing the need for air conditioning. According to a recent study by Akbari, Menon, and Rosenfeld, using white materials for a 1,000 square foot roof can reduce carbon dioxide emissions by approximately 10 MT and urban surface temperatures up to 3 degrees. By using reflective materials, both roof and pavement albedos can be increased by about 0.25 and 0.15, respectively, resulting in a net albedo increase for urban areas of about 0.1.

Recommended Approach for Implementation

The U.S. Environmental Protection Agency identifies multiple cool pavement technologies, many of which are similar if not lower in cost to traditional asphalt. There would be some staff time for coordinating and including the high albedo content requirements in the design of projects included in the Capital Improvement Plan (CIP). Caltrans would also need to be contacted regarding the State's efforts to increase albedo on state highways. Once new requirements are established in Novato's Municipal Code, this measure would be implemented on an ongoing basis through project review.

GOAL 3 GREEN BUILDING AND DESIGN

Reduce emissions from the built environment through "green building" and urban design principles that minimize the urban heat island effect and reduce energy consumption.

Measure 10: **Increase Tree Cover: Increase tree cover of structures and other improvements in the City through implementation of the City's Urban Forestry Plan, including updated landscaping requirements to ensure strategic placement of plantings to shade east and west walls of structures.**	
2020 GHG Reductions:	1,945 MT CO2e
2035 GHG Reductions:	2,175 MT CO2e
Responsible City Department:	Community Development
Supporting Departments or Agencies:	Public Works, Parks
Time Frame for Initiation:	Ongoing
Cost to City:	Low to initiate
Funding Source(s):	General Fund

Program Description

This reduction measure calls for more rigorous tree planting requirements for new development. Such strategic planting in development projects will shade structures, lower on-site temperatures, and effectively reduce energy demands. To be most effective, the City should coordinate with local and regional plant experts in selecting tree species that respect the natural region in which Novato is

located, to help create a healthier, more sustainable urban forest, and adopt a Native Tree Preservation and Mitigation Ordinance.

Trees reduce greenhouse gas emissions by naturally sequestering carbon dioxide and creating more oxygen. Additionally, the shade from trees helps minimize or prevent the urban heat island effect, a condition where urban surface and air temperatures are higher than rural surrounding areas due to development patterns.[12] The urban heat island effect can have a significant impact on local air temperatures and long-term climate patterns. Air temperature differences of approximately 3.6 to 7.2 degrees Fahrenheit have been observed for urban neighborhoods of contrasting tree cover, averaging approximately 1.8 degrees Fahrenheit per 10% canopy cover.[13]

Recommended Approach for Implementation

This measure will be implemented by updating the City's Zoning Code and requiring appropriate tree planting during project review for those projects meeting certain thresholds. This reduction measure can be implemented as part of the next Zoning Code update. To update the Zoning Code with shading requirements will take approximately 36 hours of staff time, which is equivalent to $1,800 to $3,600.

Co-Benefits

In addition to reducing energy demands, greening of the urban environment extends the life of paved surfaces, improves water quality from trapping runoff, and sequesters Carbon. Tree planting has also been show to increase traffic safety, improve area aesthetics, increase real estate values, and have other sociological benefits.

[12] U.S. Environmental Protection Agency, "Heat Island Effect." http://www.epa.gov/hiri/about/index.html. Accessed Oct 12, 2008.

[13] Scott, Simpson, and McPherson. "Effects of Tree Cover on Parking Lot Microclimate and Vehicle Emissions." Journal of Arboriculture 24(3): May 1999, 129.

GOAL 4 WATER CONSERVATION

Reduce emissions from water and wastewater sources by increasing water conservation.

Measure 11: Water Conservation: Conserve water through improved efficiency.	
2020 GHG Reductions:	18 MT CO2e
2035 GHG Reductions:	21 MT CO2e
Responsible City Department:	Public Works
Supporting Departments or Agencies:	Community Development
Time Frame for Initiation:	Short – Medium
Cost to City:	Low
Funding Source(s):	General Fund

PROGRAM DESCRIPTION

This measure relies on statewide averages in order to quantify the energy reductions that would result from conserved water use. The California Energy Commission estimates all total possible reductions for water use, including local programs and water conservation efforts. Once additional data specific to the City of Novato becomes available that associates local community-wide water use to energy consumption, these quantifications can be refined to analyze possible energy reductions that may result from local decreases in water use.

One example of a local water reduction program that is captured in the statewide averages and quantified below is the planned North San Pablo Bay Restoration and Reuse Project. Planned for completion by 2012, this project will supply urban water users and specific municipal facilities in Novato with recycled water, decreasing the use of potable water. While this project will impact both community-wide water use and municipal water use (addressed in Measure 12), additional information would be needed to disaggregate the project's impact on public and private water use. Under the base project scenario, it has the potential to reduce community-wide use in Novato by 542 acre-feet per year, an approximate reduction of 2% of water use in the target years. Under the fully connected system scenario, it could reduce community-wide water use in Novato by approximately 13%. This would likely propel the City forward in achieving higher reductions than are estimated here. Once the project is finalized, this measure should be revisited and revised to take full credit and incorporate any new, additional data specific to the City.

RECOMMENDED APPROACH FOR IMPLEMENTATION

Existing sustainable landscaping requirements in Zoning Code Section 19.28.040 identify water conservation standards for irrigation, plant selection and grouping, water-efficient landscape criteria, and water runoff policies. The City should continue to implement these policies but will have to supplement them with additional actions.

Additional actions that comprise the body of the measure include the following. These actions would require additional ordinances or actions by the City. The costs of implementation will vary depending on which activities the City chooses to implement.

- Recycled water: Require dual plumbing for use of recycled water for new commercial and residential developments.
- Water conservation measures for existing development: Encourage and facilitate the installation of water conservation measures in existing businesses and homes by updating the Municipal Code.
- Partner with the Novato Sanitary District to expand outreach and education efforts and reduce hurdles to implementation.
- Sustainable landscape standards: Update and continue to implement sustainable landscaping standards for civic, commercial, and residential development to reduce water consumption, including restricted watering methods, and control runoff. This will initially include assessment of the State Model Water Efficient Landscape Ordinance established by AB 1881 and deliberation on alternative standards required to supplement existing provisions in Section 19.28.040 of the Zoning Code. The City must either adopt the State Model Water Efficient Landscape Ordinance or develop an ordinance to fit local conditions by January 1, 2010 (as established by Assembly Bill 1881, Laird). The City should consider creating new thresholds to apply landscape standards to existing development and should consider requiring that certain developments water landscaping only with recycled water.
- Amend the Building Code to incorporate the North Marin Water District's water conservation requirements.
- Outdoor water use: Restrict the use of water for cleaning outdoor surfaces and vehicles.
- Coordinate with the North Marin Water District to benefit from the availability of their annual GHG tracking and Long Range Water Conservation Master Plan.
- Create a separate business license category for Landscapers and Landscape Maintenance companies, requiring these businesses to have a certified/qualified water efficiency employee to qualify for the business license.

CO-BENEFITS

With increased water efficiencies, not only will total kWh for transport of water be decreased, but the community's water supply will be more greatly protected and preserved for future needs. Results from this measure are assumed to result from increased water efficiency community wide and decreased overall water use, and do not include upgrades to infrastructure.

GOAL 4 WATER CONSERVATION

Reduce emissions from water and wastewater sources by increasing water conservation.

Measure 12: **Municipal Water Use: Implement programs to reduce the use of potable water in municipal facilities.**	
2020 GHG Reductions:	1 Metric Ton CO2e
2035 GHG Reductions:	1 Metric Ton CO2e
Responsible City Department:	Public Works
Supporting Departments or Agencies:	TBD
Time Frame for Initiation:	Ongoing
Cost to City:	Minimal (ongoing maintenance) TBD (larger-scale recycled water projects)
Funding Source(s):	General Fund (ongoing maintenance) TBD (larger-scale recycled water projects)

Program Description

The City uses a significant amount of energy to water its parks and other open spaces. By working to orient municipal operations so that they are water-efficient and conducive to the use of recycled water, the City will be achieving energy savings.

Recommended Approach for Implementation

This measure will be achieved through a combination of proactive investigation and modification of standard upgrades and practice.

- Recycled water: Use recycled water for agency facilities and operations, including parks and medians where appropriate. While City facilities are planned to benefit from the San Pablo Bay Restoration and Reuse Project by increased use of recycled water, the City should continue to investigate additional opportunities for use of recycled water.

- Water conserving plumbing and irrigation systems: Maintain existing plumbing fixtures and irrigation systems to minimize water use and upgrade with water-conserving technology upon replacement to improve water efficiency by 20% above the California Building Standards Code water efficiency standards.

Co-Benefits

With increased water efficiencies, not only will total kWh for transport of water be decreased, but the community's water supply will be more greatly protected and preserved for future needs. The water efficiencies associated with this measure are assumed attributable to infrastructure upgrades.

GOAL 5 VEHICLE EFFICIENCY AND ALTERNATIVE FUELS

Reduce emissions from transportation sources by promoting use of alternative fuels and efficient use of traditional automobiles.

Measure 13: Vehicle Idling: Improve traffic flow and reduce VMT within the City.	
2020 GHG Reductions:	3,262 MT CO2e
2035 GHG Reductions:	4,068 MT CO2e
Responsible City Department:	Public Works
Supporting Departments or Agencies:	TBD
Time Frame for Initiation:	TBD
Cost to City:	TBD
Funding Source(s):	TBD

Program Description

Vehicle idling produces emissions. Therefore, by reducing the amount of vehicle idling through the more efficient flow of vehicles, the City will achieve significant reductions in emissions.

Recommended Approach for Implementation

The goal of this measure is to reduce GHG emissions from transportation sources by improving traffic flow through:

- Implementation of traffic flow management techniques, including signal synchronization, evaluation of transit and emergency signal priority, and other techniques. These measures require additional investigation by the City and an assessment of what can be feasibly implemented. Varying costs will be associated with each action.
- Implementing vehicle idling limitations for commercial and construction vehicles and buses beyond state law. City code currently limits the idling time of fleet diesel trucks to no more than 5 minutes and is consistent with state law. Through an amendment, the City can create a more stringent standard.

Co-Benefits

In addition to limiting fuel use, improving traffic flow will reduced time and costs associated with travel.

GOAL 5 VEHICLE EFFICIENCY AND ALTERNATIVE FUELS

Reduce emissions from transportation sources by promoting use of alternative fuels and efficient use of traditional automobiles.

Measure 14: Vehicle Trips: Facilitate programs aimed at reducing vehicle trips.	
2020 GHG Reductions:	1,269 MT CO2e
2035 GHG Reductions:	1,489 MT CO2e
Responsible City Department:	Public Works
Supporting Departments or Agencies:	TBD
Time Frame for Initiation:	Medium
Cost to City:	TBD (ride-share program) Minimal ($1,800–$3,600 for car-share program)
Funding Source(s):	Grants General Fund

PROGRAM DESCRIPTION

This measure reduces car trips in the City through a two-pronged approach of ride-share and car-share programs.

Although less traditional than ride-share programs, car-share programs can be equally effective. Car-sharing programs like City Car Share in San Francisco, Oakland, El Cerrito, and Berkeley allow participants to reserve vehicles online for a low hourly rate. Although users are still utilizing personal vehicles, it has been found that car sharing has a major impact on the travel behavior of its members by reducing the number and length of trips. Once members give up their personal cars, the car is no longer the default mode of travel and is therefore used less than a personally owned vehicle. Additionally, car-share vehicles are often newer, more efficient models or hybrid vehicles. There has been a documented link between car-share programs and decreased vehicle miles traveled (VMT). In San Francisco, car-share members' daily VMT (weekday/workday) fell from 2.80 to 1.49 miles while the VMT of the control group of non-members rose from 5.45 to 20.85. These figures refer to second-year impacts; first-year impacts showed a net increase in VMT.[14]

RECOMMENDED APPROACH FOR IMPLEMENTATION

The following actions should be implemented to achieve this measure:

- Partnership with Rideshare 511 and major employers to create ride-share programs, preferential parking, and shuttle services to public transit connections. To accomplish this, the City will need to research existing efforts and ways to achieve synergy and combined momentum in developing an appropriately scaled and targeted program. Toward this end, the

[14] Cervero, Robert and Tsai, Yu-Hsin (2003). San Francisco City CarShare: TravelDemand Trends and Second-Year Impacts. University of California at Berkeley, Institute of Urban and Regional Development. Working Paper 2003–05.

City could conduct a study to investigate which demographics have the least other transit options and target them accordingly.

- Facilitate development of a citywide car-share program through the Car Share organization. It is estimated that initial setup and coordination between City staff and the Car Share organization will cost 36 hours of staff time, or $1,800 to $3,600.

Co-Benefits

By providing alternative forms of transit for residents and workers, the City will provide more affordable and effective transit options that eliminate the need for a car. These options can provide significant cost savings to program participants.

GOAL 5 VEHICLE EFFICIENCY AND ALTERNATIVE FUELS

Reduce emissions from transportation sources by promoting use of alternative fuels and efficient use of traditional automobiles.

Measure 15: **Low Emission Vehicle Infrastructure: Improve infrastructure for low emission vehicles.**	
2020 GHG Reductions:	582 MT CO2e
2035 GHG Reductions:	1,163 MT CO2e
Responsible City Department:	Community Development
Supporting Departments or Agencies:	Public Works Transportation Authority of Marin Marin Climate and Energy Partnership
Time Frame for Initiation:	TBD
Cost to City:	TBD
Funding Source(s):	TBD

Program Description

Electric vehicles (EV) are much more efficient than standard internal combustion engine vehicles. The performance of this measure is related to the replacement of standard vehicles with EVs once the necessary infrastructure is available. The literature supports the fuel use reduction equivalent to one 10-mile trip for every charging station available. The energy use needed to service the charging stations was then calculated to discount the emissions reductions.

Recommended Approach for Implementation

In order to encourage vehicles with low emissions, the City must provide supportive infrastructure. Such vehicles require special infrastructure (such as plug-in stations) that are not currently provided by existing services (e.g., gas stations). While the City requires the provision of EV facilities for specified development projects, in order to fully implement this measure the City must expand its role through creative partnerships that take a concerted and comprehensive approach to encouraging EVs in the region.

The expansion of supportive infrastructure can be accomplished as follows:

- Low emission vehicle infrastructure: Work with the Transportation Authority of Marin and Marin Climate and Energy Partnership to develop infrastructure and facilities for low emission vehicles, including extended-range electric vehicles (EREV), plug-in hybrid electric vehicles (PHEVs), and all-battery electric vehicles (BEVs). This regional collaboration could leave to significant cost savings for the City, although involvement of external parties will mean that the City cannot establish with certainty a timeline or plan for investment until partnership opportunities and roles are more fully understood and established.

- Low emission vehicle facilities: Require new/modified commercial and civic developments to provide charging facilities for low emission vehicles (Level 3, Hi Power) when appropriate. Currently, Zoning Code Section 19.30.120 requires nonresidential developments over 50,000 GFA to provide low emission vehicle facilities as part of a preferential parking requirement. This is an important first step, but it is not enough along to encourage the use of EVs. Through subsequent Zoning Code updates, the City should investigate requiring additional new/modified commercial and civic developments to provide charging facilities.

- Electric vehicle adoption campaign: The City should investigate partnership opportunities to support a local electric vehicle adoption campaign, most likely in conjunction with regional provision of low emission vehicle infrastructure. The City should also investigate the possibility of incorporating the efforts of other private organizations such as Sustainable Novato.

GOAL 5 VEHICLE EFFICIENCY AND ALTERNATIVE FUELS

Reduce emissions from transportation sources by promoting use of alternative fuels and efficient use of traditional automobiles.

Measure 16: **City Low Emission Vehicles: Increase the use of alternative fuel vehicles to reduce vehicle GHG emissions.**	
2020 GHG Reductions:	214 MT CO2e
2035 GHG Reductions:	427 MT CO2e
Responsible City Department:	Public Works
Supporting Departments or Agencies:	City Manager's Office
Time Frame for Initiation:	Ongoing
Cost to City:	Medium (over time)
Funding Source(s):	Energy Efficiency and Conservation Block Grant Allocated Departmental Funds for Standard Vehicle Replacement

Program Description

This measure quantifies hybrid and electric replacements for 50% of City vehicles in the Public Works Department. Police Department vehicles and motorcycles are excluded from this analysis, as they are required to maintain pursuit capabilities, an option currently not available in hybrid vehicles. There is also low feasibility of installing a diesel fueling facility to run biodiesel or a compressed natural gas fueling site; therefore these alternative fueling methods are not accounted for. The measure gives the City credit for all alternative vehicle replacements made to date (six hybrids and three electrical vehicles since 2005).

Recommended Approach for Implementation

The City budget is currently structured so that each department sets aside funds based on a vehicle replacement schedule. City vehicles are currently purchased through the state bid procurement process provided by the Department of General Services, which provides vehicles at discounted rates to jurisdictions. While prices of hybrids and standard vehicles fluctuate, estimates of likely costs for vehicle replacements and hybrid upgrades are provided below based on all City vehicles scheduled for replacement through the 2010–2011 Fiscal Year. The chart shows the difference in cost for standard vehicle replacement (which the City is responsible for budgeting) and hybrid vehicle replacement (the additional amount the City would have to obtain), but it is provided for estimate purposes only, as prices are likely to change. All costs cited below are quoted from the current State of California Department of General Services bid or the 2009–2010 City budget.

Table 4-Estimates of Costs for Hybrid Replacement through the 2010–2011 Fiscal Year

Unit No.	Vehicle Description	Department	Amount for Standard Vehicle Replacement	Source of Cost for Vehicle Replacement	Cost for Hybrid Replacement	Difference between Standard and Hybrid Replacement
158	1999 Dodge Pickup Br 2500	Street Maintenance	$32,833	2009–2010 City budget	$34,890	$2,057
161	1999 Sonoma Mini-Pickup	Building Maintenance	$20,399	2009–2010 City budget	$34,890	$14,491
348	2004 Dodge Dakota Pickup (350NR)	Code Enforcement	$15,616	2009 state contract for Dodge Dakota	$34,890	$19,274
349	2004 Dodge Dakota Pickup (351NR)	Code Enforcement	$15,616	2009 state contract for Dodge Dakota	$34,890	$19,274
346	1999 Chevy Sonoma Pickup	Private Projects/ Engineering	$17,965	2009 state contract for 2WD Chevy Silverado (closest equivalent)	$34,890	$16,925

The City has direct control over vehicles used for municipal operations and can achieve this measure by continuing to implement the same rate of vehicle replacement with hybrids and providing infrastructure as follows:

- Vehicle fleet: Continue to convert the City's vehicle fleet to hybrid, electric, and alternative fuel vehicles at a rate of approximately 2 vehicles each year to achieve a total of 15 hybrid vehicle upgrades by 2020 and 30 hybrid vehicle upgrades by 2035. Since the City has 9 vehicle replacements complete or identified, it has to purchase 4 more hybrid upgrades by 2015 and an additional 19 upgrades by 2030. Tentative cost estimates for the difference between standard and hybrid vehicle replacement are provided above.

- Clean diesel: Continue installation of diesel oxidation catalysts on the diesel-powered vehicles and equipment as required by state law. The City should investigate new diesel fueling technologies and new diesel vehicles as information becomes available to determine whether any new opportunities are available for expanding the scope of upgrading vehicles to cleaner, alternative diesel fuels.

CO-BENEFITS

Hybrid and other alternative fuel vehicles have a lower operating cost than conventional vehicles.

GOAL 6 CITYWIDE LAND USE AND DESIGN

Reduce emissions by decreasing vehicle miles traveled (VMT) within the City through strategic land use and design.

Measure 17: Require mixed-use, infill development at higher densities to ensure the provision of a mix of housing, employment, and commercial services within the community.	
2020 GHG Reductions:	1,245 MT CO2e
2035 GHG Reductions:	3,585 MT CO2e
Responsible City Department:	Community Development
Supporting Departments or Agencies:	TBD
Time Frame for Initiation:	Ongoing
Cost to City:	Low
Funding Source(s):	General Fund

PROGRAM DESCRIPTION

This measure quantifies the VMT that will occur with increased densities of mixed use. The measure assumes that increased densities of mixed use will increase use of alternative travel modes and reduce the use of automobiles.

Under this measure, areas of the City would be identified as viable for higher densities and mixed use. These could be areas that have little neighborhood-serving retail like laundromats, corner markets, and

coffee shops, or they could be areas in need of revitalization. The City might also consider the balance of jobs to housing by increasing densities near commercial centers.

Recommended Approach for Implementation

The City should implement a comprehensive approach for incentivizing and achieving mixed-use development. Not only does the City need to evaluate zoning regulations and incentives, but it also needs to equip the private sector and educate the public about the benefits of mixed use. Only when all sectors of the community are involved will the City successfully achieve its target.

Following completion of the General Plan Update and subsequent modifications of the Zoning Code and other development regulations for implementation of the new General Plan policies and directives, the City should initiate implementation of this measure. It is likely that General Plan directives will necessitate implementation of this measure regardless.

City staff estimates that writing mixed-use, infill, and higher-density code revisions will consume approximately 90 hours of staff time (equivalent to $4,500 to $9,000, depending on pay rate). It is important to note that these hours can be spent in conjunction with other code revision efforts following the General Plan Update.

Accomplishing this measure will consist of the following:

- Assessing the City's land use mix: Reevaluate land use types and mixes to ensure residents' needs are met within the City. This will likely build on or largely utilize work conducted as part of the General Plan Update, such as the North Redwood Boulevard Planning Study. However, completion of this measure will require interpreting all such available information in light of reductions to VMT.

- Neighborhood-serving commercial services: Provide for neighborhood-serving commercial services within 3 miles of all residential uses to decrease the need for single-occupancy vehicles.

- Mixed-use, high-density, and infill development: Encourage the development of mixed-use, high-density, infill development near transit and amenities. As part of subsequent updates to encourage mixed use, the City should consider appropriate incentives for mixed-use development such as streamlined permit application procedures, increased densities, or some other form of incentive.

- Detached single-family residences: Continue to support the Urban Growth Boundary by reducing the number of single-lot/single-family detached residences. This will have to be coordinated with and directed by the General Plan Update but is essential to encourage the development of mixed uses.

Co-Benefits

In addition to GHG reductions, mixed-use redevelopment promotes a variety of densities and housing types, improves the livability of the community by providing amenities in close proximity to residences, and improves air quality by reducing the number of trips necessary to provide for basic household needs.

GOAL 6 CITYWIDE LAND USE AND DESIGN

Reduce emissions by decreasing vehicle miles traveled (VMT) within the City through strategic land use and design.

Measure 18: **Jobs/Housing Balance: Attract a variety of employment opportunities, including higher-paying jobs, for those who live, or are likely to live, in the community.**	
2020 GHG Reductions:	28,665 MT CO2e
2035 GHG Reductions:	37,067 MT CO2e
Responsible City Department:	Community Development, Redevelopment Agency
Supporting Departments or Agencies:	City Manager's Office
Time Frame for Initiation:	Ongoing
Cost to City:	Low
Funding Source(s):	General Fund, Redevelopment funds

Program Description

This measure quantifies the impact of the close proximity of jobs and housing and shows the result of the City achieving an ideal ratio of 1.5 jobs per each household. This ratio will lead to a decrease in VMT, while the number of households and jobs within the City increases. Many residents currently have to drive in order to access employment opportunities. By working to improve the jobs/housing balance within the community, the City will ensure that jobs and housing are provided in close proximity and decrease the need for residents to drive for work, thus decreasing the VMT generated by the community. ABAG's 2009 Projections were utilized to estimate household and job growth in Novato.

Recommended Approach for Implementation

The City will achieve maximum reductions in energy by facilitating vertical mixed use in single buildings with a floor area ratio of 1.5 or greater. For detached buildings within a single site, all buildings should be placed within ¼ mile of the geographic center of the project site. This should be accomplished in conjunction with the update called for in Measure 17 subsequent to the General Plan Update.

GOAL 6 CITYWIDE LAND USE AND DESIGN

Reduce emissions by decreasing vehicle miles traveled (VMT) within the City through strategic land use and design.

Measure 19: Affordable Housing: Continue support of affordable housing ordinance and programs.	
2020 GHG Reductions:	1,401 MT CO2e
2035 GHG Reductions:	1,674 MT CO2e
Responsible City Department:	Community Development, Redevelopment Agency
Supporting Departments or Agencies:	TBD
Time Frame for Initiation:	Ongoing
Cost to City:	Low
Funding Source(s):	General Fund, Redevelopment funds

Program Description

This program relies on the provision and retention of below market rate (BMR) units. Currently, the City has a BMR program administered by the Affordable Housing Program. Units in the program are sold below the market-rate value of the unit. Upon the purchase of such a unit, it is an owner-occupied unit (not rented out to a third party). Most of the City's BMR units are in the Meadow Park at Hamilton development. A mix of BMR and market-rate units has been proven to reduce vehicle miles traveled. Low-income and senior citizens are much more likely to walk or bike to their destination, which can produce similar behavior in neighbors.

Recommended Approach for Implementation

This measure was based on 2009 Regional Housing Needs Allocation (RHNA) figures for the City of Novato, which mandate the number of housing units the City is responsible for providing for all income categories through zoning and other regulations. The 2009 RHNA requires that the City increase the number of BMR units from 7% of all units (the percentage in 2009) to 10% by 2014.

By implementing the RHNA, the City will also be implementing this measure. The reductions in VMT projected by this measure will result when the City has provided the number of BMR units required by the RHNA (10% of all total units in 2020 and 2035). Since the RHNA will have to be updated again prior to 2020, any new BMR units the City is required to provide beyond 10% before the target years will propel it beyond the reductions projected for this measure.

In addition to allowing for this number of BMR units through zoning, the City will directly help to encourage the purchase of BMR units through its BMR program. This is an ongoing program of the City, and no new action is required to complete this measure. Through the program, the City directly contributes funds to both develop affordable housing and help private developers to do so.

GOAL 6 CITYWIDE LAND USE AND DESIGN

Reduce emissions by decreasing vehicle miles traveled (VMT) within the City through strategic land use and design.

Measure 20: **Pedestrian Convenience: Promote walking through design standards and amenities that concentrate uses, reduce the need for vehicular travel, and enhance the pedestrian experience.**	
2020 GHG Reductions:	1,295 MT CO2e
2035 GHG Reductions:	3,689 MT CO2e
Responsible City Department:	Community Development
Supporting Departments or Agencies:	TBD
Time Frame for Initiation:	Ongoing
Cost to City:	Low to Medium
Funding Source(s):	General Fund (creation of standards) Entitlement fees (ongoing implementation)

PROGRAM DESCRIPTION

This measure recognizes that reduced vehicle trips will be achieved by providing integrated communities with all the needs for daily living accessible without a vehicle. There are many design and policy methods to promote pedestrian and bicycle travel, including increased tree planting, median landscaping, clearly dedicated crosswalks (painted or paved differently), and countdown-style crossing signals. All of these methods promote enhanced aesthetics, reduced vehicle speeds, and safer pedestrian and bicycle environments.

The CCAP guidebook attributes emissions reductions for a variety of pedestrian measures. Applicable measures include a 0.5% reduction for connectivity to transit, as the increased density and ridership will facilitate improvement in transit frequency, a 1.5% reduction for measures which relegate parking to the rear of structures so that public entrances are oriented toward the pedestrian, a 0.5% reduction related to providing shaded pedestrian pathways between transit facilities and building entrances to increase the comfort of the user while walking to the building entrance, and a 1% reduction for minimizing barriers to pedestrian access of neighboring facilities and sites.

RECOMMENDED APPROACH FOR IMPLEMENTATION

The City will need to update regulations within the Zoning Code to implement this measure. This can be accomplished subsequent to the General Plan Update and will likely help to implement the General Plan. Updated regulations should accomplish the following:

- Ensure that applications for new office and mixed-use development analyze the project's connection and orientation to pedestrian paths, bicycle paths, and existing transit stops within 1/2 mile of the project site. Projects must be oriented toward an existing transit, bicycle, or pedestrian corridor with minimum setbacks. An option available to the City could be to make

this a required condition of approval for all new, large-scale developments and to require that connections be made to all transit facilities internal or adjacent to the project site. It is estimated that establishing this condition of approval would add an additional 4 hours per plan check, or $200 to $400, a cost to be absorbed by the project applicant.

- Require applications for new office and mixed-use development in downtown areas to minimize setbacks from the street and provide pedestrian pathways. Primary entrances shall be located on street frontage, with the parking lot designed to include clearly marked and shaded pedestrian pathways between transit facilities and building entrances.

- Encourage pedestrian-oriented plazas, walkways, bike trails, bike lanes, and street furniture within the Civic Center area and connections to other community areas. This may be accomplished through an additional layer of design regulations specific to the Civic Center (e.g., an overlay zoning district).

- Pedestrian convenience: Promote pedestrian convenience and recreational opportunities through development conditions requiring sidewalks, walking paths, or hiking trails connecting various land uses and including safety amenities such as lighting and signage.

CO-BENEFITS

In addition to GHG reductions, the measure also promotes cohesive communities and small local businesses. It facilitates a higher quality of life that is more easily accessible and will lead to a healthier and more active lifestyle for residents.

GOAL 7 ALTERNATIVE TRANSPORTATION MODES

Reduce emissions from transportation sources through promotion of non-vehicular modes of travel.

Measure 21: **Nonresidential Bicycle Facilities: Increase bicycle-parking requirements for new and significantly retrofitted nonresidential projects to a minimum rate of 1:20 vehicle spaces. Bicycle parking shall be divided between short-term facilities (bike racks) and long-term facilities (bike lockers or other covered facilities). Continue implementing requirements for showers, lockers, and changing space in all large nonresidential facilities.**	
2020 GHG Reductions:	5,252 MT CO2e
2035 GHG Reductions:	22,012 MT CO2e
Responsible City Department:	Community Development
Supporting Departments or Agencies:	TBD
Time Frame for Initiation:	Ongoing
Cost to City:	Low
Funding Source(s):	General Fund (creation of standards) Entitlement fees (ongoing implementation)

PROGRAM DESCRIPTION

This measure calls for expanding existing regulations to ensure a higher provision of bicycle parking in commercial uses. Providing adequate bike parking facilitates for commercial uses facilitates the increased reliance on travel by bike rather than by vehicle. This measure relies on the reduction in VMT that results from sufficient bike parking.

RECOMMENDED APPROACH FOR IMPLEMENTATION

Sections 19.30.090–120 of the Zoning Code establish residential and nonresidential bicycle parking and end–of-trip facility requirements, in addition to requirements for nonresidential end-of-trip facilities with bicycle and pedestrian access. These regulations will have to be updated as follows:

- The Zoning Code requires retail uses to provide a ratio of 1 bike parking space per every 20 vehicle parking spaces. This requirement needs to be increased to 1:10.
- The City can continue implementing end-of-trip facility requirements for nonresidential developments over 100,000 square feet gross floor area. No modification to the regulations is needed.
- The City may also consider providing incentives for bicycle parking in conjunction with other measures, such as providing reduced parking requirements through the Zoning Code (Measure 24) for projects that provide a certain threshold of bicycle parking.

Co-Benefits

In addition to GHG reductions, the measure promotes a healthful lifestyle and reduced commuting costs for individuals. The measure also alleviates traffic congestion and improves local air quality.

GOAL 7 ALTERNATIVE TRANSPORTATION MODES

Reduce emissions from transportation sources through promotion of non-vehicular modes of travel.

Measure 22:

Multi-Family Bicycle Parking: Increase bicycle-parking requirements for new multi-family residential construction. Short-term facilities shall be provided at a minimum rate equal to 10% of vehicle spaces. Long-term facilities shall be provided at a ratio of one long-term bicycle parking space for every unit. Long-term facilities shall consist of one of the following: a bicycle locker, a locked room with standard racks and access limited to bicyclists only, a standard rack in a location that is protected from the elements and monitored by video surveillance 24 hours per day. Alternatively, spaces may be provided in designated space within the units' garage/carport.

2020 GHG Reductions:	18 MT CO2e
2035 GHG Reductions:	45 MT CO2e
Responsible City Department:	Community Development
Supporting Departments or Agencies:	TBD
Time Frame for Initiation:	Ongoing
Cost to City:	Low
Funding Source(s):	General Fund (creation of standards) Entitlement fees (ongoing implementation)

Program Description

This measure calls for expanding existing regulations to ensure a higher provision of bicycle parking in multi-family uses. By providing sufficient bike parking for multi-family uses, bike travel will account for a greater proportion of all multi-family trips from the home.

In addition to relying on higher requirements for bicycle parking, this measure relies on the assumption that multi-family households in Novato will expand from 25% of all households (currently) to 30% in 2020 and 35% in 2035.

Recommended Approach for Implementation

Sections 19.30.090–120 of the Zoning Code establish residential and nonresidential bicycle parking requirements. These regulations should be updated in conjunction with the changes called for by Measure 21, subsequent to the General Plan Update and in conjunction with other updates called for by the General Plan. The costs for the updates required by this measure will be negligible when bundled with other updates in this manner.

- The Zoning Code requires multi-family residential uses to provide a ratio of 1 bike parking space per every 10 vehicle parking spaces. This requirement needs to be increased to 1:10 for short-term parking plus one space per each unit.

- The City may also consider providing incentives for bicycle parking in conjunction with other measures, such as providing reduced parking requirements through the Zoning Code (Measure 24) for projects that provide a certain threshold of bicycle parking.

Co-Benefits

In addition to GHG reductions, the measure promotes a healthful lifestyle and reduced commuting costs for individuals. The measure also alleviates traffic congestion and improves local air quality.

GOAL 7 ALTERNATIVE TRANSPORTATION MODES

Reduce emissions from transportation sources through promotion of non-vehicular modes of travel.

Measure 23: **Complete Streets: Adopt "complete street" standards to facilitate multi-modal access for those trips that cannot be completed by walking alone.**	
2020 GHG Reductions:	806 MT CO2e
2035 GHG Reductions:	2,008 MT CO2e
Responsible City Department:	Community Development
Supporting Departments or Agencies:	Public Works
Time Frame for Initiation:	Long
Cost to City:	High
Funding Source(s):	General Fund, Fees, Loans, Grants

Program Description

Completion of this measure entails provision of additional bike lanes throughout the City. This reduction measure gives credit to the City for all existing bike lanes and is based on planned bike lane projects established in the City of Novato 2007 Bike Plan.

This measure recognizes that many trips are not possible on foot alone and aims to replace the use of the vehicle as the first alternative in such instances. By providing adequate infrastructure for bike travel, increased use of bikes will be encouraged and total VMT reduced. Research has shown that each additional mile of bikeway provided per 100,000 residents will increase bicycle commuting 0.075%, all else being equal.[15]

Recommended Approach for Implementation

The City will complete this measure primarily through implementation of the City of Novato 2007 Bike Plan. Implementation of this plan will specifically entail the following:

[15] Nelson and Allen, 1997.

- By 2020 provide
  - 0.985 miles of new Class I bike lanes (completely separated from vehicular traffic)
  - 2.99 miles of new Class II bike lanes (a designated lane for bike traffic on City streets, not separated from vehicular traffic)
  - 1.675 miles of new Class III bike lanes (City streets without designated bike lanes that are safe enough for bike use)
- By 2030 provide
  - 1.97 miles of new Class I bike lanes
  - 5.98 miles of new Class II bike lanes
  - 3.35 miles of new Class III bike lanes

Complete streets will also be achieved through other design and infrastructure improvements that will require updates to the City's Zoning Code and other portions of the Municipal Code. Such updates should occur after the General Plan Update and be addressed with other new topics called for by the General Plan. The costs for integrating these updates with others required by the General Plan will be minimal.

New standards that the City should incorporate into its regulations include:

- Pedestrian and bicycle design standards: Develop and implement comprehensive pedestrian and bicycle design standards that require streets to provide for a safe and convenient system of bicycle routes and pedestrian ways, including sidewalks, walking paths, or other connections, with safety amenities such as lighting and signage.
- Requirement for complementary bicycle infrastructure and facilities: Expand City improvement standards to require bicycle infrastructure and facilities, such as bicycle stoplight sensors, bicycle lanes and paths, etc.
- North-south bicycle path: Develop a north-south bicycle path through the City.

CO-BENEFITS

In addition to GHG reductions, the measure promotes a healthful lifestyle and reduced commuting costs for individuals. The measure also alleviates traffic congestion and improves local air quality.

GOAL 7 ALTERNATIVE TRANSPORTATION MODES

Reduce emissions from transportation sources through promotion of non-vehicular modes of travel.

Measure 24: **Parking Standards: Revise parking standards to disincentivize single-occupant vehicles and promote non-vehicular travel for developments in commercial, multi-unit residential, or mixed-use developments near transit. Account for design elements that promote non-vehicular travel such as proximity to transit, proximity to employment centers, bicycle facilities, and location near transit.**	
2020 GHG Reductions:	10,248 MT CO2e
2035 GHG Reductions:	12,250 MT CO2e
Responsible City Department:	Community Development
Supporting Departments or Agencies:	Public Works
Time Frame for Initiation:	Short term
Cost to City:	Low
Funding Source(s):	General Fund

Program Description

This measure calls for creation of cost-based pricing for parking in order to discourage single-occupant vehicle use, in conjunction with other strategies. Cost-based pricing is the primary strategy that will achieve significant reductions in vehicular use. This term refers to pricing parking at a rate in order to recover the full cost of parking facilities and typically reduces parking demand 10–30% compared with unpriced parking.[16]

Easily accessible parking has been shown to encourage the use of the vehicle. This measure thus reduces the ease and accessibility of parking while expanding opportunities for alternative transit. Together, this coordinated approach will disincentivize the use of single-occupant vehicles and reduce total VMT.

Recommended Approach for Implementation

To achieve the reductions of this measure, the City needs to implement cost-based parking pricing. The City will have to investigate the most appropriate method to implement this program. Achievement of the measure is based on an assumption that cost-based pricing would affect 10% of all local trips. Pursuit of this measure should be addressed in the General Plan Update through the Circulation Element. Alternatively, the City should utilize the most up-to-date data available for the Circulation Element in the General Plan Update to determine an appropriate strategy that will ensure cost-based pricing will affect at least 10% of all local trips. In the immediate time frame, the City can start by implementing cost-based parking pricing on all City-owned parking lots for public use.

The Zoning Code currently provides restrictions on parking, yet this measure requires additional regulations that surpass those currently in existence. Existing standards include parking requirements

[16] Shoup, 2005.

established in Zoning Code Section 19.30.040, parking maximums and available parking reductions and traffic demand management in Section 19.30.120, and provisions allowing for shared parking or the demonstration of reduced parking needs

In order to achieve additional reductions beyond those projected for this measure, the City should complement cost-based parking pricing with the other additional strategies that can be accomplished with revisions to the Zoning Code and other City programs after the General Plan Update. Through this approach, the following revisions will pose minimal costs.

- Create streamlined regulations in the Zoning Code that establish special exemptions for parking. Such exemptions would allow a project to build less than the required amount of parking if it provides other design elements that reduce the need for automobile use, such as shaded transit stops. These exemptions should be by-right allowances not requiring special approval once certain criteria are satisfied (special approval is required by the existing Zoning Code).

- New zoning regulations should require the provision of preferential parking in public and private developments for alternative-fuel vehicles, carpools, and vanpools. This strategy would be addressed in a manner similar to the requirement for provision and distribution of compact or handicapped parking spots.

CO-BENEFITS

In addition to GHG reductions, the measure promotes a healthful lifestyle and reduced commuting costs for individuals. The measure also alleviates traffic congestion and improves local air quality.

GOAL 7 ALTERNATIVE TRANSPORTATION MODES

Reduce emissions from transportation sources through promotion of non-vehicular modes of travel.

Measure 25: **Public Transit: Work with transit providers to plan, fund, and implement additional transit services that are cost-effective and responsive to existing and future transit demand.**	
2020 GHG Reductions:	242 MT CO2e
2035 GHG Reductions:	362 MT CO2e
Responsible City Department:	Community Development, Public Works
Supporting Departments or Agencies:	TBD
Time Frame for Initiation:	Ongoing
Cost to City:	Low to high
Funding Source(s):	General Fund, Grants, Loans, Fees

PROGRAM DESCRIPTION

The City must take a proactive stance to implement a variety of transit programs throughout the City, including establishment of car-pooling and ride-share programs, expansion of existing transit services, and expansion of existing activities.

Many needs can only be met by a vehicle or provide greater efficiencies by vehicle – for instance, carpooling, school buses, and special ride-share options for handicapped populations. By encouraging and facilitating the special trips that benefit from vehicular use, this measure will reduce the need for single-occupant vehicles and combine trips, reducing total VMT.

Recommended Approach for Implementation

In order to implement this measure, the City needs to itemize this measure to be addressed in the General Plan Update. It requires a coordinated and comprehensive approach. The measure will be achieved by increasing the percentage of Novato residents who use transit—currently, only 8% of residents use transit for commuting. The following landmarks will implement this measure:

- By 2020, achieve a 30% increase in transit travel from existing levels.
- By 2050, achieve a 50% increase in transit travel from existing levels.

By addressing this measure as part of the General Plan Update, the costs to create an appropriate strategy will be minimal. However, the costs of implementing that strategy will vary depending on the final approach.

The General Plan Update will need to assess and consider appropriate ways to achieve these targets in transit ridership use, but some initial action projects to be considered include:

- School bus service: Work with the Novato Unified School District to restore or expand school bus service.
- Expand efforts to work with transit providers to include Sonoma Transit and any shuttles that are currently being used between Sonoma and Marin.
- Public transit incentives: Provide public transit incentives such as free or low-cost monthly transit passes.
- Shuttle service: Work with large employers to provide shuttle service to public transit.
- Improve security: Improve lighting and other security measures near public transit and park and ride lots.
- SMART stations: Maximize use of Metropolitan Transportation Commission grants to plan for SMART stations.
- Downtown SMART Whistle Stop: Include a downtown SMART Whistle Stop (request stop) at the existing station.
- Park and ride lots: Evaluate the need for additional park and ride lots.

Co-Benefits

With increased transit ridership opportunities, users of transit will benefit by realizing significant cost savings and a larger array of convenient transit options.

GOAL 7 ALTERNATIVE TRANSPORTATION MODES

Reduce emissions from transportation sources through promotion of non-vehicular modes of travel.

Measure 26: **Safe Routes to School: Collaborate with the Transportation Authority of Marin to expand Safe Routes to School programs, including a walking school bus program to provide a supervised, safe, and timely commuting alternative for children.**	
2020 GHG Reductions:	3 MT CO2e
2035 GHG Reductions:	3 MT CO2e
Responsible City Department:	Public Works
Supporting Departments or Agencies:	Parks, Recreation, and Community Services
Time Frame for Initiation:	Short
Cost to City:	Low to Medium
Funding Source(s):	Safe Routes to School program

Program Description

This measure actively promotes walking as a safe mode of local travel, particularly for children attending local schools. Waking is encouraged by employing traffic calming methods such as median landscaping and provision of bike or transit lanes to slow traffic, improving roadway capacity, and addressing safety issues.

According to the most recent census data (Census 2000), approximately 8,760 school-age children lived in Novato (ages 6–18). Until a few decades ago, most grade school students walked or bicycled to school. Now, only a small portion (typically about 20%) walk or bicycle to school in North American communities. Travel to school represents 10–15% of peak period motor vehicle trips in many urban areas. Chauffeuring children to school often results in two vehicle trips, one to the school and one returning home, or four additional trips per day. There are currently few detailed studies of the effectiveness of school transport management programs, but anecdotal evidence indicates that total reductions in automobile trips of 10–20% or more are possible at a particular school, and much greater reductions are possible when schools are sited and designed for good accessibility.

Recommended Approach for Implementation

Projected energy savings will result from a projected decrease in VMT for student commutes by 15%. The City needs to investigate the most appropriate methods to achieve this reduction. Each strategy will entail varying levels of staff effort and cost. Initial possibilities include:

- Creation of "walking buses" or "walk pools" to school. Parents would volunteer to meet students at select locations and chaperone them to school on a pre-established route. Such a program would have to be established in conjunction with designated schools.

- Conducting a cost-benefit study that provides a range of feasible alternatives for geographic areas in which to implement pedestrian and bicycle enhancements that would remove barriers for children to walk or bike to school.

- Provision of incentives for encouraging carpooling for students' trips to school. Incentives could include provision of a free pizza dinner and tickets to a local sports event for each participating family.

Co-Benefits

School transport management can provide financial savings to schools and parents, help reduce parking and traffic problems, reduce pollution, and provide safety and health benefits.

GOAL 7 ALTERNATIVE TRANSPORTATION MODES

Reduce emissions from transportation sources through promotion of non-vehicular modes of travel.

Measure 27: **Municipal Travel: Encourage employees to utilize alternative forms of transportation for commutes and work-related trips.**	
2020 GHG Reductions:	63 MT CO2e
2035 GHG Reductions:	66 MT CO2e
Responsible City Department:	TBD
Supporting Departments or Agencies:	TBD
Time Frame for Initiation:	Short – ongoing
Cost to City:	Medium
Funding Source(s):	General Fund, Grants

Program Description

The City can directly encourage employees to utilize alternative forms of transit by easing access to use or rewarding those who choose to use it. By providing these incentives and removing barriers to use of alternative transit, this will further lead to reductions in VMT.

Recommended Approach for Implementation

To implement this measure, the City needs to achieve a participation rate of 20% of City workers in a program that eliminates all work VMT. This translates into the following targets:

- In 2020, 47 City employee participants

- In 2030, 49 City employee participants

The City has already begun implementation of this measure through creation of two vanpools for municipal employees. One was started in 1997 and a second in 2008, eliminating approximately 50,000 annual VMT from 1997 to 2008 and 50,000 VMT from 2008 to 2009. In addition, all non-essential services on alternating Fridays have been closed. Further, the Police Department received a BAAQMD grant in 2005, using it to purchase 10 bicycles; however, at this time, no full-time staff have been assigned to these bicycles and they are infrequently used.

The City must assess existing programs, utilize existing resources, and establish an appropriate strategy to eliminate the need for vehicular travel for target employees. Costs will vary depending on the approach utilized. The City should start with the following actions.

- Assessment of the existing vanpool program, its potential for expansion with a growing work force, and projection of the number of employees it will serve.
- Assessment of the Police Department's bike fleet and exploration of how to utilize these bikes to meet VMT reduction targets. For example, the City may consider allocating the bikes for use by another department.
- Consideration of alternative programs to supplement existing programs and resources as needed. For example, the City may consider the following:
    - Trip Reduction Incentive Program (TRIP): Establish an incentive program for employees who voluntarily participate in alternative forms of transportation to and from work, including parking cash-out, or who participate by telecommuting and/or alternative work schedules, as appropriate. For instance, the City of San Luis Obispo has implemented a Trip Reduction Incentive Program (TRIP) in cooperation with San Luis Obispo County Rideshare that provides rewards and guaranteed rides home for commuters. The program has been highly successful, achieving a 20% participation rate from the city's employee workforce.
    - Expansion of the City's bicycle fleet: Provide fleet bicycles and encourage their use for short trips to meetings or site visits. The costs of such a program would be minimal and may be more appropriate for departments other than the Police Department that are less restricted by work demands and necessity of quick availability.

CO-BENEFITS

City employees will be providing a model to the community of responsible travel and will be attesting to the City's investment and pride in its alternative transit programs. The measure will also reduce the costs associated with vehicular travel for those employees participating in the program.

GOAL 8 WASTE

Reduce emissions from waste sources.

Measure 28: Zero Waste: Implement the adopted Zero Waste Resolution.	
2020 GHG Reductions:	8,877 MT CO2e
2035 GHG Reductions:	11,567 MT CO2e
Responsible City Department:	Public Works
Supporting Departments or Agencies:	TBD
Time Frame for Initiation:	Ongoing – phase in
Cost to City:	Medium
Funding Source(s):	General Fund, Fees, Grants

Program Description

This measure requires implementation of the City's zero waste goal. The Zero Waste International Alliance broadly defines zero waste as a philosophy and visionary goal that emulates natural cycles, where all outputs are simply an input for another process. Under a zero waste policy, everything would be recycled, minimal disposables would be allowed, and composting would be required. A zero waste policy would decrease the amount of waste sent to landfills, thus reducing the greenhouse gas emissions released from landfills. The majority of entities that have implemented zero waste policies at this time are large businesses. According to the Zero Waste Alliance, Hewlett Packard in Roseville, California, reduced its waste by 95% and saved $870,564 in 1998 through a zero waste policy. Interface, Inc. in Atlanta, Georgia, has eliminated over $90M in waste through a zero waste policy.[17]

Recommended Approach for Implementation

The City Council adopted a Citywide Zero Waste Goal in 2007 that directs the City to adopt zero waste as a long-term goal, with the benchmarks of an 80% landfill diversion rate by 2012 and zero waste by 2025. Completion of this measure requires the following:

- Achievement of a 95% landfill diversion rate by 2020
- Achievement of 100% landfill diversion rate by 2035

Further, in 2008 the City implemented an Environmental Procurement (Green Purchasing) Policy, which requires the purchase of printers that are duplex capable, use of at least 30% recycled paper, and purchase of gold-certified computers.

This measure will require the continued implementation of these existing efforts. However, to achieve community-wide zero waste, the City needs to implement a broader array of programs and actions. Implementation of the zero waste policy would require approximately 200 hours of staff time per year

[17] Zero Waste Alliance, http://www.zerowaste.org/case.htm#benefits, accessed Sept. 30, 2008.

for training, purchasing of receptacles, and coordinating with handlers, or approximately $10,000 to $20,000, depending on pay grade. The startup of the program may require additional time the first year. Such a program would likely include the following components:

- Construction and Demolition Ordinance: Adopt a more stringent Construction and Demolition Ordinance that mandates a reported 60% diversion (current standard is 50%).
- Composting and recycling: Require the City's next solid waste service agreement to include organic waste composting and expanded green waste and recycling options for businesses and residents, if feasible.
- Restaurant food waste collection: Work with the Novato Sanitary District to implement a restaurant food waste collection program.
- E-waste: Provide e-waste recycling drop-off bins at City facilities.
- Recycling containers in public areas: Provide interior and exterior storage areas for recyclables and green waste, and adequate recycling containers in public areas, including parks and community centers.
- Mandatory recycling at special events: Require recycling at City-sponsored and other public events. Evaluate zero waste or recycling requirements for all special events at City facilities and/or all special events that require a City permit or authorization.
- Organic material recovery program: Work with the Novato Sanitary District to establish an organic material recovery program for green waste for municipal parks and facility landscaping.
- Residential outreach: Develop outreach program to encourage residential participation in green waste and composting programs, perhaps in conjunction with existing City programs or private efforts.
- Nonresidential outreach: Educate businesses and residents about climate-friendly procurement opportunities and opportunities to reduce waste, including discontinuing use of polystyrene foam containers and disposable bags.
- Municipal purchasing and procurement programs: Continue to implement and expand sustainable purchasing programs, including the City's Environmentally Preferable Purchasing Program. Provide a preference or incentives to service providers, vendors, and contractors who follow climate-friendly practices, such as the use of recycled content materials, Energy Star or equivalent materials and equipment, as well as alternative fuel vehicles.

CO-BENEFITS

The City’s zero waste policy will lead to more environmentally conscious lifestyles within the City and will facilitate more conservation efforts throughout the community.

Reduction Measure Summary – State Reductions

The following are state reduction strategies included in the AB 32 Scoping Plan and accounted for in the City'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. **Figure 4-6** presents a revised forecast based on the local and state mitigation measures.

Low Carbon Fuel Standard

The State is proposing to reduce the carbon intensity of transportation fuels consumed in California. To reduce the carbon intensity of transportation fuels, CARB is developing a Low Carbon Fuel Standard (LCFS), which would reduce the carbon intensity of California's transportation fuels by at least 10% by 2020 and 20% by 2035 as called for by Governor Schwarzenegger in Executive Order S-01-07. LCFS will incorporate compliance mechanisms that provide flexibility to fuel providers in how they meet the requirements to reduce greenhouse gas emissions.

Pavley (AB 1493)

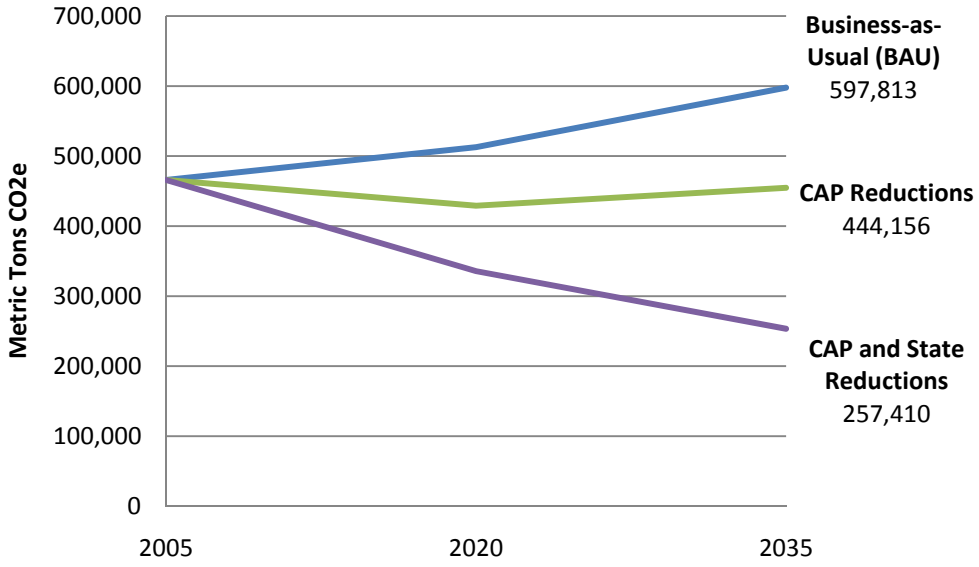
Assembly Bill 1493 (Pavley), signed into law in 2002, will require carmakers to reduce greenhouse gas emissions from new passenger cars and light trucks beginning in 2011. The California Air Resources Board adopted regulations in September 2004 that create two phases of increasingly stringent standards for car manufacturers between 2009 and 2020. It is expected that new vehicles sold in California will create an average of 16% fewer greenhouse gas emissions than current models.

Renewable Portfolio Standard (RPS)

Established in 2002 in Senate Bill 1078, the RPS program requires electricity providers to increase the portion of energy that comes from renewable sources to 20% by 2010 and to 33% by 2020. Per the trend of Executive Order S-14-08, this renewable energy goal is assumed to increase to 50% by 2030.

Other state initiatives such as funding mechanisms and loan programs are not included in these state reductions. Rather, they are included within the local reductions because of the need for or requirement for local government implementation or contribution to the effort.

Figure 4-6 Revised 2020 and 2035 Forecast of Novato's GHG Emissions



CHAPTER 5 – ADAPTING TO CLIMATE CHANGE IN NOVATO

Even in a "best-case" scenario, the effects of climate change are likely to negatively impact Novato. It is therefore prudent that the City and community be prepared for the known and unknown consequences of climate change. Waiting for these impacts to become more severe before responding or having an established method of response will only put the City at an economic and social disadvantage to other cities in the region that are proactively addressing climate change.

Climate change adaptation is a priority at the state level through Executive Order S-13-08 signed by Governor Schwarzenegger in November 2008. The State's California Climate Adaptation Strategy (CAS) is currently available for public review and comment. The CAS identifies climate change vulnerabilities resulting from sea level rise, increased temperatures, shifting precipitation, and extreme weather events and recommends methods and policies to adapt to these changes. The Executive Order also directs state agencies to analyze existing and planned infrastructure projects that could be at risk for sea level rise.[18] By coordinating regionally and cooperating with state adaptation efforts, Novato will preserve the quality of life residents of the City enjoy now.

LOCAL ADAPTATION MEASURES

The known consequences of climate change, as discussed in the introduction chapter, include sea level rise, increased risk of wildfires, an increase in unpredictable weather, negative impacts on wildlife, a deterioration of public health, and a decrease in the consistent supply of fresh water. It is important that Novato prepare for climate change not only within its borders but also within the region as a whole. Creating partnerships with bordering cities, the County of Marin, and agencies such as BCDC and ABAG will ensure the safety of the region as a whole. It is also important to maintain consistency with state adaptation efforts.

GOAL 9 Novato will become resilient to climate change.

Improve the City's resilience to reduce vulnerability to extreme events resulting from climate change.

Adaptation Measure 1: Incorporate climate change threats, impacts, projections, adaptation needs, and strategies into the General Plan, hazard mitigation plans, emergency response and preparedness plans, development plan review, capital project planning, and other ongoing activities as appropriate.

1.1 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, desalination, and water-use and/or irrigation efficiency.

[18] Office of the Governor press release, Gov. Schwarzenegger Issues Executive Order Directing State Agencies to Plan for Sea Level Rise and Climate Impacts, November 14, 2008. http://gov.ca.gov/press-release/11035/

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.

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

d. Environmental hazards including seawalls, storm surge barriers, and fire protection.

Adaptation Measure 2: Identify and reassess regional climate change vulnerabilities.

2.1 On a regular basis, work with neighboring cities, counties, and regional agencies to establish more uniform approaches to addressing climate change.

Adaptation Measure 3: Prepare for sea level rise.

3.1 Cooperate with the San Francisco Bay Conservation and Development Commission (BCDC) and other regional agencies preparing for sea level rise, coastal erosion, and peak storm events.

CHAPTER 6 – IMPLEMENTING THE PLAN

Novato recognizes that responding to and preparing for climate change is a critical step toward a sustainable future. The City's early actions to reduce its contribution to climate change are consistent with the City's history and commitment to decrease the impacts of day-to-day activities to the natural environment while strengthening its economy and enhancing its vibrant quality of life. Overcoming climate change will require everyone—government agencies, nonprofit organizations, businesses, residents, and staff—to work together to implement this Plan collaboratively with regional, state, and national activities.

This Plan provides a strategy for action with specific measures and steps to achieve the identified reduction targets. The previous chapter provided a matrix for each measure that identified responsible departments or agencies, potential costs, potential funding sources, and time frames for action. The matrices allow staff, the City Council, and interested parties to track measures of interest and to monitor progress. Each Climate Action Plan is prepared with the best intentions; however, implementation requires oversight and political, organizational, and financial commitment.

IMPLEMENTATION MEASURES

The following implementation measures are intended to accompany the mitigation and adaptation measures presented in Chapters 4 and 5.

GOAL 10 Implement the Climate Change Action Plan.
The Climate Change Action Plan will be implemented to reduce Novato's greenhouse gas emissions by a minimum of 15% from the 2005 baseline by 2020 and by a minimum of 40% by 2035.

Implementation Measure 1: Monitor and report on the City's progress annually.

1.1 Provide regular implementation updates to the Sustainability Committee.

1.2 Prepare an annual progress report for review and consideration by the Sustainability Committee and the City Council.

Implementation Measure 2: Update the baseline greenhouse gas emissions inventory every five years.

2.1 Initiate the 2010 baseline GHG inventory in 2011.

2.2 Maintain the City's membership in ICLEI – Local Governments for Sustainability.

Implementation Measure 3: Continue and expand partnerships that support implementation of the Climate Change Action Plan.

3.1 Enter into a partnership agreement with PG&E.

3.2 Continue to support the Marin Climate and Energy Partnership.

3.3 Participate in ongoing programs of the Marin County Energy Partnership.

Implementation Measure 4: Maintain funding to implement the Climate Change Action Plan.

4.1 Identify funding sources and options for all mitigation measures.

4.2 Include mitigation and adaptation measures in department budgets, capital improvement programs, and other plans as appropriate.

4.3 Pursue local, regional, state, and federal grants as appropriate to support implementation.

Implementation Measure 5: Integrate climate action planning with other activities and programs in the City.

5.1 Integrate the CCAP measures into the Sustainability Committee's Work Plan, the Capital Improvement Plan, and department work plans as appropriate.

5.2 Integrate CCAP mitigation and adaption measures into the General Plan Update as appropriate.

Implementation Measure 6: Review and update the Climate Change Action Plan regularly, at a minimum of every 5 years.

6.1 Review and update the CCAP as appropriate following the adoption of the City's General Plan Update.

6.2 Amend the CCAP as necessary to comply with state regulations.

Implementation Funding

One of the main barriers to implementation is lack of available funds. There are multiple grant and loan programs through state, federal, and regional sources to combat climate change. A portion of the City's allocation from the Department of Energy's Energy Efficiency and Conservation Block Grant program supported the completion of this Climate Change Action Plan. In addition, the Bay Area Air Quality Management District (BAAQMD) supported regional GHG inventory efforts. With the establishment of this plan for action, Novato is in a position to apply for additional funding to implement the supporting measures in a timely fashion. Funding sources may include the Association of Bay Area Governments, the State of California's many programs offered by the California Energy Commission and Strategic Growth Council among others, the Bay Area Air Quality Management District, and other government and nonprofit organizations.

In addition, funding opportunities will increase with implementation of state legislation. With the funding from current state bills and future grant programs, Novato is likely to receive assistance to achieve its climate action goals and measures.

APPENDICES

APPENDIX A– RELATIONSHIP OF EXISTING POLICIES AND PROGRAMS TO PROPOSED MITIGATION MEASURES

APPENDIX B– MEASURES CONSIDERED BUT NOT INCLUDED IN NOVATO'S CLIMATE CHANGE ACTION PLAN

APPENDIX C– METHODOLOGY AND ASSUMPTIONS FOR MEASURES

APPENDIX A – RELATIONSHIP OF EXISTING POLICIES AND PROGRAMS TO PROPOSED MITIGATION MEASURES

Associated Measure	Existing Policies and Programs	Existing Requirement/ Implementation	Recommended Requirement/Implementation
1	Install light-emitting diodes (LEDs) for street and other outdoor lighting (in addition to existing LED traffic signals).	Red and green traffic signals replaced with LEDs, with yellow being replaced as necessary.	Complete replacement of the 3,280 incandescent and mercury vapor street, parking lot, and other municipal outdoor lights with LED or other energy-efficient alternative.
8	Solar access requirements (Zoning Code Section 19.20.110)	Policies address street orientation, setbacks, siting, compact design, and potential obstruction.	Facilitation of the development of small-scale distributed renewable energy production, including adoption of incentives, amendments to development codes, design guidelines, and zoning ordinances, installation of solar panels on carports and over parking areas on municipal facilities, commercial projects, and new large-scale residential developments, and creation of an AB 811 program for small and large projects.
12	Sustainable landscaping (Zoning Code Section 19.28.040)	Irrigation, water-efficient plant selection and grouping, water-efficient landscape criteria and water runoff policies.	Continue to implement, in addition to requiring preparing for use of recycled water, facilitating the installation of water conservation measures in existing businesses and homes, and restricting the use of water for cleaning outdoor surfaces and vehicles.
14	Idling time of fleet diesel trucks limited to no more than 5 minutes.	The existing standard is consistent with state law (http://www.ciaqc.com/assets/ off_road_changes/Idling_Limits.pdf).	Improve traffic flow through (1) synchronizing signals, evaluate transit and emergency signal priority, and implement other traffic flow management techniques; and (2) implementing vehicle idling limitations for commercial and construction vehicles, and buses beyond state law.
16	Requirement for low emission vehicle facilities in private development. (Zoning Code Section 19.30.120)	Required of nonresidential developments over 50,000 square feet gross floor area (GFA) (part of preferential parking requirement).	Expands the City's role in developing facilities through partnerships with the Transportation Authority of Marin and Marin Climate and Energy Partnership requiring additional new/modified commercial and civic developments to provide charging facilities and adding an outreach effort to encourage use of the technology.
22, 23	Bicycle parking & end-trip facility requirements (Zoning Code Sections 19.30.090 and .120); residential and nonresidential standards, nonresidential end-trip facilities with bicycle/pedestrian path access.	- Multi-family residential requires 1:10 bike parking - Retail requires 1:20; other nonresidential 1:10 bike parking - End-of-trip facilities required for nonresidential developments over 100,000 GFA	- Multi-family residential bike parking increased to 1:10 short term plus one long-term space per unit - All nonresidential bike parking increased to 1:0 -Continued implementation of end-of-trip facilities requirements

Associated Measure	Existing Policies and Programs	Existing Requirement/ Implementation	Recommended Requirement/Implementation
25	Parking requirements (Zoning Code Sections 19.30.040 and .050) parking maximums, available reductions and traffic demand management (Zoning Code Section 19.30.120)	Exceeding parking requirements requires special approval, reductions available for shared parking, those in parking districts, or for demonstration of reduced need. Preferential parking for nonresidential development over 10,000 GFA.	Includes the existing programs and adds parking management program with parking fees and design elements promoting non-vehicular travel, such as through reduced on-site parking requirements, adjusted parking pricing, and shared parking facilities.
28	Employee trip reduction plan (also see municipal travel)	- Two vanpools, one created in 1997 and a second in 2008, eliminating approximately 50,000 annual VMT from 1997 to 2008 and 100,000 annual VMT from 2008 to 2009. - Since 1996 all non-essential services have been closed alternating Fridays.	Establish Trip Reduction Incentive Program (TRIP) for employees who voluntarily participate in alternative forms of transportation to and from work, including parking cash-out, or who participate by telecommuting and/or alternative work schedules, as appropriate.

APPENDIX B – MEASURES CONSIDERED BUT NOT INCLUDED IN NOVATO'S CLIMATE CHANGE ACTION PLAN

Measure or Action	Reason for Exclusion
Transit Fleet: Convert the City's bus and shuttle service to hybrid, electric, or alternative fuel.	The City does not own or operate a transit fleet.
Join Marin Clean Energy.	By majority vote, the City Council does not support community choice aggregation.
Require pedestrian/bicycle-only street in new development.	Not feasible at this time.
Implement Intelligent Transportation Systems (ITS) for surveillance and traffic control, such as synchronized signals, transit and emergency signal priority, and other traffic flow management techniques, to improve traffic flow and reduce vehicle idling. Implement programs to reduce "incident-based" traffic congestion, such as expedited clearing of accidents from major traffic arteries, airport traffic mitigation, etc.	These measures are not appropriate or financially feasible for the City at this time.
Provide financial incentives for use of hybrid/low emission/alternative vehicles. Provide location efficient mortgages.	These measures are not feasible or appropriate activities for the City at this time.

City of Novato Climate Action Plan

Energy Use Reduction Measures

	Reduction Measure	2020 Reductions			2035 Reductions		
		kWh	Therms	Metric Tons Co2e	kWh	Therms	Metric Tons CO2e
Reference Year BAU Projection		***302,956,071***	***14,809,026***	***151,608***	***340,771,677***	***16,125,768***	***167,688***
Goal 1: Energy Efficiency and Conservation							
1	Efficient Outdoor Lights: Work with the Marin General Services Authority to complete replacement of (the 3,280) incandescent and mercury vapor street, parking lot and other municipal outdoor lights with LED or other energy efficient alternative.	-895,809	0	-214	-895,809	0	-214
2	Municipal Energy Audit and Retrofits: Reduce energy use in buildings by (minimum 30)% through energy retrofits to buildings and facilities.	-1,031,747	0	-247	-1,160,531	0	-277
3	Energy Efficiency Protocols: Establish energy efficiency protocols to reduce energy consumption through behavior and operational changes.	-361,111	-11,571	-148	-361,111	-11,571	-148
4	Low Income Households Programs: Expand and better integrate programs for low-income households such as the distribution of CFL lights and water-conserving showerheads.	-1,300,000	-222,000	-1,498	-1,300,000	-222,000	-1,498
5	Outreach: Promote residential and commercial energy efficiency and conservation through energy bill inserts, public services announcements, recognition programs, and other forms of public outreach.	-138,065	-11,003	-92	-145,906	-11,628	-97
Subtotal Goal 1		**-3,726,733**	**-244,574**	**-2,199**	**-3,863,358**	**-245,199**	**-2,235**
Goal 2: Renewable Energy							
6	Municipal Renewable Energy: Install cost-effective renewable energy systems on all buildings and facilities and purchase remaining electricity from renewable sources.	-343,916	0	-82	-773,688	0	-185
7	Community Renewable Energy Facilitation: Identify and remove barriers to small-scale, distributed renewable energy production within the community.	-21,112,407	-59,423	-5,363	-42,224,815	-113,038	-10,696
Subtotal Goal 2		**-21,456,323**	**-59,423**	**-5,446**	**-42,998,502**	**-113,038**	**-10,881**
Goal 3: Green Building and Design							
8	Green Building Standards: Continue to implement the City's Green Building Program. Expand program to require a minimum of 15% above California Title 24 energy standards, as amended.	-2,867,531	-112,798	-1,289	-21,169,615	-1,010,272	-10,463
9	Cool Paving Materials: Require the use of high "albedo" material for future outdoor surfaces such as parking lots, median barriers, roadway improvements, and sidewalks in order to reduce the urban heat island effect and save energy.	-3,271,926	0	-782	-7,360,668	0	-1,759

	Reduction Measure	2020 Reductions			2035 Reductions		
		kWh	Therms	Metric Tons Co2e	kWh	Therms	Metric Tons CO2e
10	Increase Tree Cover: Increase tree cover of structures and other improvements within the City through implementation of the City's Urban Forestry Plan, including updated landscaping requirements to ensure strategic placement of plantings to shade east and west walls of structures. Such strategic planting in development projects will shade structures, lower on-site temperatures, and effectively reduce energy demands.	-8,138,160	0	-1,945	-9,099,360	0	-2,175
Subtotal Goal 3		**-14,277,617**	**-112,798**	**-4,015**	**-37,629,643**	**-1,010,272**	**-14,396**
Goal 4: Water Conservation							
11	Water Conservation: Conserve water through improved efficiency.	-76,563	0	-18	-86,120	0	-21
12	Municipal Water Use: Implement programs to reduce the use of potable water in municipal facilities.	-2,590	0	-1	-2,914	0	-1
Subtotal Goal 4		**-79,154**	**0**	**-19**	**-89,034**	**0**	**-21**
Total Reduction		**-39,539,826**	**-416,795**	**-11,679**	**-84,580,538**	**-1,368,508**	**-27,533**
Net Energy Consumption / Emissions		**263,416,245**	**14,392,231**	**139,929**	**256,191,139**	**14,757,260**	**140,155**
Percentage Change from BAU		**-13.05%**	**-2.81%**	**-7.70%**	**-24.82%**	**-8.49%**	**-16.42%**
Percentage Change from Baseline		**-7.49%**	**3.57%**	**-1.72%**	**-10.02%**	**6.20%**	**-1.56%**

Transportation Reduction Measures

	Reduction Measure	2020 Reductions			2035 Reductions		
		Annual VMT	Increased Annual Energy (kWh)	Metric Tons CO2e	Annual VMT	Increased Annual Energy (Kwh)	Metric Tons CO2e
Reference Year BAU Projection		***642,688,798***	***--***	***350,153***	***768,243,240***	***--***	***418,558***
Goal 5: Vehicle Efficiency and Alternative Fuels							
13	Vehicle Idling: Improve traffic flow and reduce idling within the City.	-5,987,738	0	-3,262	-7,467,278	0	-4,068
14	Vehicle Trips: Facilitate programs aimed at reducing vehicle trips.	-2,330,102	0	-1,269	-2,733,691	0	-1,489
15	Low Emission Vehicle Infrastructure: Improve infrastructure for low emission vehicles.	-1,411,200	783,216	-582	-2,822,400	1,566,432	-1,163
16	City Low Emission Vehicles: Increase the use of alternative fuel vehicles to reduce vehicle GHG emissions.	-392,248	463	-214	-784,497	925	-427
Subtotal Goal 5		**-9,729,041**	**783,679**	**-5,327**	**-13,023,369**	**1,567,357**	**-7,148**
Goal 6: City-Wide Land Use and Design							
17	Require mixed-use, infill development at higher densities to ensure providing a mix of housing, employment and commercial services within the community.	-2,285,597	0	-1,245	-6,579,926	0	-3,585
18	Varied Employment Opportunities: Attract a variety of employment opportunities, including higher paying jobs, for those who live, or are likely to live, in the community.	-52,613,007	0	-28,665	-68,034,702	0	-37,067
19	Affordable Housing: Continue support of affordable housing ordinance & programs.	-2,570,755	0	-1,401	-3,072,973	0	-1,674
20	Pedestrian Convenience: Promote walking through design standards and amenities that concentrate uses, reduce the need to vehicular travel, and enhance the pedestrian experience.	-2,376,462	0	-1,295	-6,770,867	0	-3,689
Subtotal Goal 6		**-57,469,359**	**0**	**-31,311**	**-77,687,601**	**0**	**-42,326**
Goal 7: Alternative Transportation Modes							
21	Non-Residential Bicycle Facilities: Increase bicycle parking requirements for new and significantly retrofitted non-residential projects to a minimum rate of 1:20 vehicle spaces. Bicycle parking shall be divided between short-term facilities (bike racks) and long-term facilities (bike lockers or other covered facility). Continue implementing requirements for showers, lockers, and changing space in all large non-residential facilities.	-9,639,171	0	-5,252	-40,401,049	0	-22,012
22	Multifamily Bicycle Parking: Increase bicycle parking requirements for new multi-family residential construction. Short-term facilities shall be provided at a minimum rate equal to 10% of vehicle spaces. Long-term facilities shall be provided at a ratio of one long-term bicycle parking space for every unit. Long-term facilities shall consist of one of the following: a bicycle locker, a locked room with standard racks and access limited to bicyclists only, a standard rack in a location that is protected from the elements and monitored by video surveillance 24 hours per day. or designated space within the units garage/carport.	-32,995	0	-18	-82,826	0	-45
23	Complete Streets: Adopt “Complete Street” standards to facilitate multi-modal access.	-1,478,803	0	-806	-3,685,148	0	-2,008

	Reduction Measure	2020 Reductions			2035 Reductions		
		Annual VMT	Increased Annual Energy (kWh)	Metric Tons CO2e	Annual VMT	Increased Annual Energy (Kwh)	Metric Tons CO2e
24	Parking Standards: Revise parking standards to disincentivize single-occupant vehicles and promote non-vehicular travel.	-18,809,878	0	-10,248	-22,484,539	0	-12,250
25	Public Transit: Work with transit providers to plan, fund and implement additional transit services that are cost-effective and responsive to existing and future transit demand.	-444,298	0	-242	-664,840	0	-362
26	Safe Routes to School: Collaborate with the Transportation Authority of Marin to expand Safe Routes to School Programs, including a walking school bus program to provide a supervised, safe, and timely commuting alternative for children.	-5,578	0	-3	-5,724	0	-3
27	Municipal Travel: Encourage employees to utilize alternative forms of transportation for commutes and work-related trips.	-115,060	0	-63	-120,907	0	-66
Subtotal Goal 7		**-30,525,782**	**0**	**-16,631**	**-67,445,033**	**0**	**-36,746**
Total Change		**-97,724,182**	**783,679**	**-53,269**	**-158,156,003**	**1,567,357**	**-86,220**
Net VMT / Energy Consumption / Emissions		**544,964,616**	**--**	**296,884**	**610,087,237**	**--**	**332,338**
Percentage Change from BAU		**-15.21%**	**---**	**-15.21%**	**-20.59%**	**---**	**-20.60%**
Percentage Change from Baseline		**-5.19%**	**--**	**-5.20%**	**6.14%**	**--**	**6.12%**

Waste Reduction Measures

	Reduction Measure	2020 Reductions		2030 Reductions	
		Tons	Metric Tons CO2e	Tons	Metric Tons CO2e
Reference Year BAU Projection		***176***	***11,097***	***183***	***11,567***
Goal 8: Waste Reduction					
28	Zero Waste: Implement the adopted Zero Waste Resolution.	-141	-8,877	-183	-11,567
Subtotal Goal 8		**-141**	**-8,877**	**-183**	**-11,567**
Total Reduction		**-141**	**-8,877**	**-183**	**-11,567**
Net Tons of Waste / Net Emissions		**316**	**2,219**	**366**	**0**
Percentage Change from BAU		**80.00%**	**80.00%**	**100.00%**	**100.00%**
Percentage Change from Baseline		**92.78%**	**-78.58%**	**123.27%**	**-100.00%**

1 Energy Efficient Streetlights

Goal 1 - Energy Efficiency and Conservation

Measure Text

1. Efficient Outdoor Lights: Work with the Marin General Services Authority to complete replacement of incandescent and mercury vapor street, parking lot and other municipal outdoor lights with LED or other energy efficient alternative.

Program Description

This measure quantifies the effect of replacing all streetlights with energy efficient models. Completion of this measures assumes additional action and investment is taken by the City to replace the remaining lights not funded by the EECBG program. Additional programs that the City can pursue in conjunction with PG&E include loan programs provided by the California Energy Commission.

Co- Benefits

In addition to GHG reductions, LEDs also provide better light quality than standard sodium lamps and provide better visibility of colors. Additionally, the long 10-12 year life of LEDs significantly reduces maintenance costs.

	2020	2035
Number of Streetlights	3,126	0

Energy Reductions

	2020	2035
Annual Electricity Savings (kWh)	895,809.26	895,809.26
Annual NG Savings (Therms)	0.00	0.00

Methodology:

The method used to calculate energy savings was developed by City staff and PG&E in completing the City's Energy Efficiency and Conservation Block Grant (EECBG) application. PG&E staff calculated the number of kWhs that would be saved on a yearly basis to replace all existing high pressure sodium and metal halide vapor street light (traditional lights) versus upgrading to LED lights through PG&E's Turnkey program. It was assumed that only those streetlights PG&E assessed for cost purposes would be updated – 3126 out of the City's 3,282.

Assumptions:

1. EECBG funding and subsequent City investment will result in the replacement of all existing streetlights with more efficient LED models - 3,126 streetlights in total.
2. Total project costs include $201,300 in PG&E rebates.
3. While initial EECBG funds are not enough to fund the replacement of the entire City streetlight stock, this measure assumes the replacement of all streetlights. There are other opportunities for the City to investigate, including loan programs through the CEC in conjunction with PG&E, and full completion of this measure assumes pursuit of these additional opportunities.
4. All costs provided by PG&E are estimates and subject to change.

2 Municipal Energy Audit

Goal 1 - Energy Efficiency and Conservation

Measure Text

2. Municipal Energy Audit and Retrofits: Reduce energy use in buildings by (minimum 30)% through energy retrofits to buildings and facilities.

Program Description

The Marin Energy Management Team (MEMT) is active in auditing and retrofitting municipal buildings. Between 2005 and the end of 2009, MEMT audited and implemented energy efficiency recommendations for the City's Corporation Yard and Hamilton Community Center, Senior Center, Teen Center, and Gym. The City completed these recommended lighting retrofits in 2009, resulting in 70,275 kWh in savings, or a 2.2% reduction below the 2005 baseline. Audits have also been completed for the City's decorative light strings, Police Facility and Computer Services. Implementation of these retrofits will result in an additional reduction of 142,413 kWh, reducing energy use to 4.4% below baseline, for a total reduction of approximately 6% below baseline. The MEMT has also successfully assisted the City with their application for Clean Renewable Energy Bonds (CREBs) for solar projects, and the City is now nearing completion on three solar projects.

This measure requires the City to continue working with the MEMT and other organizations to reduce building energy use by 30% through increased energy efficiency and conservation. It assumes that all energy audit recommendations are completed by 2020, including HVAC replacements, vending machine upgrades, and LED Christmas light purchases.

Co- Benefits

The retrofits and upgrades will result in cost savings to the City which can be put back into the general fund.

Energy Reductions

	2020	2035
Annual Electricity Savings (kWh)	1,031,747	1,160,531
Natural Gas Savings (therms)	23,142	25,200

Methodology / Assumptions:

Assumptions that energy audit recommendations, including vending machine upgrades, HVAC replacements, and LED Christmas light purchases, will be completed by 2020.

3 Energy Efficiency Protocols
Goal 1 - Energy Efficiency and Conservation

Measure Text
3. Energy Efficiency Protocols: Establish energy efficiency protocols to reduce energy consumption through behavior and operational changes.

Program Description
This is the first part of a multi-tiered approach to reduce energy consumption and associated GHG emissions in municipal facilities through the implementation of energy efficiency protocols to reduce the energy demands of City buildings and facilities. This includes 1) establishing energy efficiency protocols for building custodial and cleaning services and other employees, including efficient use of facilities, such as turning of lights and computers, thermostat use, etc., 2) incorporating energy management software, electricity monitors, or other methods to monitor energy use in municipal buildings, and 3) implementing off-peak scheduling of pumps, motors and other energy intensive machinery where feasible.

Co- Benefits
In addition to GHG reductions, this measure also result in decreased operational costs.

Energy Reductions

	2020	2035
Annual Electricity Savings (kWh)	361,111	406,186
Annual NG Savings (Therms)	11,571	12,600

Methodology

Energy management software is proven to reduce energy consumption by 10% through identifying inefficiencies within operations. An additional 5% reduction in energy use for miscellanous behavoiral changes by staff and machanical operations was assumed. Reductions to electricty use were made from municipal energy consumption data, assuming that all recommended retrofits were completed (Measure 2) by 2020.

4 Low Income Household Programs
Goal 1 - Energy Efficiency and Conservation

Measure Text
4. Low Income Households Programs: Expand and better integrate programs for low-income households such as the distribution of CFL lights and water-conserving showerheads.

Program Description
This program will target low-income households, recognizing that monetary constraints provide significant barriers to purchasing and implementing energy efficient technologies. By conducting such proactive outreach, the City will equip all segments of the community to work together, enjoy significant cost savings on energy and water bills, and help the City achieve its GHG reduction targets. As shown below, the reductions result from serving merely 10% of the City's low-income population. With expansion of the program, a far greater proportion of this population could be served and greater energy savings achieved.

Co- Benefits
In addition to reducing GHG emissions, this measure will directly benefit low income households by helping them enjoy cost savings achieved through energy and water efficient technology.

Energy Reductions

Household and Program Statistics

	2020	2035
Number of Low Income Households	10,058	10,629
Households Served	1,000.00	1,000.00
Percentage of Households Served	9.94%	9.41%
Energy Savings per Household (kWh)	1,300	1,300
Annual Decrease in Energy Use (kW)	1,300,000	1,300,000
Therms Savings per Household	222	222
Annual Decrease in Therms Use	222,000	222,000

Methodology:

Annual decreases in therms and energy use were applied to the households served by the program to obtain yearly reductions that result from the program.

Source:

Report on the impacts and costs of the Iowa low-income weatherization program--calendar year (2006). <http://www.waptac.org/si.asp?id=1143.>
City of Novato General Plan (1996).

Assumptions

1. Assumes 1,000 homes will be served by weatherization programs on an annual basis, a feasible number based on comparable weatherization programs in neighboring Bay Area cities.
2. Assumes the energy and therms savings found in the study will remain constant in the target years. This is likely an underestimate, as new technologies will facilitate greater energy and therms reductions, and increased product availability will lower costs and facilitate the installation of additional energy efficient appliances and devices in low income households.
3. Assumes that 47.6% of all households in Novato are low income or very low income, earning less than 80% of the median income for Marin County.

5 Public Outreach
Goal 1 - Energy Efficiency and Conservation

Measure Text
Promote residential and commercial energy efficiency and conservation through energy bill inserts, public services announcements, recognition programs, and other forms of public outreach.

Program Description
This measure directs the implementation of a communitywide public outreach and education campaign to inform residents, businesses, and consumers about the way that individuals can reduce their energy costs and GHG emissions. This includes informing the public about the benefits of installing energy efficient indoor and outdoor lighting and alerting them to the availability of free energy audit programs, financial, and other incentives that area available to assist residential and commercial energy audits and retrofits.

The City will utilize the programs that have been initiated by the County of Marin Community Development Agency and PG&E through the Marin Energy Watch Partnership to conduct this effort. Projects are already underway through this partnership that can be targeted to educate residents and businesses about reducing energy consumption.

Energy Reductions

	2020	2035
Population	54,300	56,600
Reduction in Electricity	0.10%	0.10%
Reduction in NG	0.10%	0.10%
Annual Electricity savings	138,065.50	145,906.4
Annual Natural Gas savings	11,003.10	11,627.98

Methodology:

This measure is based on empirical data from a public education campaign designed to red emissions of criteria air pollutants in the Sacramento region (i.e., the Spare the Air program) one of the few public outreach campaigns that conducted an analysis of the effectiveness o program as it relates to emission reduction. Although this outreach campaign is transportati energy related, we use its findings for market penetration. The analysis confirmed that appr 1% of people changed their behavior (e.g., took fewer vehicle trips on Spare the Air days) a of the Spare the Air campaign. For the City's public education campaign, it was assumed th approximately 1% of people would reduce their emissions from all sectors (e.g., transportati electricity, natural gas, waste, water) by about 10%.

Source;

SMAQMD 2009. Spare the Air Control Measure Program; Revision to State Implementation Report. Available at: http://www.airquality.org/notices/CAPUpdate/STA-revisiontoSIP-StaffRpt23April2009.pdf

6 Municipal Renewable Energy
Goal 2 - Renewable Energy

Measure Text
6. Municipal Renewable Energy: Install cost-effective renewable energy systems on all buildings and facilities and purchase remaining electricity from renewable sources.

Program Description
This is the second part of a multi-tiered approach to reduce conventional energy consumption and associated GHG emissions in municipal facilities through the installation of renewable energy systems on City buildings to serve energy demands.

Co- Benefits
In addition to GHG reductions, measure also be a visible symbol to the community that the City is leading by example.

Energy Reductions

	2020	2035
Percent kWh Generated by Renewable Energy Facilities	10.00%	20.00%
Annual Electricity generated (kWh) by Renewable Energy Facilities	343,915.56	773,687.62

Source/Methodology:

Calculation takes 20% of all projected kWh of municipal energy for the target years, phased in over the time period. Assumes that municipal energy use in the target years will remain at the same proportion of municipal use to total energy use in 2005 (i.e., in 2005 municipal energy use accounted for .0083 of all kWh; therefore, .0083 X total kWh in target year = projected kWh of municipal use in target year).

Assumptions:

Assumes 20% of total electricity used by the city by the target year of 2035 will be from renewable energy systems. This percentage is assumed to be phased in, with the City achieving 10% of total production from renewable energy systems by 2020.

7 Community Renewable Energy Facilitation
Goal 2 - Renewable Energy

Measure Text
7. Community Renewable Energy Facilitation: Identify and remove barriers to small-scale, distributed renewable energy production within the community.

Program Description
The goal of this measure is to reduce GHG emissions from residential and commercial energy use by facilitating the development of small-scale distributed renewable energy production. This can be accomplished through 1) adoption of incentives, such as permit streamlining and fee waivers, as feasible; 2) amendments to development codes, design guidelines, and zoning ordinances, as necessary; 3) installation of solar panels on carports and over parking areas on municipal facilities, commercial projects, and new large-scale residential developments, and; 4) creation of an AB 811 program for small and large projects.

Energy Reductions

Electricity Reductions

	2020	2035
Percent kWh Generated by Renewable Energy Facilities	8%	15%
Annual Electricity generated (kWh) by Renewable Energy Facilities	21,112,407.30	42,224,814.60

Natural Gas Reductions

	2020	2035
Natural Gas for Residential Uses (therms) Resulting from New Development	692,575.40	1,317,455.46
Natural Gas used for Residential Hot Water Heating, therms (44% of all Nat. Gas for Residential Uses)	304,733.18	579,680.40
Natural Gas Savings from Hot Water Heater Retrofits, therms (19.5% of Natural Gas for Res. Hot Water Heating)	59,422.97	113,037.68

Source/Methodology:
1. kWh from Renewable Energy Facilities: Calculation takes 15% of all projected kWh of energy use for existing developments, as depicted in the baseline years, phased in with only 8% applied in 2020. The projected amount of energy use excludes the percentage of energy use attributed to municipal facilities that is accounted for in MM 7 (.15 x [total kWh for baseline year - total kWh for municipal uses (the total kWh for base year X .0083)]).The estimate of PV installed is restricted to installations on existing homes and commercial properties. It excludes renewable installations to power new developments that come as a result of green building efforts or the zero net energy homes effort.
2. Therms for residential uses: reductions for greater efficiencies in hot water heaters is applied only to new

2. Therms for residential uses: reductions for greater efficiencies in hot water heaters is applied only to new development and accounts for all possible savings that would be generated by more efficient hot water heaters (44% of therms for hot water heating X 19.5% therm savings in newer models X new therm use in target year = therm savings in residential uses for hot water heater retrofits).

Assumptions:
1. Assumes a 15% market penetration of renewable energy facilities in the target years phased in with only 8% penetration achieved by 2020, and that this penetration rate will only apply to existing development (as represented by kWh consumption in 2005).
2. Assumes that 44% of residential natural gas is used for water heating (CPUC) and that this rate will remain constant.
3. Assumes that there is 19.5% in natural gas savings for improved efficiency water heaters (the average of tankless and efficient gas storage models according to the Energystar.gov savings & benefits WebPages), and that this will remain constant.
4. Assumes that conversion to more efficient hot water heaters is merely an issue of turn-over and easy for property owners to finance because of minimal price differences and existing subsidies (Fuller et. al. 2009). The reductions for more efficient hot water heaters is assumed to be achieved in all new development in the target years, and so the reductions are applied to all therms that exceed levels of the baseline years. The use of therms for new development in the target years is assumed to be all new therms generated since the target year or baseline year before, cumulatively (i.e., 2035 therm use from new residential development is assumed to exclude all therms previously generated residential uses in 2005 and 2020).

Sources:
Fuller, Merrian C.; Compagni Portis, Stephen; and Daniel M. Kammen (January - February 2009). Toward a Low-Carbon Economy: Municipal Financing for Energy Efficienciy and Solar Power. Environment: Science and Policy for Sustainable Development. <http://www.environmentmagazine.org/Archives/Back%20Issues/January-February%202009/FullerPortisKammen-full.html>

CPUC: California Long Term Energy Efficiency Strategic Plan (Sept. 2008) <http://www.californiaenergyefficiency.com/docs/EEStrategicPlan.pdf>

Energy Star.gov <Energystar.gov savings & benefits webpages http://www.energystar.gov/index.cfm?c=gas_tankless.pr_savings_benefits & http://www.energystar.gov/index.cfm?c=gas_storage.pr_savings_benefits>

8 Green Building Standards
Goal 3 - Energy Efficient Building Design

Measure Text
8. Green Building Standards: Continue to implement the City's Green Building Program. Expand program to require a minimum of 15% above California Title 24 energy standards, as amended.

Program Description
This measure requires newand remodeled residential and non-residential development in the City to be built to green building standards. The City has adopted green building standards for residential buildings in September 2005, multi-family buildings in May 2007, and non-residential buildings in March 2009. These standards rely on extensive checklists whereby developers select from various green building practices or purchases. It is recommended that the City's green building ordinances be amended to require that the applicant exceeds the State's Title 24 standards as part of these checklists, which in part can be achieved by taking advantage of shade, prevailing winds, landscaping and sun screens to reduce energy use. This added requirement will ensure that new buildings achieve quantifiable energy and greenhouse gas reductions as included in this Plan. As the Ordinance now stands, building owners may choose from a variety of options, all of which have variable energy and greenhouse gas reductions, if any.

Co- Benefits
Green buildings not only save energy and water, but they are healthier for inhabitants and often more affordable to operate.

Title 24 Energy Reductions

Sector (Energy Type	Reduction from updated 2008 Standards vs. 2005	Tier 1 Reduction (+15% efficiency)	Tier 2 Reduction (+30% efficiency)
Residential NC (electricity)	21.80%	36.80%	51.80%
Residential NC (NG)	9.82%	24.82%	39.82%
NonRes NC (Electricity)	4.90%	19.90%	34.90%
NonRes NC (NG)	9.40%	24.40%	39.40%

Source:
2008 Title 24 Energy Efficiency Improvements in comparison to 2005 baseline Title efficiency standards (Source: California Energy Commission, Impact Analysis: 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings, November 2007)

Title 24 Applied to City

	2020	2035
Reduction in residential electricity (kWh)	1,918,829.42	9,759,747.30
Reduction in residential NG (therms)	85,948.61	710,828.67
Reduction in commercial electricity (kWh)	948,701.83	11,409,867.68
Reduction in commercial NG (therms)	26,849.20	299,442.88
Annual Electricity savings (kWh)	2,867,531.25	21,169,614.98
Annual Natural Gas savings (Therms)	112,797.81	1,010,271.55

Methodology:

- Assume that 60% of development between 2005 and 2020 will occur after amendment of the Ordinance to include 15% over Title 24 as a requirement.
- Assume Tier 2 (30% above) for commercial development 2020-2035.
- Assume Zero Net Energy for residential development 2020-2035.
- Assume all growth in natural gas and electricity sectors is from new construction

9 Cool Paving Materials
Goal 3 - Energy Efficient Building Design

Measure Text
9. Cool Paving Materials: Require the use of high "albedo" material for future outdoor surfaces such as parking lots, median barriers, roadway improvements, and sidewalks in order to reduce the urban heat island effect and save energy.

Program Description
Increasing urban albedo can reduce summertime temperatures, resulting in better air quality and savings from reduced air-conditioning costs. In addition, increasing urban albedo can result in less absorption of incoming solar radiation by the surface-troposphere system, countering to some extent the global scale effects of increasing greenhouse gas concentrations. Pavements and roofs typically constitute over 60% of urban surfaces (roof 20–25%, pavements about 40%). Using reflective materials, both roof and pavement albedos can be increased by about 0.25 and 0.15, respectively, resulting in a net albedo increase for urban areas of about 0.1.

To maximize the albedo of both types of pavement, lighter-colored aggregate can be used in the pavement mix. Alternatively, asphalt pavements can be covered with high-albedo sealcoats, small rocks set in binder, or a thin layer of concrete. For concrete applications, using lighter-colored sand and cement can increase reflectivity.

Co- Benefits
Cool (light-colored) pavements increase nighttime visibility and pavement durability, in addition

Energy Reductions

	2020	2035
Percent of City covered in pavement	40.00%	40.00%
Percent of paved area with high albedo	15.00%	30.00%
Albedo change	0.009	0.018
Temperature decrease (Celsius)	0.36	0.72
Reduction in electricity	3,271,925.57	7,360,668.21

Methodology:

'- The urban area is approximately 40% pavement. Assume 30% will be replaced with high albedo content. Pavement has a potential for a .15 increase in albedo. 0.40 * 0.30 * 0.15 = Net change of 0.018 by 2030. Assume half by 2020 or .009
- a 10K decrease in temperature for a 0.25 increase in albedo (Akbari)
- 10 Kelvin = 10 Celsius
'- Electricity demand in cities increases by 2–4% for each 1 degree Celsius increase

Sources:

1. EPA Heat Island Brochure, http://www.epa.gov/heatisland/resources/pdf/HIRIbrochure.pdf
2. Rosenfeld, Arthur, *Energy Efficiency: The first and most profitable way to delay Climate Change,* July 12, 2008, http://www.energy.ca.gov/2008publications/CEC-999-2008-015/CEC-999-2008-015.ppt#264,1,Energy Efficiency: The first and most profitable way to delay Climate Change Moro Camp July 12, 2008

3. Akbari, Hashem. Energy Saving Potentials and Air Quality Benefits of Urban Heat Island Mitigation1. http://www.osti.gov/bridge/servlets/purl/860475-UlHWIq/860475.pdf
4. Akbari, Hashem. 2001. COOL SURFACES AND SHADE TREES TO REDUCE ENERGY USE AND IMPROVE AIR QUALITY IN URBAN AREAS. http://www.fs.fed.us/ccrc/topics/urban-forests/docs/cool%20surfaces%20and%20shade%20trees%20to%20improve%20air%20quality.pdf

Assumptions:

2. A combination of the following strategies will be utilized for 50% of the landscape (including roads, sidewalks, courtyards and parking lots): Shade (within 5 years of occupancy); paving materials with a solar Reflectance Index (SRI) of at least 29; open grid pavement system.

10 Tree Cover
Goal 3 - Energy Efficient Building Design

Measure Text
10. Increase Tree Cover: Increase tree cover of structures and other improvements within the City through implementation of the City's Urban Forestry Plan, including updated landscaping requirements to ensure strategic placement of plantings to shade east and west walls of structures. Such strategic planting in development projects will shade structures, lower on-site temperatures, and effectively reduce energy demands. To be most effective, the City should coordinate with local and regional plant experts in selecting tree species that respect the natural region in which Novato is located, to help create a healthier, more sustainable urban forest and adopt a Native Tree Preservation and Mitigation Ordinance.

Program Description
Update City landscaping requirments to increase tree plantings where they will effectively shade improvements and reduce energy demands.

Co- Benefits
Carbon sequestration, extended life of paved surfaces, improves water quality from trapping runoff, increase in traffic safety, aesthetic improvements, increased real estate values, increased sociological benefits.

	2020	2035
Number of Trees Planted	7500	15000

Energy Reductions

	2005	2020	2035
Area of the City Effected (Acres)	17,847.24	17,847.24	17,847.24
Tree Cover	0.96%	1.09%	1.21%
Estimated Number of Trees	56,000	63,500	71,000
Carbon Sequestration per tree	0.09	0.09	0.09
Energy Reduction per tree (kWh)	128.16	128.16	128.16
Total Carbon Sequestration (metric tons)	5,040.00	5,715.00	6,390.00
Annual Electricity Savings (kWh)	7,176,960.00	8,138,160.00	9,099,360.00

Methodology:

-Area of the City of Novato is 17,920 acres, including 72.76 acres within parks (City Website, http://www.cityofnovato.org/Index.aspx?page=2).
- Currently there are 26,000 Street Trees maintained by the City; Bill Johnson, Parks and Medians Supervisor, Public Works Department.
- The average urban tree is defined as one having 133 square feet of canopy cover (American Forests, http://www.americanforests.org/resources/urbanforests/treedeficit.php)
-Sequestration: If 50 million trees were planted, they would sequester about 4.5 Mt CO2 (million tons) annually. If they were planted strategically to shade east and west walls of residential buildings, they would reduce air conditioning energy use by 6,408 GWh, equivalent to an average annual CO2 equivalent emission reduction of 1.8 Mt.
The carbon sequestration value represents the total carbon sequestration achieved by the planted trees (as part of this measure).
-Urban Heat Island Reduction: According to the United States Department of Agriculture,

planting shade trees within 40 feet of the south side or within 60 feet of the west sides of properties can reduce summertime energy consumption associated with air conditioning by approximately 30%.
-If 50,000,000 trees sequester 4.5 Mt CO2 annually, then 1 tree sequesters 0.09 tons CO2.
-If 50,000,000 trees would reduce energy use by 6,408 GWh (6,408,000,000 kWh), then 1 tree reduces energy use by 128.16 kWh per year

Sources:

1. US Forest Service, Climate Change Resource Center. "Urban Forest and Climate Change". Available at: www.fs.fed.us/ccrc/topics/urban-forests
2. USDA Forest Service, Pacific Northwest Research Station. "California Study Shows Shade Trees Reduce Summertime Electricity Use." Science Daily 7 January 2009. 20 February 2009. Available at:http://www.sciencedaily.com/releases/2009/01/090105150831.htm.

Assumptions:

Distance from and orientation to buildings, building vintage and type of air conditioning/heating. A relatively conservative assumption of 30,000 tree cover within the city and in proper relationship to buildings was made. A more precise estimate could be made with the assistance of the Novato Public Works Department, GIS and Mapping Section on analysis of GIS aerial images. A conservative estimate of 500 trees planted annually was also utilized.

11 Water Conservation
Goal 4 - Water Conservation

Measure Text
11. Water Conservation: Conserve water through improved efficiency.

Program Description
This measure relies on statewide averages in order to quantify the energy reductions that would result from conserved water use. The California Energy Commission estimates all total possible reductions for water use, including local programs and water conservation efforts. Once additional data specific to the City of Novato becomes available associating local community-wide water use to energy consumption, these quantifications can be refined to analyze possible energy reductions that may result from local decreases in water use.

One example of a local water reduction program that is captured in the statewide averages and quantified below is the planned North San Pablo Bay Restoration and Reuse Project. Planned for completion by 2012, this project will supply urban water users and specific municipal facilities in Novato with recycled water, decreasing the use of potable water. While this project will impact both community-wide water use and municipal water use (addressed in MM 13), additional information would be needed to disaggregate the project's impact on public and private water use. Under the base project scenario, it has the potential to reduce community-wide use in Novato by 542 AF/year, and approximate reduction of 2% of water use in the target years. Under the fully connected system scenario, it could reduce community-wide use in Novato by approximately 13%. This would likely propel the City forward in achieving higher reductions than is estimated here. Once the project is finalized, this measure should be revisited and revised to take full credit and incorporate any new, additional data specific to the City of the Novato.

Additional actions that comprise the body of the measure include the following. These would require additional ordinances by the City.

a. Recycled Water: Require dual plumbing for use of recycled water for new commercial and residential developments.

b. Water Conservation measures for Existing Development: Encourage and facilitate the installation of water conservation measures in existing businesses and homes.

c. Sustainable Landscape Standards: Update and continue to implement sustainable landscaping standards for civic, commercial and residential development to reduce water consumption, including restricted watering methods and control runoff. This will initially include assessment of the State Model Water Efficient Landscape Ordinance established by AB 1881 and deliberation on alternative standards are required. The City must either adopt the State Model Water Efficient Landscape Ordinance or develop one to fit local conditions by January 1, 2010 (as established by Assembly Bill 1881, Laird).

d. Outdoor Water Use: Restrict the use of water for cleaning outdoor surfaces and vehicles.

Co- Benefits
With increased water efficiencies, not only will total kWh for transport of water be decreased, but the community's water supply will be more greatly protected and preserved for future needs. Results from this measure are assumed to result from increased water efficiency community-wide and decreased overall water use, and does not include upgrades to infrastructure.

Energy Reductions

	2005	2020	2035
Total kWh	284,731,029	302,956,071	340,771,677
Community-wide kWh excluding municipal kWh	281,498,764	299,516,916	336,903,238
Community-wide kWh consumed for Water Use (based on 2005 municipal rater of 4.18%)	11,779,740	12,533,737	14,098,224
Water consumed (MG) (excluding water consumed for municipal purposes and assuming the 2005 rate of consumption per kWh remains constant)	9,063	9,643	10,847
Annual Decrease in Water Consumption (MG, using CEC estimate of 28%	2,538	2,700	3,037
Resulting Decrease in kWh consumed (at ratio of 28.356 kWh/MG)	71,957	76,563	86,120

Methodology:

1. The average % of all possible water reductions for residential indoor, residential outdoor, commercial/institutional, and industrial uses was taken ([[39 + {{25+40}/2} + 39 + 39]/4] = 37.375 (possible % of water reductions, on average, for all uses) . 75% of this figure was taken to account for incomplete achievement of total possible water reductions (.75 X 37.375 = 28.03125 (realistic % of water reductions for all uses).
2. To determine the amount of community-wide kWh consumed for community-wide water use, the ratio of kWh for municipal water use (sprinklers, irrigation, and pumps) was applied to community-wide kWh (rate for municipal water use is 4.18%, and is = kWh for sprinklers, irrigation, pumps / total kWh for all municipal operations. Next, 4.18% ws applied to community-wide kWh (excluding municipal kWh for water use) to determine community-wide kWh consumed for community-wide water use.
2. To determine a rate of kWh consumed per gallon used in the City, the ratio of municipal kWh per gallon consumed was utilized, as reflected in the rate of municipal energy use for sprinklers, irrigation, and water delivery pumps. (17,824 kWh {sprinklers and irrigation}+117,435 kWh {water delivery pumps} / .5 {proportion of total water consumption attributed to municipal operations} X 9,540 MG {total water consumed in Novato in 2005} = 28.356 kWh/MG
3. To determine the amount of water consumed in the City that exclude water consumed by municipal operates as calculated above, 95% of total water consumed in Novato in 2005 was taken (.95 X 9,540 MG = 9,063 MG total consumption excluding municipal consumption)
4. The ratio of 28.356 kWh/MG was applied to 9,063 MG consumed by the community to obtain kWh use that can be attributed to water consumption in 2005 (28.356 kWh/MG X 9,063 MG = 256,990.928 kWh in 2005 .
5. The ratio of kWh consumed for water use per total kWh in 2005 was applied to target projections of total kWh for 2020 and 2030 (excluding municipal operations) to determine projected community-wide kWh attributed solely to water use.
6. The ratio of community-wide water use per community-wide kWh consumed (excluding

6. The ratio of community wide water use per community wide kWh consumed (excluding municipal use) in 2005 was applied to projected kWh to determine projected water use
7. The percentage of reductions to projected water use was applied, and a kWh energy reduction equivalent taken using the rate of kWh/water consumed derived for the city.

Source:

- California Energy Commission (November 2005). Final Staff Report: California's Water-Energy Relationship, page 154-155. Retrieved <http://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDF>, citing "Waste Not, Want Not: The Potential for Urban Water Conservation in California", The Pacific Institute, November 2003.
- City of Novato 2005 Greenhouse Gas Inventory.
- Marin Clean Energy Partnership tool.
- MMWD annual production report 2005: <<missing link from MCEP>>
- North San Pablo Bay Restoration and Reuse Project Environmental Impact Report/Environmental Impact Statement (May 2009). Executive Summary, page ES-16. <http://www.nbwra.org/docs/>

12 Municipal Water Use
Goal 4 - Water Conservation

Measure Text
12. Municipal Water Use: Implement programs to reduce the use of potable water in municipal facilities.

Program Description
a. Recycled Water: Use recycled water for agency facilities and operations, including parks and medians where appropriate.

b. Water Conservation Plumbing and Irrigation Systems: Maintain existing plumbing fixtures and irrigations systems to minimize water use, and upgrade with water-conserving technology upon replacement to improve water efficiency by 20% above the California Building Standards Code water efficiency standards.

Co- Benefits
With increased water efficiencies, not only will total kWh for transport of water be decreased, but the community's water supply will be more greatly protected and preserved for future needs. The water efficiencies associated with this measure are assumed to be attributable to

Energy Reductions

	2020	2035
kWh Attributed to Municipal Water Use for Municipal Sprinklers, Irrigation, and Pumps	143,917	161,881
Annual Decrease in kWh with 1.8% Reduction	2,590	2,914

Methodology:

1. The percentage of municipal energy consumption for water is based on baseline data in the 2005 GHG Inventory. It was assumed that the proportion of municipal energy use for municipal sprinklers, irrigation, and pumps compared to total municipal energy use in 2005 would remain constant in the target years.

2. A 1.8% reduction was applied to the amount of projected energy consumption for municipal water use for municipal sprinklers, irrigation, and pumps. This reduction would result from co-investment by energy utilities for municipal water efficiency, based on the conservative estimate from the CEC.

Assumptions:

1. CEC estimates are based on a conservative estimate of 5,000 kWhrs/mg saved.
2. Assumes that the projected statewide decrease in energy use for increased efficiencies in water systems also applies at the municipal level.
3. Assumes that co-investment by energy utilities would be targeted specifically for water efficiencies in municipal water use and not community-wide use, and that efficiency improvements would be targeted specifically to municipal infrastructure for sprinklers, irrigation, and pumps (excludes energy use for water that would take place in other city facilities).
4. Assumes that the proportion of municipal energy use for municipal sprinklers, irrigation, and pumps compared to total municipal energy use in 2005 would remain constant in the target years. { ([kWh for municipal pumps, sprinklers, and irrigation in 2005]/[total kWh for municipal energy use in 2005]) * (projected kWh

for municipal energy use in target year) }
5. Assumes that the proportion of municipal kWh in 2005 compared to total community-wide kWh in 2005 would remain constant in the target years { (municipal kWh in 2005)/(total kWh in 2005) X (projected kWh in target year) = projected community-wide kWh in target year }

Sources:

California Energy Commission (November 2005). Final Staff Report: California's Water-Energy Relationship, page 154-155. Retrieved <http://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDF>, citing "Waste Not, Want Not: The Potential for Urban Water Conservation in California", The Pacific Institute, November 2003.
City of Novato 2005 Greenhouse Gas Inventory.

13 Vehicle Idling
Goal 5 - Energy Efficiency and Alternative Fuels

Measure Text
13. Vehicle Idling: Improve traffic flow and reduce VMT within the City.

Supporting Policies
The goal of this measure is to reduce GHG emissions from transportation sources by improving traffic flow through 1) synchronize signals, evaluate transit and emergency signal priority, and implement other traffic flow management techniques; and 2) Implementing Vehicle Idling limitations for commercial and construction vehicles, and buses beyond state law.

Co- Benefits
Reduced time and costs associated with travel.

VMT Reductions

	2020	2035
Average local trip length (minutes)	10	10
Average local trip length (miles)	4	4
Percentage of VMT attributed to local roads	29%	29%
Average number of local trips	46,431,533	55,502,307
Decrease in trip length from traffic signal synch	16%	16%
Decrease in idling time (minutes)	37,145,226	44,401,846
Heavy-Duty Truck population targeted	250	500
Hours per year truck idling	60,000	120,000
Decrease in diesel consumption (gallons)	55,000	110,000
Decrease in gasoline consumption (gallons)	309,544	370,015
Equivalent VMT reduction	5,987,738	7,467,278

Methodology:

- Average local trip length in miles and minutes derived from various local driving scenarios modeled through Google Maps and Yahoo driving directions.
- Percentage of VMT attributed to local roads calculated by dividing baseline local road travel by total travel. Assumed to be constant in 2020 and 2035.
- Average number of local trips calculated by dividing the local road VMT by the average trip length.
- Decrease in trip length from traffic signal synchronization based on a range of 8-25% as reported by John S. Niles in the Seattle Times article, "T-Ops: Use Technology To Combat Congestion." The 16% reduction is a median and supported by the traffic light synchronization project in Los Angeles - http://latimesblogs.latimes.com/lanow/2009/10/82-of-las-streets-now-covered-by-synchronized-traffic-lights.html
- Truck population: According to EMFAC2007, the 2005 population of heavy duty trucks (over 10,000 lbs) in 2005 was approximately 2,500. Assuming that truck activity is

proportionate with VMT as reported in the 2005 Baseline Inventory, Novato would be responsible for 20% of traffic and vehicles or approximately 500 heavy-duty trucks. Assume that this anti-idling enforcement successfully targets half, or 250 heavy-duty trucks by 2020 and all trucks by 2030.

- Assume heavy trucks idle for one hour per day for 240 days/year (5 day work week minus holidays)
- According to http://www.cobbcountyga.gov/green/downloads/meassure37-reduction.pdf, vehicles consume 1 gallon of diesel fuel for every hour of idling. Assume 0.5 gallons per hour for passenger cars
- Conversion to equivalent VMT completed using Marin County MPG from EMFAC2007 - 18.1 for gasoline and 7.0 for diesel

14 Trip Reduction
Goal 5 - Energy Efficiency and Alternative Fuels

Measure Text
14. Vehicle Trips: Facilitate programs aimed at reducing vehicle trips.

Program Description
1) Work with Rideshare 511 and major employers to create ride-share programs, preferential parking, and shuttle services to public transit connections; and 2) Facilitate development of a City-wide car-share program.

VMT Reductions

	2020	2035
Total Employment	27,670	32,700
Annual VMT Reduced per Rideshare Participant	211	211
Rate of Participation in Rideshare Programs	12%	15%
Annual VMT Reduced per Car Share Participant	3000	3000
Rate of Participation in Car Share Programs	543	566
Annual Decrease in VMT	2,330,102	2,733,691

Methodology:

a. Rideshare incentive programs: SLO County Rideshare Case Study – In 08/09 there were 95 employers representing 838 individuals enrolled in their Trip Reduction Incentive Program - Lucky Bucks (which includes rewards and guaranteed rides home for commuters). Cumulatively they eliminated 98,151.6 1-way trips and 1,769,444 VMT, or 117.126 trips and 211.15 VMT reduced annually per person. Total employment in SLO County is approximately 103,000 in 2008, therefore total participation is approximately 8%.

b. Participation in carsharing programs in a typical region is 10-20% of residents living in neighborhoods suitable for carsharing, and perhaps 3-5% of those residents would carshare rather than own a private vehicle ownership if the service were available (VTPI, 2009). Car share is found to typically be used by residents that drive 6,000 miles a year or less. Reduction is approximately 50%, or 3,000 miles a year.

Sources:

1. Rideshare Lucky Bucks statistical data provided by Cindy Blake, Rideshare Administrative Assistant, on Nov. 3, 2009.
2. San Luis Obispo Council Of Governments. Update to Long Range Socio-Economic Projections: May 15, 2009.
3. Care Share: Victoria Transportation Planning - http://www.vtpi.org/tdm/tdm7.htm

Assumptions

Assumes that current rate of participation is similar to that of the San Luis Obispo Rideshare program and will increase to 15% of the commuting population by 2035.

15 Low Emission Vehicle Infrastructure
Goal 5 - Energy Efficiency and Alternative Fuels

Measure Text
15. Low Emission Vehicle Infrastructure: Improve infrastructure for low emission vehicles.

Program Description
a. Low Emission Vehicle Infrastructure: Work with the Transportation Authority of Marin and Marin Climate and Energy Partnership to develop infrastructure and facilities for low emission vehicles, including extended-range electric vehicles (EREV), plug-in hybrid electric vehicles (PHEVs) and all-battery electric vehicles (BEVs).

b. Low Emission Vehicle Facilities: Require new/modified commercial and civic developments to provide charging facilities for low emissions vehicles (Level 3, Hi Power) when appropriate.

c. Electric Vehicle Adoption Campaign: Support a local Electric Vehicle adoption campaign.

VMT Reductions

	2020	2035
Number of Charging Spaces	300	600
Avg Annual Vehicle Miles per Space	4704	4704
Annual VMT Reduction	1411200	2822400
Annual Electricity Use	783216	1566432

Methodology:

Electric vehicles (EV) are much more efficient than standard internal combustion engine vehicles. The performance of this measure is related to the replacement of standard vehicles with EV's once the necessary infrastructure is available. The literature supports the fuel use reduction equivalent to one 10 mile trip for every charging station available. The energy use needed to service the charging stations was then calculated to discount the emissions reductions.

Assumptions:

Assumes that stations will be installed through civic and private development at the rate of 20 per year.

Sources:

-Calculated assuming parking spaces were used for commuting: 5 days/week, 48 weeks/year, 9.8 miles each way.
-Source for trip length: National Household Travel Survey, 2001. 2,298 Billion miles/235 Billion trips = 9.8 miles/trip.
- Kwh used = 11.1*gallons of gasoline saved. Based on a comparison of miles/gallon and Kwh/mile of 1999 Ford Ranger, 1998 Chevy S-10 and 1998 Toyota RAV. Gas mpg from www.fueleconomy.gov/feg.findacar.html. Electric Kwh/mile from Idaho National Laboratory (2006) "Full Size Electric Vehicles" Advanced Vehicle Testing Reports at avt.inel.gov.

16 City Low Emission Vehicles
Goal 5 - Energy Efficiency and Alternative Fuels

Measure Text
16. City Low Emission Vehicles: Increase the use of alternative fuel vehicles to reduce vehicle GHG emissions.

Program Description
a. Vehicle Fleet: Convert the City's vehicle fleet to hybrid, electric, and alternative fuel vehicles.

b. Clean Diesel: Continued installation of diesel oxidation catalysts on the diesel powered vehicles and equipment as required by state law.

Co- Benefits
Hybrid and other alternative fuel vehicles have a lower operating cost than conventional vehicles.

VMT Reductions

	2005	2020	2035
Number of Vehicles Replaced with Hybrids		15	30
Number of Vehicles Replaced with Evs		5	10
Miles per Gallon of Vehicle Replaced		14	14
Miles per Gallon of Replacement Hybrid		25	25
Miles per Gallon of Replacement EV		n/a	n/a
Average Annual Miles per Hybrid		3,266	3,266
Average Annual Miles per EV		117	117
Annual Gasoline Savings (gallons)		28,018	56,035
Annual Decrease in VMT		392,248	784,497
Annual kWh Electricity Use by EVs		463	925

Methodology:

- This measure quantifies hybrid and electric replacements for 50% of City vehicles in the Public Works department. Police Department vehicles and motorcycles are excluded from this analysis as they are required to maintain pursuit capabilities. There is low feasibility of installing a diesel fueling facility to run Biodiesel or a CNG fueling site, therefore these alternative fueling methods are not accounted for.
- The City had 81 vehicles in 2005 in the Public Works division. For this analysis, we assume that a quarter (20) will be replaced with hybrid vehicles before 2020 and half (40) will be replaced before 2035.
- The City's baseline inventory shows that the average annual mileage of City public works vehicles is 3,266 miles.
- MPG for hybrid and replacement vehicles is an average between a mid-sized auto and pickup truck fMPG from fueleconomy.gov.

Sources:

1. www.fueleconomy.gov used to compare fuel efficiencies of fleets being replaced in 09/10, 10/11 and 11/12 CIP budgets.
2. Replacement schedule provided by Mike Brunelle, Equipment Supervisor for the City of Novato

Novato.

3. Average annual miles per hybrid and EV based on usage data of existing alternative fleet vehicles; provided by Mike Brunelle, Equipment Supervisor for the City of Novato and Nancy Andrews, Police Dept. Management Analyst.

Assumptions:

It was assumed that the rate of fleet upgrades would remain constant, and that the type and frequency of conversion to hybrid or Electric alternatives would also remain consistent. Vehicle types converted to alternative fuel technologies were assumed to be similar to those currently available. Additionally, it was assumed that no GNG or biodiesel vehicles would be purchased due to infrastructure needs.

17 Mixed Use, Infill Development
Goal 6 - Land Use and Design

Measure Text
17. Require mixed-use, infill development at higher densities to ensure providing a mix of housing, employment and commercial services within the community.

Program Description
a. Public Outreach: Educate the public about the benefits of well-designed, higher density development.

b. Land Use Mix: Reevaluate land use types and mixes to ensure residents' needs are met within the City.

c. Neighborhood Serving Commercial Services: Provide for neighborhood-serving commercial services within 3-miles of all residential uses.

d. Jobs-Housing Balance: Reevaluate land uses and obstacles to development to encourage a balance of jobs to housing.

f. Mixed-Use, High Density and Infill Development: Encourage the development of mixed-use, high density, infill development near transit and amenities.

g. Detached Single-Family Residences: Continue to support the Urban Growth Boundary by reducing the number of single-lot/single-family detached residences.

Co- Benefits
In addition to GHG reductions, mixed-use redevelopment promotes a variety of densities and housing types, improves the livability of the community by providing amenities in close proximity to residences, and improves air quality by reducing the number of trips necessary to provide for basic household needs.

VMT Reductions

	2020	2035
Percentage decrease in VMT per 100% increase in density (Citywide)	0.05	0.05
Percentage increase density from 2005 (Citywide)	0.07	0.16
Percentage decrease in VMT (Citywide)	0.0034	0.0082
Annual Decrease in VMT (Citywide) (total VMT X % decrease in VMT)	2,176,620	6,269,433
VMT from new development	67,898,907	193,453,349
VMT attributed to shopping and commuting	21,795,549	62,098,525
Percentage decrease in VMT for mixed-use and jobs-housing balance	0.50%	0.50%
Annual Decrease in VMT for mixed-use and jobs-housing balance	108,977.75	310,492.63

Total VMT reduction for increased density and convenience to services	2,285,597.36	6,579,925.87

Methodology and Assumptions:

The performance of this measure is related to the elasticity of increased density and reduced travel associated with the increased mixture of uses. The literature supports a 5% reduction in vehicle miles traveled for every 100% increase in density and increase in convenience. To calculate the net increase in density in the City between 2005 and the target years, the following variables were needed.

-Population density from residents and employees Citywide in 2005, 2020, and 2035.

Based on a study by Ewing, Reid, et al. (2001), it was assumed that a 5% reduction in VMT would result from each 100% increase in density. Accordingly, 0.05 was taken of each target year's percent increase in density. The resulting number was the % reduction in VMT for the target year. The percent of reduction in VMT for the target year that resulted from the measure was multiplied by the annual VMT projected for that year. This resulted in a total projected decrease in VMT Citywide attributed to increased density.

Similarly, the literature supports a 5% reduction for increasing jobs-housing balance and convenience of shopping and services. Relying upon the percentage of travel attributed to shopping and commuting from national averages (14% shopping and 18% commuting) it was assumed that shopping and commuting related trips would be reduced by 5%.

Sources:

1. ONL (2004), Transportation Energy Book, Oak Ridge National Lab, Dept. of Energy (http://cta.ornl.gov/data/index.shtml.

2. Climate Change Action Plan: Addressing Greenhouse Gas Emissions Under the California Environmental Quality Act; Draft Staff Report, June 30, 2009. San Joaquin Valley Air Pollution Control District. CCAP Transportation Emission Guidebook.

3. TIAX Results of 2005 Literature Search Conducted by Tax on behalf of SMAQMD, as cited in CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, January 2008. California Air Pollution Control Officers Association. (Appendix B)

18 Jobs/Housing Balance
Goal 19 - Land Use and Design

Measure Text
18. Jobs/Housing Balance: Attract a variety of employment opportunities, including higher paying jobs, for those who live, or are likely to live, in the community.

Program Description
This measure quantifies the impact of the close proximity of jobs and housing and shows the result of the City achieving an ideal ratio of 1.5 jobs per each household. This ratio will lead to a decrease in VMT, while the number of households and jobs within the City increases. Many residents currently have to drive in order to access employment opportunities. By working to improve the jobs-housing balance within the community, the City will ensure that jobs and housing are provided in close proximity and decrease the need for residents to drive for work, thus decreasing the VMT generated by the community. ABAG's 2009 Projections were utilized to estimate household and job growth within the City.

VMT Reductions

	2020	2035
Households	21130.00	22330.00
Employment	27670.00	32700.00
Percentage decrease in VMT	0.08	0.09
Annual Decrease in VMT	52,613,006.93	68,034,702.16

Methodology:

The calculation for expected transportation emissions reductions was provided by the SJVAPCD Climate Change Action Plan. 2030 General Plan household projections were utilized as were employment estimates.
Tool/Method (trip reduction = (1-(ABS(1.5*h-e)/(1.5*h+e))-0.25)/0.25*0.03) where h = study area housing units, e = study area employment.

Sources:

1. Climate Change Action Plan: Addressing Greenhouse Gas Emissions Under the California Environmental Quality Act; Draft Staff Report, June 30, 2009. San Joaquin Valley Air Pollution Control District. (page 124)
2. Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.
3. Nelson/Nygaard, 2005. pg. 12. (trip reduction = (1-(ABS(1.5*h-e)/(1.5*h+e))-0.25)/0.25*0.03) where h = study area housing units, e = study area employment, and ABS = absolute value (Criterion & Fehr & Peers, 2001). Asymptote of 9% reduction, and an ideal 1.5 jobs per household. Note, these point reductions were taken from Urbemis 2007 9.2.458 data according to sample jobs to housing ratio.
4. Urbemis 2007 Version 9.2.4. Rimpo and Associates.

Assumptions

Assumptions: With this measure the estimated achieved GHG emission reduction is between 3.0% and 9.0% depending on jobs-housing balance. Assumes ideal balance of 1.5 jobs per household. In buildings that are ten floors high or less, no single use may constitute less than 10% of total floor space. For buildings with more than ten floors, 75% of ground level floor space must be designated for retail uses. Maximum Mitigation granted only for vertical mixed-use in single buildings with a FAR of 1.5 or greater. For detached buildings within a single site, all buildings must be placed within ¼ mile of the geographic center of the project site.

19 Affordable Housing
Goal 6 - Land Use and Design

Measure Text
19. Affordable Housing: Continue support of affordable housing ordinance & programs.

Program Description
A significant amount of evidence points to the fact that lower-income households and senior citizens own fewer vehicles and drive less. Furthermore, affordable housing ensures an equitable and just community in which people of all income levels can live in Novato.

Source(s):
Holtzclaw, John; Clear, Robert; Dittmar, Hank; Goldstein, David; and Haas, Peter (2002), "Location Efficiency: Neighborhood and Socio-Economic Characteristics Determine Auto Ownership and Use – Studies in Chicago, Los Angeles and San Francisco", Transportation Planning and Technology, 25 (1): 1-27.

VMT Reductions

	2020	2035
% of units that are BMR	10%	10%
New Households	1,330	2,530
Percentage decrease in VMT	0.004	0.004
Annual Decrease in VMT	2,570,755	3,072,973

Methodology:

URBEMIS provides a 4% reduction in vehicle trips for each deed-restricted BMR unit. Thus, the total reduction is as follows: Trip reduction = % units that are BMR * 0.04. The 2009 RHNA numbers require that the number of Below Market Rate Units in Novato be increased from 7% of all units in 2009 to 10% by 2014. We will assume that approximately 10% of all new housing will be low, very low, or extremely low income between 2009 and 2035.

Assumptions

Assume that all new traffic is caused by new business growth and new housing growth equally.

Sources:

1. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, January 2008. California Air Pollution Control Officers Association. (Appendix B MSG-21)
2. Nelson/Nygaard Consulting Associates, Creating Low-Traffic Developments: Adjusting Site-Level Vehicle Trip Generation Using URBEMIS, 2005.

20 Pedestrian Connections
Goal 6 - Land Use and Design

Measure Text
20. Pedestrian Convenience: Promote walking through design standards and amenities that concentrate uses, reduce the need to vehicular travel, and enhance the pedestrian experience.

Program Description
a. Ensure that applications for new office and mixed-use development analyze the project's connection and orientation to pedestrian paths, bicycle paths, and existing transit stops within 1/2 mile of the project site. Project must be oriented towards existing transit, bicycle, or pedestrian corridor with minimum setbacks.

b. Require applications for new office and mixed-use development in downtown areas to minimize setbacks from the street and provide pedestrian pathways. Primary entrances shall be located on street frontage, with parking lot designed to include clearly marked and shaded pedestrian pathways between transit facilities and building entrances.

c. Encourage pedestrian oriented plazas, walkways, bike trails, bike lanes and street furniture within the Civic Center area and connections to other community areas.

d Pedestrian Convenience: Promote pedestrian convenience and recreational opportunities through development conditions requiring sidewalks, walking paths, or hiking trails connecting various land uses and including safety amenities such as lighting and signage.

Co- Benefits
In addition to GHG reductions, the measure also promote cohesive communities and small local businesses. It facilitates a higher quality of life that is more easily accessible.

VMT Reductions

	2020	2035
VMT from new development	67,898,907	193,453,349
Percentage decrease in VMT	3.50%	3.50%
Annual Decrease in VMT	2,376,462	6,770,867

Methodology:

-The CCAP guidebook attributes emissions reductions for a variety of pedestrian measures. Applicable measures include a 0.5% reduction for connectivity to transit, as the increased density and ridership will facilitate improvement in transit frequency, a 1.5% reduction for measures which relegate parking to the rear of structures so that public entrances are oriented toward the pedestrian, a 0.5% reduction related to providing shaded pedestrian pathways between transit facilities and building entrances to increase the comfort of the user while walking to the building entrance, and a 1% reduction for minimizing barriers to pedestrian access of neighboring facilities and sites.

Sources:

1. Climate Change Action Plan: Addressing Greenhouse Gas Emissions Under the California Environmental Quality Act; Draft Staff Report, June 30, 2009. San Joaquin Valley Air Pollution Control District. (page 116)

2. CCAP Transportation Emission Guidebook; TIAX Results of 2005 Literature Search Conducted by Tax on behalf of SMAQMD, as cited in CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, January 2008. California Air Pollution Control Officers Association. (Appendix B)

Assumptions

Assume that all new VMT is due to increased development within the City. Assume that all development will include the removal of physical barriers between residential and non-residential uses that impede bicycle or pedestrian circulation.

21 Commercial Bicycle Parking
Goal 7 - Non-Vehicular Travel

Measure Text
21. Non-Residential Bicycle Facilities: Increase bicycle parking requirements for new and significantly retrofitted non-residential projects to a minimum rate of 1:20 vehicle spaces. Bicycle parking shall be divided between short-term facilities (bike racks) and long-term facilities (bike lockers or other covered facility). Continue implementing requirements for showers, lockers, and changing space in all large non-residential facilities.

Co- Benefits
In addition to GHG reductions, the measure also promote a healthful lifestyle and reduced commuting costs for individuals, and alleviates traffic congestion and improves local air quality.

VMT Reductions

	2020	2035
VMT Attributed to commercial businesses	266,715,851	318,820,945
VMT Attributed to new commercial	15,422,673	64,641,678
Percentage decrease in VMT	0.6250	0.6250
Annual Decrease in VMT	9,639,170.63	40,401,048.60

Methodology:

SJVAPCD Climate Change Action Plan and manipulated to correspond to the bicycle parking requirements proposed for the City of Novato.
According to the CAPCOA/the SJVAPCD Plan, provision of short and long term bike parking at the rate of 1:20 vehicle spaces supports a 0.625% reduction in emissions. Assuming reduced emissions are attributed equally to short- and long-term bicycle parking spaces, then 1/2 of the reduction (or 0.3125%) is attributable to each short- and long-term spaces provided at the 1:20 ratio. The City of Novato is proposing requiring short-term bike parking at twice that rate, or 1:20 vehicle spaces, so the reduction for this half of the measure would result in double 0.3125%, or 0.625%. The proposed long term bike parking ratio of 1:20 would result in an additional 0.3125% reduction. According to the 2001 National Household Travel Survey, average annual VMT per household is 21,187 and the “to or from work” sub-category is 5,724 (27.0%). Shopping is 3,062 (14.5%). Other Family and Personal Business is 3,956 (18.7%). Social and Recreational driving is
5,186 (24.5%). Therefore, VMT attributed to commercial businesses is 27% + 14.5% = 41.5%

Sources:

1. Climate Change Action Plan: Addressing Greenhouse Gas Emissions Under the California Environmental Quality Act; Draft Staff Report, June 30, 2009. San Joaquin Valley Air Pollution Control District. (page 106)
2. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, January 2008. California Air Pollution Control Officers Association. (Appendix B)
3. The 2001 National Household Travel Survey includes a “Summary of Travel Trends” published here: http://nhts.ornl.gov/2001/pub/STT.pdf (2.4 MB download). See page 30 of the PDF.

Assumptions

It was assumed that emissions reductions for commercial bicycle parking are attributed equally to short- and long-term bicycle parking spaces.

22 Residential Bike Parking
Goal 7 - Non-Vehicular Travel

Measure Text
22. Multifamily Bicycle Parking: Increase bicycle parking requirements for new multi-family residential construction. Short-term facilities shall be provided at a minimum rate equal to 10% of vehicle spaces. Long-term facilities shall be provided at a ratio of one long-term bicycle parking space for every unit. Long-term facilities shall consist of one of the following: a bicycle locker, a locked room with standard racks and access limited to bicyclists only, a standard rack in a location that is protected from the elements and monitored by video surveillance 24 hours per day. or designated space within the units garage/carport.

Co- Benefits
In addition to GHG reductions, the measure also promote a healthful lifestyle and reduced commuting costs for individuals, and alleviates traffic congestion and improves local air quality.

VMT Reductions

	2020	2035
Percentage of total households that are multifamily	30%	35%
VMT attributed to the residential sector	279,569,627	334,185,809
VMT attributed to NEW multi-family	5,279,143	13,252,196
Percentage decrease in VMT	0.625%	0.625%
Annual Decrease in VMT	32,994.64	82,826.22

Methodology:

- According to the CAPCOA/ the SJVAPCD Plan, provision of long term bike parking at the rate of 1 per unit supports a 0.625% reduction in emissions.
- According to the 2001 National Household Travel Survey, average annual VMT per household is 21,187 and the “to or from work” sub-category is 5,724 (27.0%). Shopping is 3,062 (14.5%). Other Family and Personal Business is 3,956 (18.7%). Social and Recreational driving is 5,186 (24.5%). Therefore, VMT attributed to residents is 18.7% +24.5% = 43.5 (trips to commercial destinations are captured within the commercial bike parking measure).
- Multifamily households currently constitute 25% of Novato's housing stock (Existing Conditions Report, page 3-15). Assume multifamily households increase to 30% by 2020 and 35% by 2035
- It was assumed that the percentage of multi-family housing would gradually increase from the current 25% to 35% by 2035.

Sources:

1. Climate Change Action Plan: Addressing Greenhouse Gas Emissions Under the California Environmental Quality Act; Draft Staff Report, June 30, 2009. San Joaquin Valley Air Pollution Control District. (page 106)
2. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, January 2008. California Air Pollution Control Officers Association. (Appendix B)
3. The 2001 National Household Travel Survey includes a “Summary of Travel Trends” published here: http://nhts.ornl.gov/2001/pub/STT.pdf (2.4 MB download). See page 30 of the PDF.

23 Complete Streets
Goal 7 - Non-Vehicular Travel

Measure Text
23. Complete Streets: Adopt “Complete Street” standards to facilitate multi-modal access for those trips that cannot be completed by walking alone.

Program Description
a. Pedestrian and Bicycle Design Standards: Develop and implement comprehensive pedestrian and bicycle design standards that require streets to provide for safe and convenient system of bicycle routes and pedestrian ways, including sidewalks, walking paths or other connections, with safety amenities such as lighting and signage.

b. Bicycle Infrastructure and Facilities: Expand bicycle infrastructure and facilities, such as bicycle stoplight sensors, bicycle lanes and paths, etc.

c. North/South Bicycle Path: Develop a North/South bicycle path through the City.

d. Ensure that applications for new office and mixed-use development analyze the project's connection and orientation to pedestrian paths, bicycle paths, and existing transit stops within 1/2 mile of the project site. Project must be oriented towards existing transit, bicycle, or pedestrian corridor with minimum setbacks.

e. Require applications for new office and mixed-use development in downtown areas to minimize setbacks from the street and provide pedestrian pathways. Primary entrances shall be located on street frontage, with parking lot designed to include clearly marked and shaded pedestrian pathways between transit facilities and building entrances.

f. Encourage pedestrian oriented plazas, walkways, bike trails, bike lanes and street furniture within the Civic Center area and connections to other community areas.

Co- Benefits
In addition to GHG reductions, the measure also promote a healthful lifestyle and reduced commuting costs for individuals, and alleviates traffic congestion and improves local air quality.

VMT Reductions

	2020	2035
Miles of new Class I bike lanes	0.985	1.97
Miles of new Class II bike lanes	2.99	5.98
Miles of new Class III bike lanes	1.675	3.35
Total new bike lanes	5.65	11.30
City Population	54,300	56,600
Percentage increase in bike commuting	0.23	0.48
Current Percentage of bike commuters	0.01	0.01
Annual Decrease in VMT	1,478,802.82	3,685,147.59

From VTPI:

being equal (Nelson and Allen, 1997).
- Assumed that 1% of trips are performed by bikes per national average (Source: Comsis Corporation (1993), Implementing Effective Travel Demand Management Measures: Inventory of Measures and Synthesis of Experience, USDOT and Institute of Transportation Engineers (www.ite.org).)

Sources:

- Dierkers, G., E. Silsbe, S. Stott, S. Winkelman, an M. Wubben. 2007. CCAP Transportation Emissions Guidebook. Center for Clean Air Policy. Washington, D.C. Available: <http://www.ccap.org/safe/guidebook.php>. as cited in California Air Pollution Control Officers Association (CAPCOA) 2008. CEQA and Climate Change.
- Miles of existing and new Bike lanes from the City of Novato 2007 Bike Plan.
- Victoria Transportation Planning Institute (VTPI) - http//www.vtpi.org/tdm/tdm93.htm

24 Parking Standards
Goal 7 - Non-Vehicular Travel

Measure Text
24. Parking Standards: Revise parking standards to disincentivize single-occupant vehicles and promote non-vehicular travel for developments in commercial, multi-unit residential, or mixed-use developments near transit. Account for design elements that promote non-vehicular travel such as proximity to transit, proximity to employment centers, bicycle facilities, and location near transit.

Program Description
a. Special review of parking is required to allow a project to build less than the typically mandated amount of parking if the development features design elements that reduce the need for automobile use.

b. Parking Management Program: Develop a comprehensive Parking Management Program that includes parking fees and design elements promoting non-vehicular travel, such as thru reduced on-site parking requirements, adjusted parking pricing, and shared parking facilities.

c. Preferential Parking: Provide preferential parking in public and private developments for alternative-fuel vehicles, carpools and vanpools, etc.

Co- Benefits
In addition to GHG reductions, the measure also promote a healthful lifestyle and reduced commuting costs for individuals, and alleviates traffic congestion and improves local air quality.

VMT Reductions

	2020	2035
Percentage decrease in VMT	10%	10%
Percentage of VMT on local roads	29%	29%
Decrease in VMT	18,809,878	22,484,539

Methodology:

- Cost-based parking pricing (i.e., prices set to recover the full cost of parking facilities) typically reduces parking demand 10-30% compared with unpriced parking (Shoup, 2005). Reduction of 10% applied to local road trips

Source:

- Donald Shoup (2005), The High Cost of Free Parking, Planners Press (www.planning.org).

25 Transit Improvements
Goal 7 - Non-Vehicular Travel

Measure Text
25. Public Transit: Work with transit providers to plan, fund and implement additional transit services that are cost-effective and responsive to existing and future transit demand.

Program Description
a. School Bus Service: Work with the Novato Unified School District to restore or expand school bus service.

b. Expand efforts to work with transit providers to include Sonoma transit and any shuttles that are currently being used between Sonoma and Marin.

c. Public Transit Incentives: Provide public transit incentives such as free or low-cost monthly transit passes.

d. Shuttle Service: Work with large employers to provide shuttle service to public transit.

e. Improve Security: Improve lighting and other security measures near public transit and park-and-rides.

f. SMART Stations: Maximize use of MTC grants to plan for SMART stations.

g. Downtown SMART Whistle Stop: Include a downtown SMART Whistle-Stop (request stop) at the existing station.

h. Park and Rides: Evaluate the need for additional Park & Ride lots.

VMT Reductions

	2005	2020	2035
Transit Ridership	766,071	809,287	830,479
Percentage increase in frequency of bus travel		30%	50%
Transit Ridership with increased freq.		810,501	832,555
Annual Decrease in VMT		444,298	664,840

Methodology:

-Marin Transit reported 3,647,956 passengers in 2008 (70,947 per week) in 2008. According to a rider survey, 21% of riders live in Novato. Assuming constant ridership per community served by Marin Transit, Novato transit ridership is approximately (3,647,956* .21) = 766,070.8
- As cited in the Existing Conditions Report, 200 Census data reveals that 8% of Novato residents report using transit for commuting.
- Assume transit ridership grows evenly with population growth
- For very 1.0% increase in transit service (measured by transit vehicle mileage or operating hours), ridership increases 0.5% (Victoria Transportation Policy Institute, vtpi.org/tdm/tdm47.htm) With the introduction of SMART lines to Novato by 2020, we expect this increase in connectivity and frequency to be significant.

Source:

1. Victoria Transportation Policy Institute, vtpi.org/tdm/tdm47.htm
2. Marin Transit, Lauren Gradia, Transportation Planner (Lgradia@co.marin.ca.us).

26 Safe Routes to School
Goal 7 - Non-Vehicular Travel

Measure Text
26. Safe Routes to School: Collaborate with the Transportation Authority of Marin to expand Safe Routes to School Programs, including a walking school bus program to provide a supervised, safe, and timely commuting alternative for children.

Program Description
To actively promote walking as a safe mode of local travel, particularly for children attending local schools by employing traffic calming methods such as median landscaping and provision of bike or transit lanes to slow traffic, improving roadway capacity, and addressing safety issues.

According to the most recent census data approximately 8,760 school age children lived in Novato (ages 6-18). Until a few decades ago most grade school students walked or bicycled to school. Now, only a small portion (typically about 20%) walk or bicycle to school in North American communities. Travel to school represents 10-15% of peak period motor vehicle trips in many urban areas. Chauffeuring children to school often results in two vehicle trips, one to the school and one returning home, or four additional trips per day. There are currently few detailed studies of the effectiveness of School Transport Management programs, but anecdotal evidence indicates that total reductions in automobile trips of 10-20% or more are possible at a particular school, and much greater reductions are possible when schools are sited and designed for good accessibility

Co- Benefits
School transport management can provide financial savings to schools and parents, help reduce parking and traffic problems, reduce pollution, and provide safety and health benefits.

VMT Reductions

	2005	2020	2035
Number of Students	8800.00	9296.43	9539.86
Estimated VMT for Student Commute	21120.00	37185.72	38159.46
Annual Decrease in VMT	--	5,577.86	5,723.92

Methodology:

- Assume number of school age children increases evenly with population growth.
- According to VTPI, there are currently few detailed studies of the effectiveness of School Transport Management programs, but anecdotal evidence indicates that total reductions in automobile trips of 10-20% or more are possible at a particular school under programs such as a walking school bus. For the purposes of this study, we will assume a 15% reduction in automobile trips
- Assume average round-trip drop off distance for parents is 5 miles

Source:

1. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, January 2008. California Air Pollution Control Officers Association. (Appendix B MSG-2)
2. National Center for Safe Routes to School. Available at: http://www.saferoutesinfo.org/resources/collateral/srts_talkingpoints.doc
3. U.S. Census Bureau. Available at: http://factfinder.census.gov

Assumptions

All students living within 2 miles of a school will participate (GIS buffers to determine % of residences within 2 miles of schools)

27 Municipal Travel
Goal 7 - Non-Vehicular Travel

Measure Text
27. Municipal Travel: Encourage employees to utilize alternative forms of transportation for commutes and work-related trips.

Supporting Actions
a. Trip Reduction Incentive Program (TRIP): Establish an incentive program for employees who voluntarily participate in alternative forms of transportation to and from work, including parking cash-out, or who participate by telecommuting and/or alternative work schedules, as appropriate.

b. .Bicycle Fleet: Provide fleet bicycles and encourage their use for short trips to meetings or site visits.

VMT Reductions

	2020	2035
Employees	236	246
Employee Travel	575,299	604,537
Participants	47	49
Annual Decrease in VMT	115,060	120,907

Methodology:

- Employee VMT reported in baseline year 2005 as 541,520 VMT for 220 employees. Assume VMT increases with overall transportation trends in the County. Assume employees increase with population
- SLO City TRIP (Trip Reduction Incentive Program) in cooperation with SLO County Rideshare: Case Study - In 08/09 there were 69 individuals enrolled in the City's incentive program (which includes rewards and guaranteed rides home for commuters). Cumulatively they eliminated 9235.2 one-way trips and 122,675.3 VMT, or 133.84 trips and 1,7777.903 VMT reduced annually per person. Total employment at the City of SLO was approximately 350 in 2008, therefore total participation is approximately 20%.
- Assume 20% participation rate

Source:

1. Rideshare Lucky Bucks statistical data provided by Cindy Blake, Rideshare Administrative Assistant, on Nov. 3, 2009.
2. City of San Luis Obispo participation and employment data provided by Kathy Hamilton, City of San Luis Obispo Human Resource Analyst, on Nov. 3, 2009.

28 Zero Waste
Goal 8 - Waste Reduction

Measure Text
28. Zero Waste: Implement the adopted Zero Waste Resolution.

Supporting Actions
a. Construction and Demolition Ordinance: Adopt a more stringent Construction and Demolition Ordinance that mandates a reported 60% diversion (current standard is 50%).

b. Composting and Recycling: Require the City's next solid waste service agreement to include organic waste composting and expanded green waste and recycling options for business and residents, if feasible.

c. Restaurant Food Waste Collection: Work with the Novato Sanitary District to implement a restaurant food waste collection program.

d. E-Waste: Provide e-waste recycling drop-off bins at City facilities.

e. Recycling Containers in Public Areas: Provide interior and exterior storage areas for recyclables and green waste, and adequate recycling containers in public areas, including parks and community centers.

f. Mandatory Recycling at Special Events: Require recycling at City-sponsored and other public events. Evaluate zero waste or recycling requirements for all special events at City facilities and/or all special events that require
a City permit or authorization.

g. Organic Material Recovery Program: Work with the Novato Sanitary District to establish an organic material recovery program for green waste for agency parks and facility landscaping.

h. Residential Outreach: Develop outreach program to encourage residential participation in green waste and composting programs.

i. Non-Residential Outreach: Educate businesses and residents about climate friendly procurement opportunities and opportunities to reduce waste., including discontinuing use of Polystyrene Foam Containers and Disposable Bags.

j. Municipal Purchasing and Procurement Programs: Continue to implement and expand sustainable purchasing programs, including the City's Environmentally Preferable Purchasing Program. Provide a preference or incentives to service providers, vendors and contractors who follow climate-friendly practices, such as the use of recycled content materials, Energy Star or equivalent materials and equipment, as well as alternative fuel vehicles.

Waste Reductions

	2020	2035
Diversion Goal	95.00%	100.00%
BAU Diversion Rate	75.00%	75.00%
Ton Reduction	141	183

Methodology:

- The City of Novato has a goal of Zero Waste by 2025. Waste diversion is assumed to be at 95% by 2020 and 100% after 2025.
- Current composting methods are understood to produce greenhouse gas emissions, however commercial composting methods are expected to improve to negate these emissions by 2020 and 2030.
- Novato's 2005 diversion rate is assumed to be consistent with Marin County at 75% as reported by the CIWMA

Source:

CIWMA webpage: http://www.ciwmb.ca.gov/