

***A Community
Climate and
Energy Action
Plan for Eugene***

September 2010



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Executive Summary

The decade from 2000 to 2009 was the warmest ever recorded.^[1] Over the last three decades, each has been warmer than the one before and science is telling us that this trend will continue.^[2] In addition, the inexpensive fossil fuels that our community and country depend on for transportation, food production, and industry are projected to become increasingly expensive.^[3] Eugene is joining a growing list of cities around the world that are addressing these climate change and energy concerns with a plan to meet the challenges with vision and creativity. In developing this local plan, community leaders and citizens have clearly recognized the need to re-imagine how we live, eat, travel, and play. As we work to adapt to the uncertainties ahead, we can be sure that the boldness of our actions today will determine the quality of life in Eugene now and into the future.

Eugene's first Climate and Energy Action Plan:

In 2008, in response to increasing concern about global climate change and the potential for volatile and rising fuel prices, Eugene's City Council asked staff to develop Eugene's first Community Climate and Energy Action Plan.

The Community Climate and Energy Action Plan goals:

1. Reduce community-wide greenhouse gas emissions 10 percent below 1990 levels by 2020.
2. Reduce community-wide fossil fuel use 50 percent by 2030.
3. Identify strategies that will help the community adapt to a changing climate and increasing fossil fuel prices.

The Six Action Areas:

Buildings and Energy looks at energy used in residential, commercial, and industrial buildings in Eugene. This section includes recommendations to reduce energy use in existing buildings and new construction, expand use of renewable energy, and prepare buildings for climate change.

Food and Agriculture includes everything related to our food production, delivery, distribution, and waste disposal. This section includes recommendations to reduce consumption of meat and dairy foods, reduce greenhouse gas emissions associated with agriculture and food waste, protect regional farmland, increase home- and locally-grown foods, and prepare our food systems for an uncertain future.

¹ "State of the Climate Global Analysis," National Oceanic and Atmospheric Administration, June 2010.

² "IPCC Fourth Assessment Report: Climate Change 2007," Intergovernmental Panel on Climate Change, 2007.

³ "Peaking of World Oil Production: Recent Forecasts," US Department of Energy, 2007.

Land Use and Transportation considers the use of land and the transportation of people and goods. This section includes recommendations to increase urban density and mixes of land use and a focus on improving systems for bike, pedestrian, transit, and electric vehicles.

Consumption and Waste looks at everything in the lifecycle of consumer goods from extraction of raw materials to manufacturing, packaging, distribution, product use and finally, disposal. This section includes recommendations to reduce greenhouse gas emissions associated with consumption of goods, improve recycling and composting, improve municipal purchasing practices, and adapt consumption strategies based on new findings.

Health and Social Services addresses mental and physical health care and assistance programs for disadvantaged populations. This section contains recommendations to prepare health and social systems for a different future and reduce the impacts of *climate*-related disasters.

Urban Natural Resources considers the soil, air, water, plants, and animals of our city. This section contains recommendations to manage land, trees, and water for multiple benefits, update resource management plans, improve access to natural resource data, and expand drinking water and stormwater management programs.

From the Mayor

The City of Eugene has a long history of environmental stewardship. It is a legacy to be proud of. Our planet faces both finite resources and *climate change*, and the Eugene City Council has committed to an entire new level of local action.

The impacts of climate change and increased energy costs affect all of us, regardless of politics, background, or socioeconomic status. These are not simply environmental issues. They are health, economic, social equity and environmental issues.

We have learned that climate change is affected by carbon emissions, and that carbon footprints are linked to the food and goods we purchase. All of us need to rethink our consumption of goods, we consume too much and at an unsustainable rate.

Our city is part of a broader community, we are part of a world that requires each of us to make significant changes in our lives as governments, businesses, and social service agencies and as individuals - we must all work together more effectively to meet these challenges and to mitigate negative impacts.

“These are not simply environmental issues. They are health, economic, social equity and environmental issues.”

Four years ago we began this journey with the Sustainable Business Initiative to foster our city’s leadership in sustainable practices, the triple bottom line of environmental stewardship, economic success and social equity. The Sustainability Commission was formed. Innovative policies and practices moved forward throughout the city, but none more ambitious than the Climate and Energy Plan.

The steps outlined in this plan will not only help us reduce our contribution to climate change and improve community resilience, they will also save taxpayer dollars through improved energy efficiency and less expensive transportation options. They will help build the local economy, provide jobs, improve air quality and public health, and community livability.

This plan is a true collaborative endeavor and the result of many hours of hard work. I am very appreciative of the remarkable efforts of everyone involved in its creation. Thank you all for this investment in our community.

We join over 100 cities in developing emissions reduction targets and creating climate action plans. Together we are a powerful force. Each city, small and large must do its part. Eugene, though modest in size is large in its commitment to the future. We move forward with optimism and a commitment to do our part to ensure a quality future for our city, our country, and our planet.

Kitty Piercy
September 2010



Mayor Kitty Piercy

Timeline and Goals

1989 Oregon legislature first establishes carbon-reduction goal

1992 Rio Earth Summit (United Nations framework convention on climate change)

2006 Eugene Sustainable Business Initiative recommends creation of 1) sustainability commission and 2) metropolitan climate action plan

2009 • Climate Leadership Initiative, et.al. creates report: "Preparing for Climate Change in the Upper Willamette Basin of Western Oregon" – highlighting impacts of climate change to Eugene and surrounding area

• Eugene City Council instructs staff to create a Community Climate and Energy Action Plan

• City of Eugene creates the first Internal (city operations) Climate Action Plan

2020 State of Oregon Goal: Reduce greenhouse gas emissions 10% below 1990 levels

2050 State of Oregon Goal: Reduce greenhouse gas emissions 75% below 1990 levels

1997 Kyoto protocol

• Eugene Mayor signs the US conference of Mayors "US mayor's climate protection agreement", striving locally to meet or beat the Kyoto protocol targets

• City of Eugene creates a greenhouse gas inventory for internal municipal operations

2005 • Oregon strategy for Greenhouse Gas Reductions completed

2007 • Eugene sustainability commission is established

• "City of Portland Descending the Oil Peak" report highlights challenges of fossil fuel depletion

• City of Eugene completes a community greenhouse gas inventory

2010 City of Eugene works with community partners to create Eugene's first Community Climate and Energy Action Plan

2030 City of Eugene Goal: Reduce overall community fossil fuel use 50% below 2005 levels

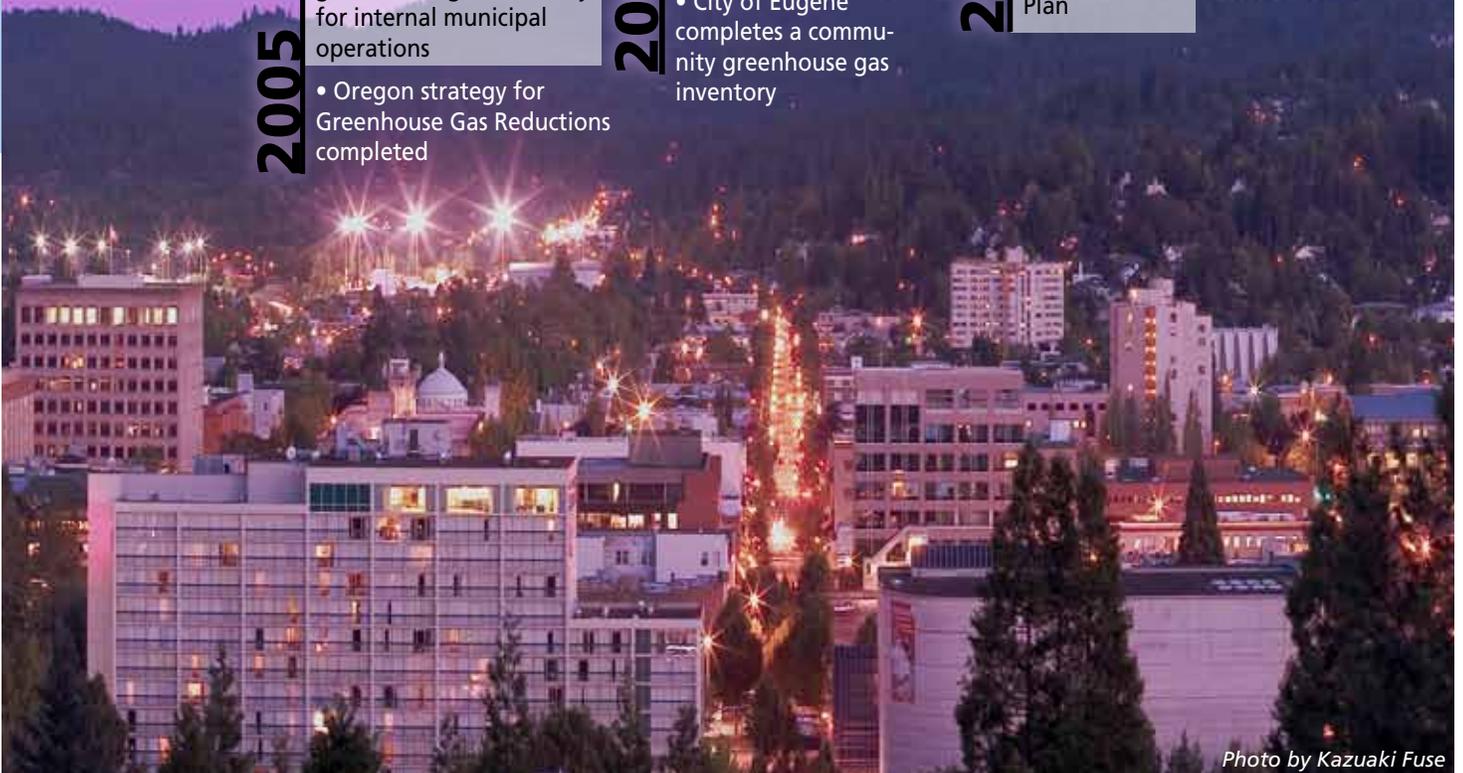


Photo by Kazuaki Fuse

Introduction

PREPARING FOR CHANGE

In the winter of 2008/2009, Eugene's City Council unanimously directed staff to develop a Community Climate and Energy Action Plan (CEAP).^[4] All City operations and City-owned facilities were to be carbon-neutral by 2020. During the same year, the Council committed the City to work with its partners to develop a plan to set carbon emission goals, to suggest effective emission reduction strategies, and to identify ways in which the community can adapt to the anticipated changes. Four months later, the Council expanded the action plan to include steps for achieving a 50 percent reduction in community-wide *fossil fuel* consumption by 2030. This plan is the product of those efforts to understand what climate change and fuel cost increases could mean for Eugene, and to find ways that lessen the expected impacts and meet the goals for reducing emissions and fossil fuel consumption.

While there is considerable discussion and some debate on the issues of climate change in the community and beyond, this plan was undertaken in response to Council direction and is informed by the scientific evidence available at the time of its publishing.

THE COMMUNITY CLIMATE AND ENERGY ACTION PLAN (CEAP)

Goals

1. Reduce community-wide *greenhouse gas* emissions to 10 percent less than 1990 levels by 2020 and 75 percent below 1990 levels by 2050.^[5]
2. Reduce community-wide fossil fuel use 50 percent by 2030.^[6]
3. Identify strategies that will help the community adapt to a changing climate and increasing fossil fuel prices.^[7]

Geographic Scope and Timeline

Citizens, topic experts and partners from inside and outside of the City of Eugene were invited to develop a plan for the broader community. This public engagement process identified challenges and opportunities and presented options and action items that will require partnerships and joint efforts across the community.

The CEAP establishes general directions and offers specific actions over the next three to five years; however, the scientific and general community's understanding of climate and energy challenges are evolving rapidly and Eugene's direction and goals will likely need to be updated.

^[4] More policy detail and background can be found in Appendix 9.

^[5] This goal matches Oregon's stated GHG reduction targets from House Bill 3543. While this target is not equivalent to the fossil fuel reduction target, it reflects the degree of GHG reductions that are necessary, according to scientific research. Additional discussion of relative greenhouse gas targets begins on page 14 of Appendix 8.

^[6] This goal, unanimously adopted by Eugene City Council February 2009, will use the base year 2005, the year of data used for the 2007 community greenhouse gas inventory.

^[7] The full text of the City Council directives related to the CEAP can be found in Appendix 9.



HOW WAS THE PLAN DEVELOPED?

The Climate and Energy Action Plan Advisory Team

The CEAP advisory team was assembled in May 2009 and was composed of 11 community members and representatives of partner agencies. In June 2009, the team began providing input on the public outreach and general planning processes. The group brought expertise to the public meetings, observed and participated in topic discussions, provided feedback on the development of the plan and the plan document, and provided background data.

Team Member

Chuck Gottfried
Sarah Mazze

Joshua Proudfoot
Jason Heuser

David Hinkley

Lorraine Kerwood/Twila Souers

Joe McCormack

Mike McKenzie-Bahr

Jan Wostmann

Heidi Beierle/Bill Randall

Shawn Boles

Partner Agency/Group

City of Springfield

Resource Innovation Group and
The UO Climate Leadership Initiative

Eugene Area Chamber of Commerce

Eugene Water and Electric Board

Friends of Eugene

Eugene Human Rights Commission

Lane Transit District

Lane County

Neighborhood Leaders Council

City of Eugene Planning Commission

City of Eugene Sustainability
Commission

The Public Engagement Process

News releases, print and online calendars, website announcements, and emails invited members of the public to participate in seven public forums. A kickoff event was held in September 2009 and one public forum was held on each of the six topics between October 2009 and March 2010. More than 500 members of the public participated, sharing concerns about climate uncertainty and fuel price volatility, and weighing in on what should be the community's highest priorities. Below are the six topics or action areas:

- Buildings and Energy
- Food and Agriculture
- Land Use and Transportation
- Consumption and Waste
- Health and Social Services
- Urban Natural Resources

The process for identifying action items for each of the six topic areas was as follows:

1. A strategy list was compiled using information submitted by regional experts and gleaned from municipal- and state-level climate and energy plans from across the nation. The list was reviewed by the topic specialists, refined, and then used as a starting place for the public forums.
2. Topic specialists were identified from across the community. Eight to twelve expert community members with broad knowledge of the topic and the ability to bring a variety of perspectives to the public forums were invited to assist with the plan. The topic specialists contributed to the development of the strategy lists, provided technical information support at the public forums, and assisted with the prioritization of strategies. A complete list of Topic Specialists can be found in Appendix 3.
3. Public forums were held to engage members of the community who are interested in climate and energy challenges as they relate to each of the six topics. Each of the forums were attended by 50 to 120 community members, including topic specialists, CEAP advisory team members, neighborhood leaders, and Sustainability Commissioners. Forum participants reviewed the strategy list for the subject topic, provided perspectives on which actions should be given the highest priority, identified missing actions or strategies, and provided detail on how individual actions could be implemented.
4. Topic specialists reviewed proposed actions in greater detail, provided input on priorities, clarified ideas, identified opportunities and challenges, and helped to ground the process in Eugene's unique economic, social, and environmental conditions.
5. Advisory team members weighed information from background documents, input from the public forums and the topic specialist meetings, and offered their varied perspectives on each topic area. The team completed a final review of the strategies and reviewed and commented on the draft Community Climate and Energy Action Plan.
6. Additional Research was conducted after the draft was released to clarify some of the relative costs and benefits of actions. This adds confidence that the priorities included in the plan are the best places for our community to take action. Targets and measures were also added.^[8] This information is compiled in the attached spreadsheet, Appendix 1.

THE OUTCOMES

Of the several hundred possible action items suggested, reviewed, and discussed in the public engagement process, the plan only includes those that are expected to best reduce fossil fuel consumption and GHG emissions, and to prepare Eugene for the impacts of energy price volatility and climate uncertainty. A strict cost-benefit analysis wasn't feasible, but the project team designed a process that weighs the relative importance of potential actions in the context of the three stated goals.

^[8] The targets associated with objectives and actions in the Plan reflect best estimates of the reductions necessary. Creating targets that are carefully calibrated to the overall GHG and fossil fuel reduction goals will require additional research.

WHAT HAPPENS NEXT?

Funding: In the 2011 fiscal year budget, \$200,000 of one-time funding was earmarked for use in implementing both the Community Climate and Energy Action Plan and the City's Diversity and Equity Strategic Plan. These funds are in addition to the work already underway across the City organization in Solid Waste management, the Green Building program, Stormwater Management, Urban Forestry, and many other existing City programs.

Reporting back: The City Council will receive annual reports assessing the progress being made on each of the multiple objectives included in the plan.

Updating the plan: Our understanding of the complex issues around climate change and greenhouse gas *sources* is continually improving, and as our community moves forward on the priorities included in this plan, it will be important to revisit, revise, and update Eugene's Community Climate and Energy Action Plan every three to five years.

HOW IS THE COMMUNITY CLIMATE AND ENERGY ACTION PLAN ORGANIZED?

The strategies are divided into six action areas. The first four are the primary targets for greenhouse gas emissions and fossil fuel reductions, and the last two focus on actions necessary to adapt to climate change and rising fuel prices.

- ↻ Buildings and Energy
- ↻ Food and Agriculture
- ↻ Land Use and Transportation
- ↻ Consumption and Waste
- ↻ Health and Social Services
- ↻ Urban Natural Resources

Please note that the actions in each area are not organized by priority. The first action in each section is not necessarily the most important, nor is the last the least important.

A table containing all of the actions and associated targets, measures, estimated financial impacts, and estimated greenhouse gas reductions data is available in the Compiled Priority Action Items Tables in Appendix 1.

Terms in *italics* are defined in the glossary located in Appendix 2.

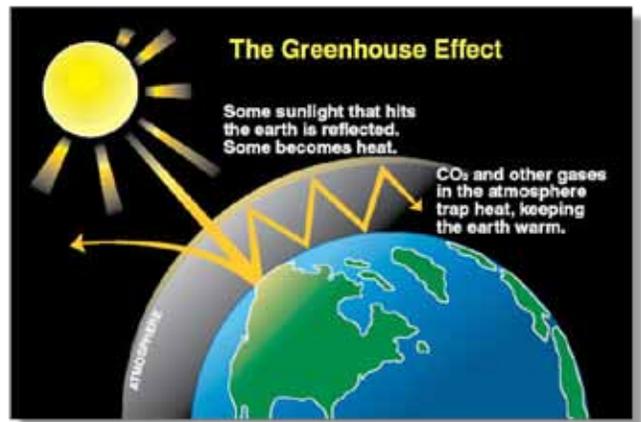


Figure 1 - Source: State of Washington Department of Ecology

HOW WILL CLIMATE CHANGE AND VOLATILE, RISING FUEL PRICES AFFECT EUGENE?

How Do Greenhouse Gases Contribute to Climate Change?

The earth receives radiant energy from the sun—part of which is reflected back to space. Greenhouse gases, including *carbon dioxide*, *methane*, and *nitrous oxide*, surround the earth and trap some of this energy—keeping the surface warm and making life on earth possible (see Figure 1). Since the start of the Industrial Revolution we have been burning fossil fuels such as oil, coal, and *natural gas* to heat and light our homes and businesses, create electricity, and provide transportation. By burning fossil fuels and releasing carbon dioxide, these activities have increased the amount of greenhouse gases in the *atmosphere*, causing more of the sun's energy to be trapped. The trapped energy warms the earth and changes our climate. Climate scientists have been telling us if we are to avoid further intensifying the *greenhouse effect* and its impact on our climate, we will need to reduce our greenhouse gas emissions. Nations, states, and communities must work to decrease greenhouse gas emissions and plan for climate change.

How Will Our Climate Change?

Carbon dioxide and other greenhouse gases produced today will remain in the atmosphere and continue to affect the climate for decades to come. However, reducing greenhouse gas emissions now is expected to decrease the magnitude of climate change over time. "Preparing for Climate Change in the Upper Willamette River Basin of Western Oregon: Co-Beneficial Planning for Communities and Ecosystems,"^[9] published in 2009, identifies several important changes expected to affect our community:

- ∞ Average annual temperatures increase by 8 to 12° F by around 2080.
- ∞ Reduced *snowpack* and resultant lower stream flows in summer
- ∞ Increased demand for water for agricultural uses.
- ∞ Reduced summer hydroelectric power *generation* capacity (due to lower stream flows in summer) and increased summer demand for electricity.
- ∞ Increased storm intensity, flooding, and wildfires.
- ∞ Higher rates of heat-related illness, exhaustion, asthma, and respiratory diseases.

In addition to these physical impacts, climate change is expected to have significant financial impacts, particularly if it accelerates and if we don't prepare our systems for the impacts just outlined. The report, "An

^[9] "Preparing for Climate Change in the Upper Willamette River Basin of Western Oregon: Co-Beneficial Planning for Communities and Ecosystems," US Department of Agriculture, Climate Leadership Initiative, and National Center for Conservation Science and Policy, 2009.

Overview of Potential Economic Costs to Oregon of a Business-As-Usual Approach to Climate Change,^[10] makes several important observations, including the following: “If spread evenly, Oregon’s households, on average, could incur annual costs of \$1,930 per year by 2020. Of this amount, \$830 relate to expenditures on energy, \$460 relate to health-related costs, and \$370 to the adverse effects of climate change on salmon populations. These costs are not negligible. The 2020 average of \$1,930 represents more than 4 percent of the current median household income in Oregon.” The report continues by listing many of the costs that haven’t yet been calculated, and states that, “Far greater costs might materialize elsewhere or in future centuries, the result of a business-as-usual approach to climate change over the next few decades. If temperatures rise to the maximum levels predicted under the business-as-usual scenario, billions of people in less-developed countries likely would endure increased thirst and starvation, thousands of species would face extinction, sea levels would rise several meters, and vast areas of the oceans could become essentially barren. To the extent that these distant effects matter to today’s Oregonians, the potential costs would be far greater than we indicate.”

“Continued dependence on coal, oil, and natural gas affects not only our climate, it influences the stability of our local and national economy”

In contrast to these costs, several reports suggest that taking action now will result in significant savings. “Washington Western Climate Initiative Economic Impact Analysis”^[11] and “Pathways to a Low-Carbon Economy,”^[12] suggest that reducing energy use and preparing for climate change will quickly save citizens, businesses, and governments millions of dollars by reducing energy costs and creating sorely needed jobs.

How Will a Rise in Fuel Prices Affect Eugene?

Continued dependence on coal, oil, and natural gas affects not only our climate, it influences the stability of our local and national economy. Global demand for oil and natural gas has increased rapidly over the last 30 years. The supply of these non-renewable resources is limited, and over the last decade, concern about the shrinking supply and rising demand has increased. Many credible sources project that global oil supply will go into irreversible decline within the next five to ten years.^[13]

Gas prices over \$4 per gallon during the summer of 2008 reminded consumers of how dependent Eugene’s economy is on these fuels for

^[10] “An Overview of Potential Economic Costs to Oregon of a Business-As-Usual Approach to Climate Change,” *CLI Et. al.* 2009

^[11] “Washington Western Climate Initiative Economic Impact Analysis,” *ECONorthwest*, 2010

^[12] “Pathways to a Low-Carbon Economy: Version 2 of the Global Greenhouse Gas Abatement Cost Curve,” *McKinsey and Company*, 2009

^[13] “Peaking of World Oil Production: Recent Forecasts,” *US Department of Energy*, 2007

our daily activities. The increased costs of fuel, transportation, food, and consumer goods had a significant impact on many consumers and businesses, and hit small businesses and lower- and fixed-income households the hardest.

The City of Portland Peak Oil Task Force studied the likely impacts of rising fuel prices and in 2007, published their findings in “Descending the Oil Peak: Navigating the Transition from Oil and Natural Gas.”^[14] The report identifies a number of ways in which northwest communities such as Eugene are vulnerable to changes in global energy markets. For example, transportation of freight via air and truck is expected to become more costly and to cause food prices to rise. Increased costs for fertilizer, animal feed, and processing will also put upward pressure on food costs. Likewise, heating and cooling buildings will become significantly more expensive. Rising costs and shrinking disposable incomes will result in economic weakness, increased unemployment, and higher demand for social services. As is the case with the effects of climate change, the impacts of rising costs and a weakening economy will be felt broadly across the region and those hardest hit by the changes will be the most vulnerable—children, the elderly, and those with lower or fixed incomes.

While there is clearly a need to transition away from dependence on oil, coal, and natural gas, there aren’t always easy substitutes. That is in part because these fossil fuels provide a huge amount of energy in a very small volume that can be easily transported, stored, and used by just about anyone. Just one gallon of gasoline, currently sold for about \$3, is roughly equivalent to three weeks of labor for one person.^[15] Our economic systems have become very reliant on this incredibly cheap and convenient source of “labor” and when the cost of this “labor” goes up, so do the prices of goods and food that depend on this energy for production and distribution.

In contrast to convenient and energy-dense oil, most of the available renewable substitutes like wind, solar and wave energy all generate electricity that requires heavy and expensive batteries to store. The energy transmission and storage systems that will be required for widespread use of these alternatives will take 10 to 20 years and significant investment to develop.^[16] In order to reduce the impacts of high fossil fuel prices, these investments must be made soon. Heavy investments in **renewable energy** sources will only help replace part of our current energy need, so reduced energy use overall is essential.



^[14] “Descending the Oil Peak: Navigating the Transition from Oil and Natural Gas,” City of Portland Peak Oil Task Force, 2007.

^[15] “The Tightening Conflict: Population, Energy Use, and the Ecology of Agriculture,” M. Giampietro, D. Pimentel, 1994.

^[16] “Peaking of World Oil Production: Impacts, Mitigation, & Risk Management,” Hirsch et. al. 2005.

What has Eugene Done to Prepare for Climate Change and Rising Fuel Prices?

Internal Climate Action Plan: In 2009, at the direction of City Council, the City of Eugene created an Internal Climate Action Plan^[17] that describes how the organization will reduce energy use in internal operations with the goal to be *climate neutral* by 2020. This will be done by increasing *energy efficiency*, increasing waste prevention, improving purchasing methods, and offsetting any remaining energy use by purchasing quality carbon offsets.

Waste reduction plan: The City of Eugene is currently creating an internal waste reduction plan with the goal to reduce waste 90 percent by 2030. This will also reduce greenhouse gas emissions from City operations.

Food Scope document: In early 2010 staff completed a scoping and resource plan for development of a food security plan in conjunction with community partners.^[18] This work is a positive step toward improving food security in Eugene, and an important part of preparing for climate change.

The Community Greenhouse Gas Emissions Inventory for Eugene

In 2007, as a first step toward creating a climate and energy action plan, City staff and community partners compiled an inventory of the community's greenhouse gas (GHG) emissions. The Eugene Community Greenhouse Gas Emissions Inventory Report^[19] provides useful detail about the community's emissions related to buildings, energy use, and transportation.

This report, however, does not account for the energy and associated emissions, that are "embodied" in consumer goods, energy and services. **Embodied energy** is all of the energy—including electricity, oil and natural gas—used in making, transporting, storing, distributing and disposing of the consumer goods we use—from drinking cups and lawn furniture, to refrigerators and cars. It is the energy used to mine the metal, harvest the wood, grow the cotton, extract the oil to make the plastic, as well as to manufacture, distribute, and finally to dispose of these items. Many products today are made of components which come from several places and have been shipped around the world before we encounter them. For this reason, calculating the amount of energy in any one item is very difficult; the data and methodology for this type of analysis have been developed only recently.

^[17] The City of Eugene Internal Climate Action Plan can be found in Appendix 4 and on the City's website.

^[18] "City of Eugene Food Security Scoping and Resource Plan," City of Eugene, April 2010.

^[19] See Appendix 8 for the full text of the "Eugene Community Greenhouse Gas Emissions Inventory Report," July 2007.

A Greenhouse Gas Inventory for the Metro Portland Region

In April 2010, Metro, the regional government for the metropolitan Portland area published "Regional Greenhouse Gas Inventory; The Carbon Footprint of Residents and Businesses Inside the Portland Metropolitan Region." The report, the first of its kind in the nation, is based on analysis which considered the embodied energy of all the goods, services, transportation modes, and energy consumed in the metro area.

Metro's GHG inventory reveals additional information that, along with the Eugene GHG Report, provides a more complete picture of the community's greenhouse gas emissions. For example, Metro's study revealed that 48 percent of greenhouse gas emissions are related to the production, manufacture and disposal of materials, goods and food. (Note that many of these emissions were not estimated in Eugene's GHG Report.) Also, 25 percent of emissions are associated with transportation, which includes the use of passenger vehicles, light trucks, and mass transit services. The final 27 percent are produced by residential, commercial, and industrial consumption of natural gas and electricity.

This new analysis provides valuable information about the real emissions impacts of particular choices and strategies; businesses and residents now have even greater control over their greenhouse gas footprint.

A Greenhouse Gas Inventory for the Eugene/Springfield Metro Area

Lane Council of Governments is conducting a community greenhouse gas inventory for the Eugene/Springfield metropolitan area using the same methodology employed to generate the Portland Metro inventory outlined above. This inventory will be available in the fall of 2010 and the findings will be compared with the Portland Metro inventory to further inform this plan.

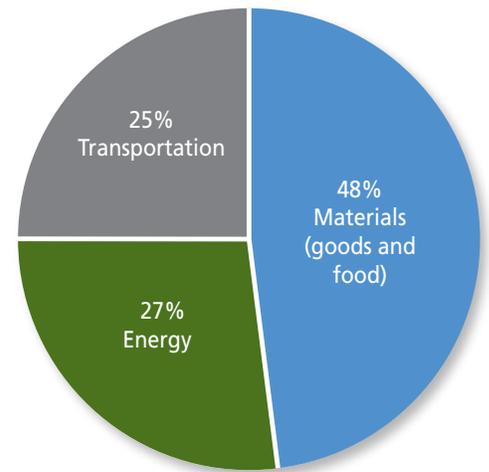


Figure 2 - Greenhouse gas emissions by system.
Source: Metro regional greenhouse gas inventory.



Buildings and Energy

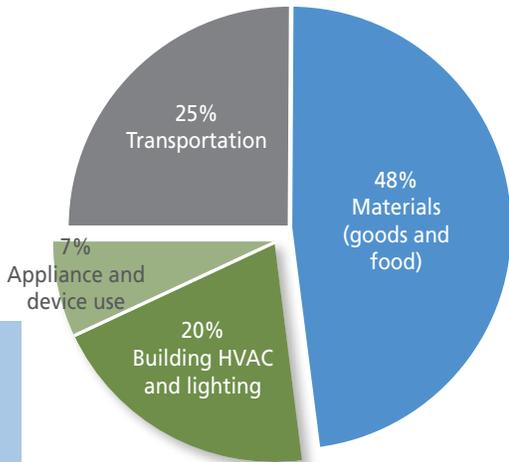


Figure 3 - Greenhouse gas emissions by system.
Source: Metro Regional GHG Inventory

What is the Buildings and Energy Action Area?

This section focuses on all the energy used to provide heating, cooling, light, and power in residential, commercial and industrial buildings in Eugene and on the resulting GHG emissions. The emissions from this sector come from a wide variety of power uses such as operating a commercial businesses (e.g., supermarkets), producing industrial products (e.g., operating sawmill equipment), to powering events (e.g., lighting at Autzen Stadium), as well as the traditional heating/cooling/power needs of homes, apartments, office buildings, manufacturing facilities, etc.

What Part of Eugene's GHG Footprint Comes from Buildings and Energy?

The GHG inventory created by Metro^[20] shows that emissions from energy use in buildings accounts for roughly 27 percent of that community's GHG emissions (see Figure 3). This plan assumes that those numbers are generally true for Eugene. The community GHG inventory created by the City of Eugene^[21] shows the bulk of emissions associated with building energy use comes from burning natural gas to heat water and buildings, and not from electricity use. There is still need to pay close attention to electricity use, however, because any increases in electricity use, whether from growing population or increased overall demand, is likely to be met by burning coal or natural gas to generate electricity. Therefore, ongoing efforts at electricity conservation are essential to avoiding increased GHG emissions.

How Do Buildings and Energy Contribute to GHG Emissions?

The primary utilities for Eugene are the Eugene Water and Electric Board (EWEB), a publicly-owned utility, and the NW Natural Gas Company, an investor-owned utility. Though natural gas is cleaner than coal or oil combustion, it still produces significant amounts of greenhouse gases. The 2007 community GHG inventory projects that by the year 2020 the community will produce more emissions by burning natural gas than by burning gasoline for transportation.

Compared to other communities, a small amount of Eugene's GHG emissions result from electricity generation and use; largely because EWEB sources most of its electricity from hydroelectric dams and other low-GHG-emitting energy sources (see Figure 4). In addition, over the past several decades, EWEB has met much of the increased demand for electricity in Eugene through "efficiency". Instead of additional power plants to meet increasing demand EWEB funds energy conservation programs to reduce demand. This has reduced the amount of electricity that EWEB needs to generate or purchase on behalf of customers by 13 percent. Continuing to reduce the GHG emissions from the local electricity mix by increasing conservation and including more renewable energy sources will ensure a low-carbon electricity mix well into the future. Note that even renewable

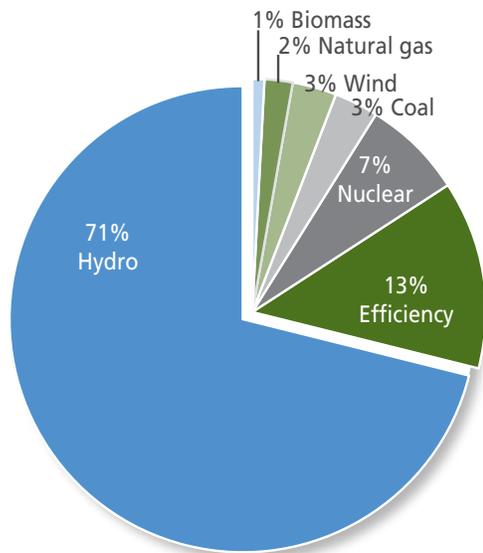


Figure 4 - EWEB power source by type.
From EWEB data.

^[20] "Regional Greenhouse Gas Inventory; The Carbon Footprint of Residents and Businesses Inside the Portland Metropolitan Region" Metro, April 2010.

^[21] For more detail on greenhouse gas emissions from buildings and energy use in Eugene, see Appendix 8 "Eugene Greenhouse Gas Emissions Inventory Report" City of Eugene, July 2007.

energy sources, such as wind and solar power, have some associated GHGs—primarily from construction of the required infrastructure; however, the amounts are minimal compared to burning fossil fuels to generate electricity.

The big opportunities to reduce GHG emissions are increasing the percentage of energy that is renewable, retrofitting existing buildings and equipment, and maximizing efficiency in new buildings. The Northwest Power and Conservation Council^[22], EWEB^[23] and the *Energy Trust of Oregon*^[24] all call for increased conservation and use of renewable energy sources correlating directly with the recommendations outlined in this plan.

How Will Rising Fuel Prices Impact Buildings and Energy?

In order to significantly reduce fossil fuel use and GHG emissions in the buildings and energy sector, the community must make structural and behavioral changes. The increase in fuel costs associated with the projected increase in demand and decreased supply of oil will have considerable impacts on the ability of residents and business owners to heat and power their homes and businesses. Because they are less energy efficient, many older homes and non-residential structures will become increasingly expensive to heat, light, and operate. Rising fuel prices will also increase the cost of constructing new buildings and retrofitting existing ones, especially as the costs to extract and process raw materials and transport goods increases. This increase is likely to encourage the reuse of buildings and building materials.

How Can We Prepare the Buildings and Energy Sector for Climate Change?

While Eugene takes steps to reduce the community's GHG emissions, we must also prepare for the projected impacts of climate change. More intense storms, reduced snowpack, lower summertime stream flow, and more extreme summertime heat events, will have tangible impacts on buildings and energy resources. Some of the changes can be mitigated through the application of the following *adaptation* strategies:

- Maximizing energy and water efficiency in buildings.
- Designing buildings, and locating them in ways that take advantage of the sun and natural ventilation.
- Using landscaping to increase summer shading and minimize air conditioning use.
- Reducing the *urban heat island* effect by planting trees and incorporating reflective roofs and light-colored pavement.
- Designing buildings to be more durable and to withstand more intense storm events.
- Incorporating *stormwater* management strategies such as green roofs, *bioswales* and raingardens.

^[22] The Northwest Power and Conservation Council's 6th Plan calls for all new electricity load growth in the region to be met through conservation (over 5,800 average megawatts-aMW) or renewables.

^[23] EWEB's "2008-2027 Energy Conservation Resource Strategy 2008-2027" identifies the acquisition of over 54 aMW in conservation measures over the next 20 years at a cost of less than \$0.055/kWh.

^[24] Energy Trust of Oregon's current 5-year Strategic Plan includes the goal of saving over 22.5 million annual therms of natural gas through efficiency and conservation. "Strategic Plan 2009-2014," Energy Trust of Oregon. 2009. <http://energytrust.org/About/policy-and-reports/Plans.aspx>

EWEB GREENPOWER

In 1999 EWEB became the first public utility in Oregon to build and own a wind farm. Today, Adams Elementary School and Northwest Youth Corps are both preparing to mount solar panels on their roofs. And if you charge your electric car at Lane Community College, that power too, will be coming from the sun.

Projects like these, funded by EWEB Greenpower, help meet the goal to increase the amount of energy that comes from renewable sources. If Eugene is to experience a dramatic shift away from fossil fuels, investments will need to be made at many levels and fortunately for businesses and residents, supporting this transition to renewable energy has become very easy and affordable.

EWEB Greenpower is a voluntary program for customers who can pay as little as \$1.50 per month to support the program. These Greenpower funds, collected from neighbors and local businesses, are then combined to support renewable energy projects right here in the Northwest. To learn more, visit www.eweb.org/greenpower.

Fortunately, many adaptation strategies will help the community reduce both energy use and GHG emissions.

Efforts Underway

Several organizations are working to increase energy efficiency and reduce GHG emissions in Eugene. Local utilities have effective conservation programs that have had a very significant impact on energy consumption. For example, EWEB has offered energy conservation programs for its customers for over 30 years for an annual energy savings that exceeds 500 million *kWh* per year—more than the combined output of the utility's six hydroelectric projects.^[25] Other efforts underway:

- The City of Eugene offers assistance for energy-efficiency through housing rehabilitation loans, business loans, and the Green Building Incentive Program.
- The Climate Master™ program created by the Climate Leadership Initiative.
- Housing and Community Services Agency (HACSA) offers energy efficiency incentives.
- The Energy Trust of Oregon offers incentives.
- BRING Recycling offers the ReThink Business program.
- The City of Eugene is implementing its Internal Climate Action Plan to reduce GHG emissions from City-owned buildings and City operations.



^[25] "2008 Facts & Figures," Eugene Water and Electric Board. 2009.

OBJECTIVES AND ACTIONS FOR BUILDINGS AND ENERGY

Objective 1:

Reduce total GHG emissions from existing buildings by 50 percent by 2030.

According to the Metro Regional Greenhouse Gas Inventory, residential, commercial and industrial energy use in existing buildings accounts for about 27 percent of all GHG emissions. Sixty-six percent of Eugene's housing stock was built before 1980 when efficiency standards were much lower, signifying a substantial opportunity to increase energy-efficiency in existing buildings. Their retrofiting will be accelerated by expanding the successful programs offered by EWEB, Energy Trust of Oregon, and other partners. Educational and outreach programs will continue to be an important tool to reduce energy use by changing the behavior of building occupants. For example, requiring that information about a building's energy use is made available at the time of sale will empower builders, building owners, renters and buyers to make informed choices and will increase market demand for more energy-efficient buildings.

High-Priority Actions

- 1.1. Identify the most *cost-effective* opportunities for increasing efficiency in existing buildings. Support the existing efforts of local utilities to find these opportunities.
- 1.2. Expand assistance and incentive programs for building retrofits that increase energy efficiency and reduce the carbon footprint of existing buildings.
 - 1.2a) Work with Energy Trust of Oregon to focus on improving efficiency in buildings that are heated with natural gas.
 - 1.2b) Target sectors with high-efficiency potential including rental buildings, multifamily housing, remodels, and commercial tenant infill.
- 1.3. Establish a project fund to complement existing loan and incentive programs by focusing on long-term, low-interest financing mechanisms for residential and commercial energy efficiency and/or renewable energy system installations.
- 1.4. Target *occupant behavior* in order to reduce energy use in all types of buildings.
 - 1.4a) Strategies include Advanced Meter Infrastructure (already planned for by EWEB), real-time energy consumption information and community-based social marketing programs.
- 1.5. Adopt an *energy performance score* program or similar tool to disclose total energy use in existing and new buildings for use by builders, realtors, owners, and renters.



DISTRICT ENERGY

In a district energy system, steam, or hot or chilled water is produced in a central plant and distributed to multiple buildings in a defined area through underground pipes. These systems eliminate the need for heating or cooling equipment in each building, reducing upfront costs and saving energy. Also, district energy systems may offer more flexibility in the type of fuel used resulting in an easier transition from fossil fuel. An additional value of district systems is the distribution of expenses across all users for operations, maintenance and/or retrofitting, thereby reducing costs to customers. District energy systems, especially those that use renewable fuel sources, can play an important role in reducing the carbon footprint of Eugene's buildings.



Objective 2:

Reduce GHG emissions from new construction by 50 percent by 2030.

Advances in technology and emphasis on *whole building design* and *integrated design* are enabling construction of buildings that can achieve far greater energy efficiency than previously imagined. New construction also provides an opportunity to incorporate adaptation strategies that allow buildings to work effectively in a changing climate. Facilitating construction of high-performing new buildings can play a significant role in reducing GHG emissions. The actions listed below aim to improve efficiency standards and increase assistance for energy efficiency and climate adaptation strategies in new buildings.

High-Priority Actions

- 2.1. Lobby for adoption and actively participate in development of building code amendments that meet the *Architecture 2030* standards for energy efficiency (standards outlined in Appendix 11).
- 2.2. Increase incentives for highly energy-efficient new buildings aiming toward *zero net energy* and *carbon neutral* buildings.
 - 2.2a) Revise or expand incentives to encourage smaller homes that require less energy to operate and fewer building materials to construct.

Objective 3:

Expand Development of Renewable and District Energy Systems.

Renewable energy comes from resources that can be naturally replenished such as wind, hydroelectric, and solar—in contrast to fossil fuels like coal and oil that cannot. Renewable energy sources also produce much fewer GHG emissions than fossil fuels. Increasing use of renewable energy will reduce our use of fossil fuels, decrease GHG emissions, generate green jobs and increase local energy self-sufficiency.

High Priority Actions:

- 3.1. Increase the use of on-site renewable energy systems, such as solar hot water, *photovoltaic*, and ground-source heat pumps, by removing financial, infrastructural, regulatory, and perceptual *barriers*.
 - 3.1a) Invest in EWEB's downtown network to allow surplus energy from photovoltaics on downtown buildings to be integrated into the electricity grid.
 - 3.1b) Address the financial barriers to onsite renewable energy by expanding financing options like long-term loans and property-assessed clean energy bonds.

CITY OF EUGENE GREEN BUILDING PROGRAM

The goal of the City's Waste Prevention and Green Building Program is to make sustainable waste prevention and green building practices the norm in Eugene, through the guide2Green Program. Priority goals for the program are to reduce GHG emissions, promote sustainable economic development and support local self-sufficiency activities. To achieve these goals, the Program provides technical assistance, education and training, and grants and incentives to the Eugene community. In September 2009, the City implemented a Green Building Incentive Program. To be eligible, projects must seek green building certification through either *Earth Advantage* or Leadership in Energy and Environmental Design (*LEED*) programs. Incentives include priority plan review and inspections, same-day permits, reduced systems development charges, technical assistance, and recognition and publicity benefits. Residential projects that meet high standards for energy efficiency and waste reduction are also eligible for rebates on permit fees, which are partially funded by the American Recovery and Reinvestment Act through the Energy Efficiency and Conservation Block Grant Program.

- 3.1c) Assess and reduce barriers to solar energy use and balance priorities for solar access.
- 3.3. Develop at least one *community scale renewable energy* pilot project by 2015.
- 3.4. Develop *district energy* systems in Eugene.
 - 3.4a) Remove legal, technical, policy, governance, and financial barriers to district energy systems.
 - 3.2b) Complete the viability study for a district energy system for the EWEB Riverfront Master Plan.
 - 3.2c) Develop at least one clean district energy, or shared energy, system pilot project by 2015 by working with property owners and local utilities.

Objective 4: Increase the implementation of climate change preparation strategies for the built environment.

While Eugene takes steps to lower greenhouse gas emissions, the community must also prepare for the inevitable impacts of climate change. Since buildings constructed today will likely be in use for decades, state building codes must facilitate climate preparation strategies. These strategies that improve energy efficiency will also help the community adapt to the effects of climate change. Increasing efforts to conserve water will also help reduce the amount of energy used to treat and distribute water, and will improve Eugene's ability to adapt to the projected reductions in water supply.

High Priority Actions:

- 4.1. Encourage the use of passive systems in buildings for heating, cooling, ventilation, water delivery, and incorporate climate change preparation strategies into building design and construction.
 - 4.4a) Lobby to improve state building codes.
 - 4.4b) Develop incentives to encourage the use of passive heating and cooling systems, lighting, ventilation, and other strategies that reduce energy demand and better adapt buildings for a changing climate.
- 4.2. Provide education, assistance and incentives to reduce potable water use in new and existing buildings and landscaping.
 - 4.2a) For example: low-flow fixtures, appropriate (xeriscape) landscaping, use of *greywater* and onsite rainwater catchment systems, behavior change, etc.



Food and Agriculture

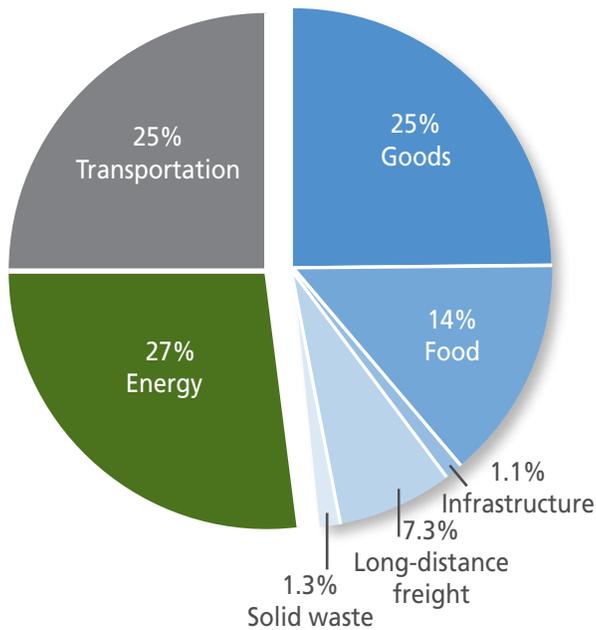


Figure 5: Greenhouse gas emissions by system. Source: Metro Regional GHG Inventory

What is the Food and Agriculture Action Area?

In this Plan, the food and agriculture sector includes everything related to food production and delivery, from the agricultural field to grocery store shelves. This includes the systems, infrastructure and activities which produce and process food, the systems used to transport and distribute food, and the systems that dispose of waste from food production, processing and consumption.

What Part of Eugene's GHG Footprint Comes From Food and Agriculture?

Eugene's 2007 greenhouse gas inventory does not specifically identify greenhouse gas associated with food production and distribution. However, Metro's regional greenhouse gas inventory^[26] indicates that food provision accounts for roughly 14 percent of total greenhouse gas emissions for the Portland Metro area (see Figure 5) and this plan will assume that the findings for Eugene would be similar. This figure does not include GHG emissions associated with transportation of food or disposal of solid waste generated by food production.

How Do Food and Agriculture Systems Contribute to GHG Emissions?

A popular misconception is that transportation is the largest source of GHGs associated with our food supply. In fact, GHG emissions associated with our food come primarily from the food production phase^[27]—a result of energy use by farming and processing equipment, manufacture of fertilizers and other agricultural chemicals, production of animal feed, provision of irrigation water, etc. In addition, a very significant amount of GHGs, largely in the form of methane, are generated by livestock animals and management of their wastes.

While there is growing national interest in buying locally-produced foods and there are many good reasons to support local growers, when it comes to reducing GHG emissions associated with food, the most effective approach is to reduce the consumption of carbon-intensive foods such as dairy products and red meat. It turns out that the methods used to grow our food, and the amount of meat and dairy products that we eat, have a much more significant impact on total GHG emissions than do typical transportation methods or distances.

^[26] "Regional Greenhouse Gas Inventory; The Carbon Footprint of Residents and Businesses Inside the Portland Metropolitan Region," Metro Regional Government, April 2010. See Appendix 7 of this document.

^[27] "Food Miles and the Relative Climate Impact of Food Choices in the United States," Weber and Matthews. 2008.

How Will Rising Fossil Fuel Prices Impact Food and Agriculture Systems?

Fossil fuels are used extensively in most food and agriculture systems for powering agricultural, processing and refrigeration machinery; manufacturing fertilizers, pesticides, and other agricultural chemicals; transporting and distributing products; and producing agricultural equipment and materials. Increasing costs for fuel, including diesel, gas and natural gas, will impact food and agricultural systems at all of these points and are expected to have a significant impact on the price of food.

How Can We Prepare Our Food and Agriculture Systems for Climate Change?

While steps must be taken to reduce the carbon footprint of food and agriculture systems, the systems must also be prepared for the projected impacts of climate change. "Preparing for Climate Change in the Upper Willamette River Basin of Western Oregon,"^[28] identifies several likely climatic changes expected in the Eugene area. The area will likely experience warmer, wetter winters and warmer, drier summers, factors that will undoubtedly affect the agricultural productivity of the valley. Here are a few adaptive strategies that will enable the food and agriculture systems to maintain productivity in the face of climate change:

- Growing a wider diversity of food crops.
- Growing food with fewer fossil fuel inputs.
- Developing drought-tolerant food crops for this region.
- Reducing the agricultural consumption of freshwater, and using greywater where appropriate.

Efforts Currently Underway

Many organizations and members of the Eugene community are working to improve access to locally-grown foods and to raise awareness about the importance of food security for the community. Willamette Food and Farm Coalition, the Farm to School program, Lane Food Policy Council, Food for Lane County, the Extension Service, neighborhood sustainability and farming groups, and many others are working to strengthen supplies, improve storage capacity, encourage local agriculture, facilitate home gardening and otherwise improve resiliency of the local food systems.



^[28] "Preparing for Climate Change in the Upper Willamette River Basin of Western Oregon: Co-Beneficial Planning for Communities and Ecosystems," US Department of Agriculture, Climate Leadership Initiative, and National Center for Conservation Science and Policy, 2009.

OBJECTIVES AND ACTIONS FOR FOOD AND AGRICULTURE:

Objective 5:

Reduce consumption of carbon-intensive foods.

Growing evidence shows that the kind of food we eat makes a significant difference in the associated GHG emissions. The facts and choices are not always intuitive and it is important that education and outreach programs are developed to inform the community about the importance of food choice as a strategy to reduce GHG emissions.

High Priority Actions:

- 5.1. Begin a community campaign to educate the public about food choice as part of a climate-friendly lifestyle.
 - 5.1a) Specifically encourage reduced consumption of red meat and dairy products and other carbon-intensive foods.
- 5.2. Implement a “Buy climate-friendly first” food purchasing policy for public institutions including city and county governments, schools, and hospitals.

Objective 6:

Reduce GHG emissions associated with agriculture and food waste.

While most agricultural production occurs outside Eugene’s urban areas, local governments and citizens can encourage growers and state leaders to reduce the GHGs associated with agriculture. A waste-digesting system for the community would provide methane from decomposing food waste for use as a locally-generated fuel source.

High Priority Actions:

- 6.1. Transition to agricultural methods that reduce GHGs. Support efforts of Oregon Department of Agriculture, Oregon Tilth, Oregon State University, Willamette Farm and Food Coalition, and other partners.
 - 6.2. Conduct a pilot project at the River Avenue Wastewater Treatment Plant to determine the system’s ability for co-digestion of food waste and biosolids as detailed in the Consumption and Waste section.
-



Objective 7:**Increase food security by preserving the productive capacity of the local and regional *foodsheds*.**

In order to increase the *resilience* of Eugene's food supply, local and regional agriculture systems must maintain the capacity to grow a significant percentage of the community's food.

High Priority Actions:

- 7.1. Strengthen land use regulations which protect farm lands, particularly those on high-value agricultural soils.
 - 7.1.a) Strengthen City and County land use protections to prevent urban growth onto prime farmlands.
- 7.2. Strengthen current farmland protections at state levels.
 - 7.2.a) Lobby state agencies to strengthen protections for high-value farmlands.

Objective 8:**Prepare our food systems for the uncertainties created by climate change and rising energy prices.**

Eugene can take action now to ensure that the community's food supply is resilient to the system-destabilizing effects of climate change. In addition, by reducing the energy inputs required by the food supply system, the community can reduce impacts that increasing energy costs will have on the cost of food.

High Priority Actions:

- 8.1. Implement the following recommendations from Eugene's Food Security Scoping and Resource Plan.^[29]
 - 8.1.a) Identify a City of Eugene liaison for food-system related programming.
 - 8.1.b) Develop a comprehensive Community Food Security Assessment and implement changes to improve food security.
- 8.2. Develop an updated regional emergency food distribution plan that accounts for climate- and energy-based disruptions. The level of need for such a plan will be made clear by conducting a *vulnerability* assessment as outlined in the Health and Social Services section.
- 8.3. Increase the diversity and drought resistance of food crops grown in the upper Willamette Valley.
 - 8.3a) Support efforts of food-advocacy organizations, food growers, and state agencies to develop appropriate crops.
 - 8.3b) Prioritize development of vegetable protein crops such as beans and grains that are suited to the Willamette Valley.
- 8.4. Remove barriers to using greywater in agriculture. Work with state lawmakers to find solutions for greywater re-use.



^[29] "City of Eugene Food Security Scoping and Resource Plan." City of Eugene Planning and Development Department, April, 2010.

COMMON GROUND GARDEN

The first crop of onions and garlic were planted in October; and by mid March, leafy greens were planted in protected cloches, followed by kale, chard, lettuce, cauliflower, broccoli, kohlrabi, snap peas and snow peas. In June, tomatoes, peppers, summer squash, cucumbers, herbs, bush and pole beans, beets, ground cherries, and leeks were all put into the ground. Over the course of a year, this group of neighborhood gardeners hopes to produce 1600 pounds of food.

Nearby residents in the Friendly Neighborhood, had been thinking about starting a garden on the unimproved city street for years, and in September 2009, a small group formed around the vision of a shared, open, neighborhood garden. During a neighborhood meeting, the group decided how to organize the garden, name the garden, and how to form work parties to build beds, plant seeds and starts, and make use of free city leaves and free arborist wood chips.

The Common Ground Garden exemplifies community based action and serves as a model for others across the community. In addition to growing bountiful fruits and vegetables, this garden grows social capital, neighborhood empowerment, better nutrition, neighborhood resilience, and a feeling of community well being and belonging.

Interested in trying this out in your neighborhood? In early 2011, look for the City's "Urban Gardening Manual," a resource guide that shares best practices for how to start a neighborhood garden, access financial and organic resources, and clear guidance on using public lands. For more information, contact City of Eugene Compost and Urban Ag Specialist Anne Donahue at 541-682-5542.

Objective 9:

Increase availability of home-grown and locally-sourced food in Eugene

Many Eugene community members are interested in growing their own food to reduce the *energy intensity* of their food, gain new skills, enjoy the recreational benefits of growing food, and reduce the cost of their household's food. Food gardening can also be an important community-building activity, strengthening neighborhoods and social groups. The increased social cohesion it encourages can improve the community's resilience in times of change and challenge. Home-grown and locally-grown food can provide security and resilience during short- and longer-term emergencies by reducing reliance on food imported from long distances.

High Priority Actions:

- 9.1. Expand community gardens on public and private lands including school campuses, City lands, and church properties.
 - 9.1a) Conduct an assessment of opportunities for community garden locations within the city.
- 9.2. Encourage planting of non-invasive food-bearing trees and shrubs on public and private lands. Support urban tree food programs of such advocates as Tree by Tree, and the Eugene Tree Foundation.
- 9.3. Reevaluate limitations on numbers and types of animals permitted under Eugene's code to allow, where appropriate, an increase in the number and variety of food-producing animals that can be kept by urban residents.



Land Use and Transportation

LAND USE AND TRANSPORTATION

What is the Land Use and Transportation Action Area?

This section of the Community Climate and Energy Action Plan considers how the community is spatially organized, and how that organization affects transportation needs. The transportation systems in this section are those that move people and local freight: passenger vehicles, bicycles, mass transit systems, air transport and local freight distribution systems, and the roads and other infrastructure required for these systems. Transportation of goods is discussed in Chapter 4: Consumption and Waste section.

Although a particular land use may directly impact consumption of fossil fuels and emission of greenhouse gases, in most cases, the more important impacts of land uses are on the demand for transportation systems. Land use directly impacts transportation system needs and transportation systems contribute significantly to fossil fuel consumption and GHG emissions. As the two are so connected, this plan will consider them together and outline action items for each that will affect the other.

What Part of Eugene's GHG Footprint Comes From Land Use and Transportation?

According to the analysis completed for the Metro Regional Greenhouse Gas Inventory,^[30] about 25 percent of the Portland area's greenhouse gas emissions are associated with local transportation systems. This plan will assume that GHG impacts for Eugene are similar. The majority of emissions come from on-road commercial vehicles, private cars and air travel, with rail, marine and mass transit contributing smaller amounts of greenhouse gases (see Figure 6).

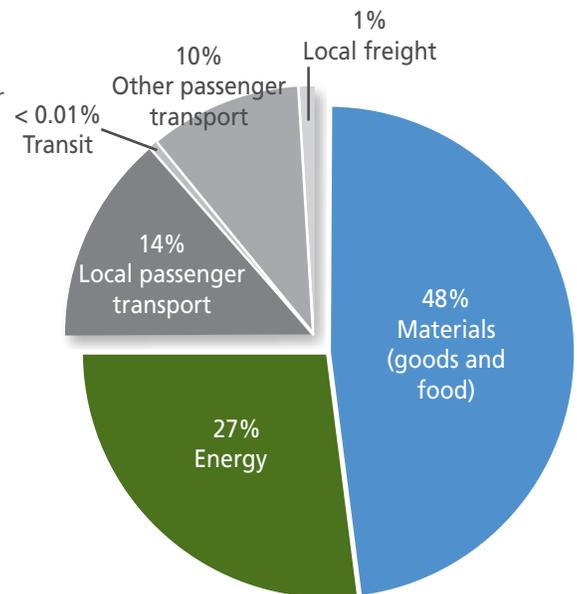


Figure 6: Greenhouse gas emissions by system.
Source: Metro Regional GHG Inventory

^[30] "Regional Greenhouse Gas Inventory; The Carbon Footprint of Residents and Businesses Inside the Portland Metropolitan Region," Metro Regional Government, April 2010.

How Do Land Use and Transportation Contribute to Greenhouse Gas Emissions?

Land use decisions influence where people live and do business, and where the schools, services and industry are located. Distances and available transportation modes between home, stores, work and school have a significant impact on transportation needs and are a major driver of a community's greenhouse gas outputs.

Metro's study found that local passenger transportation accounts for 14 percent of greenhouse gas emissions in the region. Other passenger transport, primarily long distance ground transportation and air travel, accounts for 10 percent, and mass transit for less than 0.01 percent, of total regional GHG emissions. As stated above, emissions from long distance freight are associated with transporting goods rather than people, and their scope, impacts, and reduction strategies are discussed in Chapter 5: Consumption and Waste.

How Will Rising Fuel Prices Impact Land Use and Transportation?

Increases in fuel prices will discourage the use of less fuel-efficient transportation modes such as the single-occupancy vehicle. As operating a private vehicle becomes more expensive, Eugene will likely see an increase in demand for mass transit and other transportation options, and for housing nearer to employment, which could lead to denser land use patterns.

How Can Eugene Prepare Land Use and Transportation Systems for Rising Fuel Prices?

Fuel prices and demand for transportation alternatives can rise more quickly, as in 2008, than transportation systems can adapt. If investments are made in alternatives to the single-occupant vehicle, the community will be better prepared for increases in the price of fuel and subsequent shifts in transportation demand. With alternatives in place, such as improved mass transit, bicycling, and electric vehicle infrastructure, the community can shift more easily away from expensive transportation. Alternative transportation will be particularly important for community members who cannot afford to purchase newer, more fuel-efficient or electric-powered automobiles.

Another proactive measure that will reduce transportation-related GHG emissions is making fuel-wise land use decisions that reduce dependence on single-occupant vehicles, such as facilitating infill development and developing walkable neighborhoods.



Preparing Eugene's Land Use and Transportation Systems for Climate Change.

A recent study of potential climate change scenarios for the Eugene area concluded that the community may experience more severe storm events and resultant flooding, as well as an increase in forest fires.^[31] This analysis suggests that transportation systems will be impacted, especially roads and railroads, and those along rivers and streams, or on unstable slopes, will be especially vulnerable. Increased storms and wildfire smoke may also impact air travel and transport of goods. In order to minimize the impacts to the transportation system, planning and design efforts must consider these scenarios.

In addition to impacts on the transportation system, the same study suggests that the Eugene area could experience an influx of *climate refugees*, people moving away from areas that have become less livable due to a rise in sea level, severe storms, or prolonged drought. Land use and transportation planning processes must consider possible impacts on the community.

Efforts Underway

A number of government agencies, business, and non-profit organizations are working to reduce the community's dependency on fossil fuels for transportation. For years Eugene has developed and implemented land use regulations, such as the state required Urban Growth Boundary, that facilitate compact growth and reduce transportation demand. The community has nationally-recognized mass transit, and bicycle infrastructure systems that decrease dependence on single-occupant vehicles. Likewise, alternate modes advocacy, undertaken by City staff along with partners such as point2point solutions, Lane Coalition for Healthy Active Youth, Bike Lane Coalition, Greater Eugene Area Riders, and many others, continues to press for more non-vehicle transportation infrastructure. However, the community must do even more to meet the Eugene City Council's goal of reducing fossil fuel use 50 percent by 2030. Below is a list of objectives and related action items that will help Eugene reach this goal.

^[31] "Preparing for Climate Change in the Upper Willamette River Basin of Western Oregon: Co-Beneficial Planning for Communities and Ecosystems," US Department of Agriculture, Climate Leadership Initiative, and National Center for Conservation Science and Policy, 2009.

ENVISION EUGENE in the year 2030. Envision your neighborhood, home, job, school, and your favorite parks and shops – and how you will get there. In the spring of 2010, Eugene’s Planning Division started a community conversation, called Envision Eugene, to think about how Eugene will grow and change over the next 20 years. The plan will help answer the questions of how and where we will accommodate a population of nearly 200,000 people; and where’s the balance between increasing density and preserving what’s important to us about our neighborhoods, city, and area?

Envision Eugene has been collecting community input through workshops, websites, and surveys to help inform the creation of our community plan. People are being asked to think about ways to grow inside the existing urban growth boundary (UGB), and if necessary, where and how might the boundary be expanded. Concepts from the Climate and Energy Action Plan like 20 minute neighborhoods, increasing reliance on buses, bikes and walking, and special setbacks for Bus Rapid Transit, are key components of the Envision Eugene discussion.

In the fall of 2010, Envision Eugene will ask community members to help select a preferred growth scenario that meets the city’s land needs and promotes the most sustainable, livable, prosperous city possible. To learn more about Envision Eugene and how you can be involved, visit our website at:

www.EnvisionEugene.org.



OBJECTIVES AND ACTIONS FOR LAND USE AND TRANSPORTATION:

Objective 10:

Create 20-minute neighborhoods, where 90 percent of Eugene residents can safely walk or bicycle to meet most basic, daily, non-work needs, and have safe pedestrian and bicycle routes that connect to mass transit.

“Twenty-minute neighborhoods” are those in which a significant number of regular trips can be made in 20 minutes without using a personal automobile. A resident might walk to the grocery store or school and meet many of their recreational and social needs without using a car. Creating these neighborhoods is an important step toward meeting our greenhouse gas and fossil fuel reduction goals. This objective cannot be achieved by local government alone; success will depend on partnerships with neighborhoods, businesses, Lane Transit District, school districts, and others.

Implementing the 20-minute neighborhoods action will ultimately increase the mix of land uses (residential next to commercial, near schools, near parks) in the urban area, and increase connectivity of alternative transportation systems such as bike paths, pedestrian paths, and the bus system. Recent research suggests that accessibility of destinations is strongly associated with *vehicle miles traveled (VMT)*, and “walking is most strongly related to measures of land use diversity, intersection density, and the number of destinations within walking distance.”^[32] Work is underway at the state and regional levels to create the models that can predict how much greenhouse gas reductions can really be achieved by making these changes. In the absence of those tools, there is broad agreement that these changes can and will have a significant and lasting reduction in the use of gasoline and diesel fuel in our urban areas.

High Priority Actions:

- 10.1. Make the creation of 20-minute neighborhoods a core component of the Eugene Plan and the Eugene Bicycle and Pedestrian Master Plan.
- 10.2. By 2013, complete and implement a 20-minute neighborhoods plan:
 - 10.2a) Identify funding for necessary planning effort.
 - 10.2b) Identify key accessibility components for 20-minute neighborhoods: e.g., schools, parks, grocery store, retail services, etc.
 - 10.2c) Conduct a network gap analysis to determine needs.
 - 10.2d) Identify steps to improve the number and distribution of 20-minute neighborhoods.
 - 10.2e) Coordinate with *opportunity siting* and *infill compatibility standards* planning.

^[32] “Travel and the Built Environment: A Meta-Analysis,” Ewing et. al. 2010.

Objective 11:
Increase density around the urban core and along high-capacity transit corridors:

Growing evidence indicates that increasing the density of development around the urban center and transit corridors is an effective strategy for reducing fossil fuel use and greenhouse gas emissions. This type of development increases access to services, increases bikeability and walkability, reduces single occupant auto trips, and makes transit more effective.^{[33],[34],[35]} In addition to reducing fossil fuel use by curbing single-occupant vehicle trips, preventing sprawling land use appears to help communities adapt to climate change by reducing the number of extreme heat events.^[36]

High Priority Actions:

- 11.1.** Zone future commercial and high-density residential uses in and around the urban core, and along EmX and other high-capacity transit corridors to accommodate urban growth.
- 11.1a) Coordinate with opportunity siting and infill compatibility standards planning efforts.

Objective 12:
Include the potential for climate refugees when conducting land use planning.

The negative impacts of climate change in the Pacific Northwest may be low relative to impacts in other regions of the US and globally. This could bring about rapid movements of climate refugees—people leaving unlivable locations seeking less-impacted areas. In order to prepare for these possible impacts, city and community planning activities must be increasingly flexible and broad-thinking.^[37]

High Priority Actions:

- 12.1.** Closely monitor the community's population growth rate to gauge whether population projections are accurate.
- 12.1a)** Set population thresholds that will trigger review of community growth plans; for example, if growth rates are significantly different than projections for several years in a row.
- 12.1b)** If trends show a significantly higher rate of population increase than was assumed in the planning process, Eugene should update its planning model sooner than legally required.

^[33] "Cost-Effective GHG Reductions through Smart Growth & Improved Transportation Choices: An economic case for investment of cap-and-trade revenues," Center for Clean Air Policy, July 2009.

^[34] "Moving Cooler: An analysis of transportation strategies for reducing greenhouse gas emissions," Urban Land Institute, 2009.

^[35] "Travel and the Built Environment: A Meta-Analysis," Ewing et. al. 2010.

^[36] "Urban Form and Extreme Heat Events: Are Sprawling Cities more Vulnerable to Climate Change than Compact Cities?" Stone, et. al., 2010.

^[37] The City of Eugene is currently undergoing a land use planning process, *Envision Eugene*, to be completed in early 2011, that will determine how the next 20 years of population growth will be accommodated.



Objective 13:

Continue to expand and improve Eugene's bicycle and pedestrian infrastructure and connectivity to increase the percentage of trips made by bike and on foot.

In order to increase the number of trips taken by bike or on foot, gaps in bicycle and pedestrian transportation systems must be identified and necessary improvements must be made. In May 2010, the City of Eugene will begin work on a Eugene Pedestrian and Bicycle Master Plan. This project will identify gaps in the bike and pedestrian networks and enable the community to focus resources for infrastructure where most needed. A systematic approach to improving bike and pedestrian transportation networks, will advance Eugene toward meeting community fossil fuel and greenhouse gas reduction targets.

High Priority Actions:

- 13.1.** Create a pedestrian and bicycle master plan that will accomplish the following:
 - 13.1a)** Identify mobility gaps in the bicycle and pedestrian transportation system.
 - 13.1b)** Recommend improvements to increase safety (real and perceived), comfort, speed, and convenience for users of all ages and skill levels.
 - 13.1c)** Create a plan for implementing the necessary system improvements.
 - 13.1d)** Identify funding sources for *implementation*.
- 13.2.** Increase the mileage and connectivity of bicycle boulevards and shared-use paths to encourage biking by cyclists of various skill levels.
- 13.3.** Create a "Complete Streets" policy that requires all subsequent transportation and rehabilitation projects to incorporate infrastructure for bicycles, pedestrians, and mass transit service.

HEALTH IMPACTS OF CLIMATE ACTION

Many of the actions contained in this plan will have positive impacts that go beyond saving energy and fossil fuel. With help from Upstream Public Health, a non-profit health advocacy organization, an effort was made to assess some of the possible health-related impacts—and the product is the first ever Health Impact Assessment (HIA) conducted on a local climate action plan.

Similar to environmental impact assessments that require federal agencies to consider the environmental impact of their proposed actions, HIAs are used to evaluate the potential health effects of a project or policy before it is implemented. The assessments are voluntary and typically focus on health outcomes such as obesity, physical inactivity, asthma, injuries, and social equity.

The HIA found that many of the transportation-related objectives in the Plan are likely to positively affect the public's health. Several policies aimed at reducing greenhouse gas emissions also result in increased physical activity, better air quality, and fewer vehicle crashes. These changes lead to reduced rates of chronic disease and mortality, reduced respiratory illness, and fewer injuries and fatalities from vehicle collisions. The full report is available as appendix 5 of this report and more information is available online at:

www.upstreampublichealth.org.

Objective 14:

Increase the supply of integrated, convenient, efficient, and cost-effective public transit:

Mass transit is one of the more effective strategies to reduce transportation reliance on single-occupant vehicles. Not only does increased use of transit reduce GHGs,^[38] but it can provide a lower-cost, accessible transportation alternative.

High Priority Actions:

- 14.1. Diversify funding sources for Lane Transit District (*LTD*) to increase the long-term reliability of mass transit service while maintaining cost effective and fuel efficient transit service.
- 14.2. Align City of Eugene Transportation System Plan and LTD's long-range transit plan to integrate bus routes into the broader alternative transportation system.
 - 14.2a) Partner with LTD to help inform service changes and improvements.
 - 14.2b) Create special *setbacks* along future *Bus Rapid Transit (BRT)* or other mass transit corridors to accommodate future right-of-way expansion.
 - 14.2c) Determine the role of mass transit in accomplishing greenhouse gas emission reduction goals by working with LTD in developing the Long Range Transit Plan.
- 14.3. Invest in transit infrastructure that meets future access and mobility needs while consuming less fossil fuel.
 - 14.3a) Maximize electrification of the regional mass transit systems.
 - 14.3b) Increase use of hybrid vehicles including buses and other heavy vehicles.

^[38] "Moving Cooler: An Analysis of Transportation Strategies for Reducing GHGs," The Urban Land Institute, 2009.

Objective 15:**Expand outreach, marketing and education about climate-friendly transportation alternatives.**

In order to be motivated to change their behavior, community members must understand the effects of their transportation choices on overall greenhouse gas emissions and the available alternatives to the single-occupant vehicle. Emissions reductions can be realized by reducing the number of people who drive in single-occupant vehicles and by educating the community about how to be more fuel-efficient when they do drive their automobiles.

High Priority Actions:

- 15.1.** Increase promotion of bicycling, walking, mass transit, car-pooling, telecommuting, high-occupancy vehicles, and emergency ride home programs as attractive alternatives to driving.
- 15.2.** Increase the community's understanding of fuel-efficient driving techniques.

Objective 16:**Ensure maximum efficiency in current and future freight systems.**

Movement of goods is important for the community's economy; however, it typically produces significant greenhouse gas emissions.^[39] As Eugene makes changes to transportation systems to decrease reliance on fossil fuels, efficient delivery of food, consumer goods, and other materials must be maintained.

High Priority Actions:

- 16.1.** Plan for efficient freight transportation that minimizes greenhouse gas emissions and fossil fuel consumption, and accomplishes the following:
 - 16.1a)** Connects multiple modes—train, truck, van, car, bicycle.
 - 16.1b)** Accommodates upper Willamette Valley commercial, industrial and agricultural freight needs.
 - 16.1c)** Facilitates efficient local deliveries.

^[39] "Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions," Urban Land Institute, July 2009.

Objective 17:
Increase the use of low-carbon vehicles and fuels to improve overall fuel-efficiency and reduce vulnerability to fluctuating oil prices.



In order to meet the stated fossil fuel reduction target (reduced 50 percent by 2030), some of the current automobile transportation must be transitioned from fossil fuels to electricity. This will require considerable new infrastructure, some of which is now in the planning phase. According to the Oregon Department of Transportation, “Reducing on-road vehicle GHG emissions by 75 percent from 1990 levels would be equivalent to reducing Oregonian’s per capita annual consumption of petroleum fuels from 567 gallons to 68 gallons. This will not be achievable without transformative changes in vehicle fleets and fuels such as electrification of the light vehicle fleet.”^[40]

High Priority Actions:

- 17.1.** Accelerate the transition to plug-in hybrids and electric vehicles. Partner with Lane County, EWEB, auto retailers, electrical contractors, UO, LCC, and others.
 - 17.1a)** Support the installation of a network of electric car charging stations.
 - 17.1b)** Require installation of electric car charging stations in new multifamily housing.
 - 17.1c)** Use guidance provided by the University of Oregon Electric Vehicle strategy.
- 17.2.** Conduct research to understand what role biofuels can play in decreasing Eugene’s vulnerability to energy markets. Work with partners at LTD, the Oregon Department of Energy, etc.
 - 17.2a)** Complete research by 2013 so that outcomes can inform the next CEAP.

^[40] “Background Report: The Status of Oregon Greenhouse Gas Emissions and Analysis,” Oregon Department of Transportation, October 2009.

Consumption and Waste

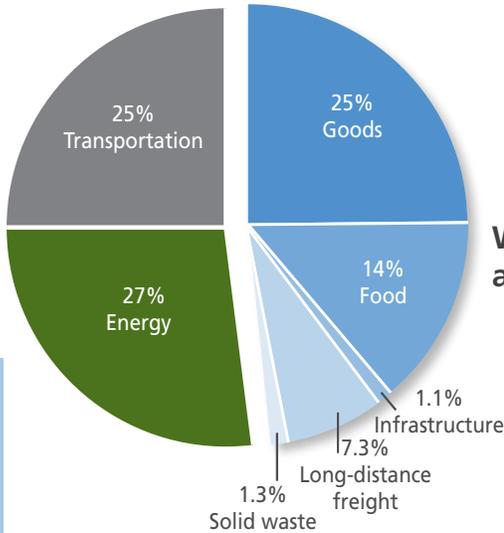


Figure 7: Greenhouse gas sources by system.
Source: Metro Regional GHG Inventory

What is the Consumption and Waste Action Area?

For the purposes of this plan, consumption and waste includes everything in the *lifecycle* of consumer goods; the embodied energy in everything from chairs to cars, from building materials to strollers. The lifecycle of these goods begins with mining or extraction of raw materials, and includes their manufacturing, packaging, distribution, use and finally, their disposal.

What Part of Eugene's GHG Footprint Comes from Consumption and Waste?

Until very recently, many inventories of GHG emissions, including the City of Eugene's, focused on the direct emissions that come from the use of fossil fuels. Using this methodology, these analyses have consistently shown that transportation and energy systems are the major contributors to GHG emissions; however, a number of recent consumption-based analyses measure what the fossil fuels are ultimately used for. This new evaluation method is the basis of leading research on US GHG emissions and includes an inventory completed in the fall of 2009 by the Environmental Protection Agency (EPA).^[41] Consumption or "systems-based" inventories show roughly 42 percent of US emissions come from the provision of food and goods—roughly equaling the combined emissions from the transportation and energy systems.

The GHG inventory recently completed by Metro^[42] also considered lifecycle emissions and developed estimates for the metropolitan Portland region's total GHG emissions using regionally adjusted consumption and transportation data. Metro's report estimates that the provision of goods (excluding food) accounts for 25 percent of GHG emissions in the region. However, when the emissions from provision of food and solid waste disposal are included, the total GHG emissions comprise roughly 40 percent of the region's total emissions (see Figure 7). According to the inventory, consumption and waste in the Portland Metro region have a greater share of total emissions than either transportation or energy use in buildings. For the purposes of this Action Plan, we will assume that the Eugene area's profile is within the bounds of the two studies and that consumption and waste comprises roughly 40 - 42 percent of the total GHG emission profile.

How Do Consumption and Waste Contribute to Greenhouse Gas Emissions?

Conventional sector profile GHG inventories consider GHG emissions from solid waste management. This includes carbon dioxide from collection, transportation and processing of waste with the majority of emissions coming from the decomposition process in landfills where methane is released. Systems GHG inventories, such as that created by Metro, consider resource extraction activities such as mining and logging; transporting and processing of raw materials; and manufacturing, and packaging and distribution of consumer goods, which all consume large amounts of coal, oil, and natural gas.

^[41] "Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices." US EPA, September 2009.

^[42] "Regional Greenhouse Gas Inventory; The Carbon Footprint of Residents and Businesses Inside the Portland Metropolitan Region," Metro Regional Government, April 2010.

How Will Rising Fossil Fuel Prices Impact Consumption and Waste Systems?

Due to the large amounts of coal, oil, and natural gas used during production and distribution of goods and food, a small increase in fossil fuel prices will likely be magnified in the cost of goods. As prices of products increase (and incomes stay flat), more people may choose to repair and reuse consumer goods, expanding the usable life of products resulting in a decrease in new consumer purchases. Rising food costs will mean that food will likely become a larger portion of a household's budget and may shift more families into a position of *food insecurity*. This decrease in purchasing of consumer goods and food will likely create downward pressure on the local, regional and national economy.

How Can We Prepare Consumption and Waste Systems for Climate Change?

While climate change will likely have some impact on consumption and waste systems, they are not expected to be as significant as the impact forecasted for other systems and sectors. Therefore, this plan does not focus on adaptation or preparation strategies for consumption and waste systems.

Efforts Currently Underway

Eugene has a strong history of implementing reduce, reuse, and recycle programs. Currently, over 95 percent of Eugene households participate in recycling services and roughly 53 percent of the waste produced in the area is diverted from the landfill. In 1994, the City of Eugene began using a rate structure for home solid waste collection that charges homeowners more money if they throw away a larger volume of waste. This has had the effect of reducing the volume of waste going to the landfill. The majority of solid waste from Eugene is taken to Lane County's Short Mountain Landfill, where an estimated 75 percent of the methane released from decomposing waste is captured and used to generate electricity.

In addition, the community supports and benefits from local recycling, reuse, and composting businesses ranging from industrial recycling at Schnitzer Steel to home scale re-use at St. Vincent de Paul and Goodwill Industries. BRING Recycling has been a leader in the community for the reuse of building materials for over 30 years and NextStep Recycling has provided electronics reuse and recycling for over 10 years. Organizations such as MECCA (Materials Exchange Center for Community Arts) and the Resurrected Refuse Action Team also help community members find creative new ways to re-use materials. Large-scale commercial composting facilities operated by Lane Forest Products and Rexius Sustainable Solutions help keep organic wastes out of the local landfill. All of these local businesses create jobs, reduce waste, and several provide service and education to disadvantaged populations, further building the capacity of our community.





OBJECTIVES AND ACTIONS FOR CONSUMPTION AND WASTE:

Objective 18:

Reduce greenhouse gas emissions by addressing purchasing habits.

The actions in this objective are aimed at working with community partners to change consumer behavior to reduce the impact that our purchasing habits have in creating greenhouse gases. Consumption is not only being addressed at the grassroots and household levels, but through international business organizations such as the World Business Council for Sustainable Development.^[43] Major corporations are also beginning to recognize the need to decrease emissions related to product development.

High Priority Actions:

- 18.1.** Educate businesses and residents about the important role of consumption in creating greenhouse gas emissions. Focus on encouraging the purchase of durable, repairable and reusable goods; reducing the amount of materials that go to waste (including food); reducing consumption of carbon-intensive consumer goods and services.
- 18.2.** Lobby at the state level for better product labeling that includes information about greenhouse gas emissions associated with products.
- 18.3.** Provide information for the public on when to replace high energy-use appliances such as refrigerators, dishwashers, and water heaters. Where this information is already available, increase its distribution and accessibility.
- 18.4.** Actively support new state and national *product stewardship* legislation that requires producers to be involved in end-of-product-life management, either through product design changes (e.g. compostable snack bags), investing in take back programs (e.g. Oregon E-cycles), or placing a fee on the sale of products to support diversion (e.g. Oregon Bottle Bill).

^[43] "Sustainable Consumption Facts and Trends: From a Business Perspective," The World Business Council for Sustainable Development, 2009.

Objective 19:
Increase waste diversion by improving recycling.

Recycling, reusing, and repurposing materials can reduce greenhouse gas emissions by reducing the energy used to mine or harvest virgin materials. There is a significant opportunity to increase recycling of waste from building construction and demolition, activities that currently generate roughly 30 percent of the total waste generated in Oregon.

High Priority Actions:

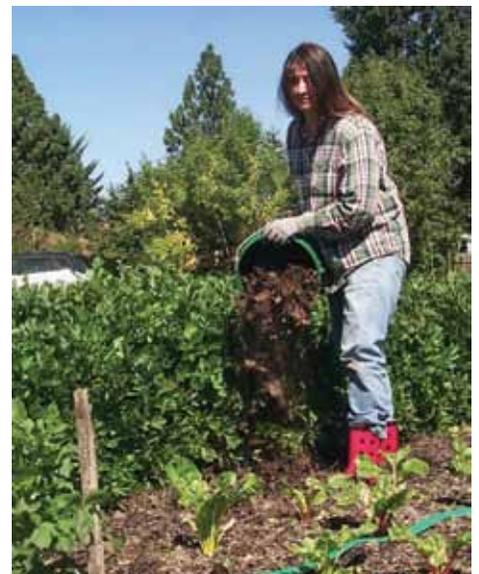
- 19.1. Target expanded recycling outreach and services to commercial and multi-family residential building owners and occupants, including local businesses, apartment buildings, and student and cooperative housing.
- 19.2. Enact a local ordinance to increase waste recovery rates from commercial and multi-family buildings.
- 19.3. Assist businesses in improving paper, metal and glass recycling with a goal of supporting 5 percent of the community's businesses each year. Aid partners by promoting events or trainings, providing space for trainings, assisting with funding, etc.
- 19.4. Enact an ordinance that requires all construction and demolition waste materials to be sorted for reusable or recyclable materials.

Objective 20:
Increase waste diversion rate for organic wastes

The 2002 Waste Composition Study by the Oregon Department of Environmental Quality (DEQ) found that 34 percent of total waste being disposed at Short Mountain Landfill from the city of Eugene was compostable organic waste. The majority of methane emissions generated in a landfill system come from the decomposition of organic materials, and methane is a potent greenhouse gas with more than 21 times the *global warming* potential of carbon dioxide. Although an estimated 75 percent of methane generated from the landfill gas system is recovered, the remainder is emitted into the atmosphere.

High Priority Actions:

- 20.1. Establish a permitted facility within the Eugene/Springfield area that can accept and compost (or anaerobically digest) all organic materials including food wastes.
 - 20.1a) Develop a collection program and rate structure to support food waste collection.
 - 20.2. Conduct a pilot project at the River Avenue Waste Water Treatment Plant to determine the system ability to co-digest food waste and biosolids to generate electricity.
-



Objective 21:**Conduct research to determine the most effective next steps in the area of consumption and waste.**

There are many actions that may have significant benefits but the scale of benefits is largely unknown at present. Below are two actions that were identified as potential solutions, but further research is needed. These research efforts must be completed by 2013 so that findings can be used to inform the next Climate and Energy Action Plan.

High Priority Actions:

- 21.1.** Follow research being conducted by 1) the EPA's West Coast Forum on Climate Change and Materials Management, 2) Action Item recommendations from the Materials Management subcommittee of the Oregon Governor's Global Warming Committee's Roadmap 2020 plan, and 3) Oregon Department of Environmental Quality systems-based GHG inventory, to determine highest priority and most cost effective measures to address GHG production in the materials management sector.
- 21.2.** Determine the greenhouse gas emissions profile from the current solid waste collection system and provide recommendations on how to reduce carbon emissions within the system.

Objective 22:**Reduce greenhouse gases in municipal operations by changing purchasing practices and reducing waste.**

It is important that local governments lead by example. In 2009, in response to direction from Eugene's City Council, City staff prepared an Internal Climate Action Plan^[44] to make City operations *climate neutral* by the year 2020. In order to accomplish this goal, the City's purchasing practices must be changed to reflect the current understanding of greenhouse gas sources. Additionally, City staff are creating an internal waste prevention plan to reduce waste production, increase diversion of waste, and reduce greenhouse gases associated with purchasing decisions.

High Priority Actions:

- 22.1.** Increase the effectiveness of current City of Eugene purchasing policies that prioritize: 1) Reuse of products and materials, 2) purchasing durable goods, and 3) avoiding disposable goods whenever possible. Implement the following steps:
 - 22.1a)** Set targets for these procurement policies.
 - 22.1b)** Identify measurements to monitor the impacts of these procurement policies.
 - 22.1c)** Increase efforts to implement these purchasing policies throughout the organization.

^[44] The City of Eugene Internal Climate Action Plan is available as Appendix 4

- 22.2.** Encourage other local public agencies to prioritize: Reuse of products and materials, purchasing durable goods, and avoiding disposable goods whenever possible.
- 22.3.** Reduce public agency purchase of greenhouse gas-intensive goods by 2014.
- 22.3a)** Identify City-purchased goods (either directly or through contracts) with the highest associated life cycle greenhouse gas emissions by 2012.
 - 22.3b)** Create a plan to reduce purchase of the 5 goods that have both the most greenhouse gas intensive life cycles, and the highest rates of purchase.
 - 22.3c)** Annually report the quantity of these goods being purchased.
- 22.4.** Implement steps outlined in the City waste reduction plan to reduce waste at City buildings, events, and ongoing operations.
- 22.4a)** Continue to monitor the waste stream from internal operations in order to measure progress.
-



Health and Social Services

What is the Health and Social Services System?

The Health and Social Services system includes public, private and not-for-profit service agencies that provide a broad spectrum of support programs in the community including mental and physical health care, assistance for low-income community members, addiction prevention and treatment programs, and child abuse prevention programs. These services are included in the Community Climate and Energy Action Plan, not because they are significant sources of greenhouse gases, but because they are an important safety net for our community and very vulnerable to the impacts of climate change and rising fuel costs. Likewise, to a large extent, the populations that are assisted by the services are themselves very vulnerable to the effects of climate change and fuel price volatility.

What Part of Eugene's GHG Footprint Comes From Health and Social Services?

The provision of health and social services involves transportation of people and goods, and consumption of materials and energy; therefore, the services are associated with some greenhouse gas emissions. However, in this plan GHG emissions, and the methods to reduce them, are discussed in earlier chapters on buildings and energy, food and agriculture, *land use* and transportation, and consumption and waste. The focus of the Health and Social Services chapter is on adapting to changing climate and rising fuel prices—not specifically on reducing greenhouse gases.

How Will Increasing Fuel Prices Impact Health and Social Services?

Increasing global demand for a finite amount of oil and natural gas has led to rising fuel prices and will likely continue to do so. As the cost of fossil fuels rise, low-income and other disadvantaged community members will be most affected by the changes. With less financial resiliency, these vulnerable populations will have the most difficulty adapting to rising costs, and as impacts of the rising fuel costs spread throughout the economy, the number of economically disadvantaged in Eugene will likely grow.



Photo by Denise Wendt, FOOD for Lane County



Existing income and housing conditions in Eugene are already challenging. According to the Eugene-Springfield 2010 Consolidated Plan, “Poverty rates in the cities of Eugene and Springfield have climbed over the past 40 years, rising from 10.9 percent of the total population in 1969 to 19.3 percent in 2007”; “The 2009 One-Night Homeless Count identified 2,232 homeless persons”; “more than one-quarter (26.1 percent) of all homeowners and nearly half (47 percent) of all renters have a housing cost burden,” where more than 30 percent of household income is paid for housing costs, including utilities. These challenging conditions mean that health and social services, such as hunger relief and the provision of affordable housing, are already stressed.

Other challenges resulting from increasing fuel prices:

- Increasing costs of fuel for transportation and home heating.
- Rising food prices.
- Higher costs for medical services and public health services.
- Increasing demand for social services.
- Increasing demand for public school services with increased costs of maintaining school facilities.
- Growing vulnerable and marginalized populations.

In order to avoid the most severe impacts of rising fuel prices, Eugene must prepare local and regional health and social service systems for these changes, and create systems that can adapt to a different energy and climate future.

How will climate change affect our health and social services?

In the Eugene/Springfield area, climate change is expected to cause warmer, drier summers and wetter, stormier winters.^[45] Other potential challenges posed by climate change:

- Increased risks of flooding and consequent impacts on transportation infrastructure, housing stock, etc.
- Increased wildfire resulting in reduced air quality.
- Higher rates of asthma and other respiratory diseases.
- Disruption to transportation systems due to severe storms.
- Negative impacts on the drinking water supply.
- Increased energy prices.
- Increased incidence of heat-related illness.

^[45] “Preparing for Climate Change in the Upper Willamette River Basin of Western Oregon: Co-Beneficial Planning for Communities and Ecosystems,” US Department of Agriculture, Climate Leadership Initiative, and National Center for Conservation Science and Policy, 2009.

These impacts could result in more displaced and homeless community members; economic strains for vulnerable populations; and resultant food emergencies; and increased demand for public health and other social, services by a community strained by social, economic and environmental changes.

Efforts Currently Underway

The University of Oregon Climate Leadership Initiative, in coordination with the Oregon Coalition of Local Health Officials (CLHO), is coordinating a statewide response to health issues related to climate change. Lane County Public Health actively addresses health concerns likely to be exacerbated by climate change, including *vector-borne diseases* and heat-related illnesses. Many public, private and not-for-profit social service agencies are providing support for members of the community who are vulnerable to economic change, loss of housing, food insecurity, health crises, and other conditions that challenge the resiliency of their families and households. The major challenge for this sector, as outlined above, is the expected increase in demand for health and social services as climate change and rising fuel prices exceed many individuals' and households' ability to adapt.



Photo by Denise Wendt, FOOD for Lane County



FOOD FOR LANE COUNTY

Hunger is not new to Oregon, a state that ranked 15th in the nation for food insecurity and 3rd for very low food security in 2008, and where requests for food boxes went up 20 percent from 2008 to 2009. The two leading reasons people in Lane County seek assistance from a food bank are the high costs of food and energy; two concerning costs discussed in detail throughout this plan.

For 25 years, the nonprofit food bank FOOD for Lane County (FFLC) has been dedicated to alleviating hunger by creating access to food in our community. FFLC programs are designed to help low-income individuals and families obtain nutritious food when they cannot afford to buy it. This is accomplished by soliciting, collecting, rescuing, growing, preparing and packaging food for distribution to food pantries, meal sites, shelters, affordable housing sites, and non-emergency programs. In the last year alone, FFLC distributed 6.5 million pounds of food, resulting in over five million meals for those in need. In addition to distributing this much-needed food, FFLC fights the root causes of hunger through public awareness, education and community advocacy.

FFLC serves the emergency food needs for a population base of 338,000 people living in the 4,620 square miles comprising both urban and rural Lane County, and depends on volunteers and the local community to help meet this need. Find out more by visiting

www.foodforlanecounty.org

OBJECTIVES AND ACTIONS FOR HEALTH AND SOCIAL SERVICES:

Objective 23:

Prepare community systems for longer-term climate and energy challenges including fuel shortages, increased summer drought and increased storm intensity.

The community's local emergency management programs are well-prepared to manage unexpected and relatively short-term emergencies such as urban forest fires, heat waves, and localized flooding. There is need to assess the vulnerability of the water supply and health systems to longer-term emergencies.

High Priority Actions:

- 23.1.** Conduct a climate and energy vulnerability assessment that assesses the mid-term, and longer-term climate and energy vulnerabilities of essential services – specifically energy, water, food, health, housing, and sanitation.
 - 23.1a)** Build on existing emergency management efforts.
 - 23.1b)** Identify viable local solutions and estimate costs of reducing vulnerabilities.
 - 23.1c)** Estimate capacity needs and costs for implementing preparation and adaptation strategies.
 - 23.1d)** Continue to monitor emerging data on climate-change-related health risks and revise adaptation plans as necessary.
- 23.2.** Strengthen current hunger relief systems to handle increased short-term and long-term demand.
 - 23.2a)** Conduct analysis to project future demand for hunger relief services. This could be conducted as part of the vulnerability assessment (above).
 - 23.2b)** If analysis (a) suggests need, develop plans to prepare for increased food demand from a higher percentage of the population by partnering with the local food bank.
 - 23.2c)** Identify and remove barriers to, and encourage, development of homegrown food sources such as backyard and community gardens, urban food orchards, etc. This action item is also identified in the Food and Agriculture section.
- 23.3.** Increase financial assistance for low-income populations to support energy efficiency home retrofits that reduce the costs for utility service.
 - 23.3a)** Target rental properties and property managers.
- 23.4.** Conduct a food security assessment, as outlined in the Food and Agriculture section and take action to increase security of the community's food supply.



Objective 24:
Reduce *exposure* of human populations to climate-related disasters.

The frequency of forest fires and flooding are expected to increase in the upper Willamette Valley as a result of higher summertime temperatures and changes in precipitation patterns.^[46] Existing local emergency plans contain provisions for managing the impacts of both these emergencies at their present scale and frequency; however, Eugene must develop expanded strategies to reduce the negative impacts of increased flooding and wildfires.

High Priority Actions:

- 24.1.** Reduce risk of home fires due to wildfires in and around the urban area.
 - 24.1a)** Increase efforts to educate homeowners about creating defensible space around their homes.
- 24.2.** Ensure essential services are not located within the 100-year flood zone.
 - 24.2a)** Identify essential emergency and non-emergency services that are located in flood zones or that could be isolated by flooding.
 - 24.2b)** Develop a plan to move essential services out of the flood zone and/or decrease their vulnerability to flood damage and flood isolation.

Objective 25:

Increase the capacity of Eugene’s health sector, and the community at large, to meet the health-related challenges of climate change and rising fuel prices by fostering greater involvement of the public health system in climate change and energy planning.

Public health professionals are already working to address many of the challenges that climate change and increasing energy prices are likely to exacerbate. As the professionals who are most directly involved with this work, they are a critical part of raising community awareness. Public health professionals will play an essential role in planning adaptation strategies for mitigating the impacts of climate change and energy cost volatility.

High Priority Actions:

- 25.1.** Educate the public and health professionals about health risks posed by climate change.
- 25.2.** Prioritize local public health resources to emphasize educating the public, staff, and administration about climate change, energy price volatility and the related system impacts and health risks.
- 25.3.** Develop a climate change preparation strategy for the public health system.

^[46] *“Preparing for Climate Change in the Upper Willamette River Basin of Western Oregon: Co-Beneficial Planning for Communities and Ecosystems,” US Department of Agriculture, Climate Leadership Initiative, and National Center for Conservation Science and Policy, 2009.*

Urban Natural Resources

What is the Urban Natural Resources Action Area?

Urban Natural Resources, as the term is used in this plan, comprises the soil, air, water, plants, and animals in the suburban and urbanized areas of the community. These resources include stormwater, drinking water, and all the trees, shrubs, grasses and other plants that are scattered across the community on public and private lands.

What Part of Eugene's GHG Footprint Comes from Urban Natural Resources?

Maintenance activities, which are necessary to protect and manage urban natural resources, produce some greenhouse gases; for example, when fossil fuels are used to power machinery and maintenance vehicles. However, the amount of GHG produced is a minute percentage of the total produced in the community. In fact, most inventories do not include natural resources as a source of greenhouse gas emissions, and many describe plants and soils as *carbon sinks*, a place where greenhouse gases, such as carbon dioxide, are taken out of the atmosphere by trees and other plants and stored in their leaves, stems and roots.

How Will Rising Fuel Prices Impact Urban Natural Resources?

Increasing fuel prices are expected to encourage community members to seek more recreational opportunities closer to home. This may increase the use of neighborhood parks, the Ridgeline Trail, the West Eugene Wetlands, and Riverfront paths, as well as other facilities such as the Howard Buford Recreation Area and the waters of the Willamette River in and around Eugene. At the same time, increased fuel prices are likely to drive up the cost of park maintenance, tree care, riparian restoration, and weed control. These challenges may be compounded as services compete for resources when home, business, and local government budgets are under the economic pressure of increasing energy prices.

How Can We Prepare Our Urban Natural Resources for Climate Change?

Probable outcomes of climate change on the community's urban natural resources:

- ∞ Lower summer stream flows.
- ∞ Increased stream temperatures.
- ∞ Warmer terrestrial temperatures.
- ∞ Increased summer drought and risk of wildfire.
- ∞ Increased number and scale of problems caused by *invasive species*.

The projected changes in temperatures, rainfall patterns, stream flow and wildfire incidence will likely result in shifts in hydrology and in habitat types. As the region gets hotter and drier in summer, native plants and



THE WILDLAND-URBAN

INTERFACE is that area where human development mixes with forested lands. The trend of people building homes on previously uninhabited forest land is expected to continue, thereby exposing greater numbers of people and property to the hazards of a wildfire.

Wildfires are a natural process that cycles nutrients, maintains forest health, and creates wildlife habitat, but the probability of wildfires in Oregon is expected to increase due to warmer temperatures and increased drought associated with climate change. Reducing the overall fire risk in Eugene's wildland-urban interface will take time, energy, and resources.

Fortunately, simple tools are available to help with this task. Creating and maintaining defensible space (see image above) around homes is the first step in surviving a wildfire and reducing the risk of damage to structures. This is done by removing flammable vegetation, trimming trees, planting fire resistant plants, utilizing non-combustible roofing material and providing clear emergency exits.

More help is available by contacting the Eugene Fire and EMS Department, or visiting www.firefree.org.



animals that are well adapted to current conditions may become less competitive than other species. Some plants and animals will likely disappear altogether and others will relocate.

The way that the community's land is developed affects the resiliency of Eugene's infrastructure. Low Impact Development (LID) is a design approach that strives to maintain and enhance natural water movement, both within a developing site and more broadly throughout urban areas. Some LID strategies include preventing unnecessary soil compaction, retaining rainwater (also known as stormwater) on-site, and designing stormwater systems to put water back into the soil instead of into the storm drain. LID strategies protect soil and increase the resiliency of stormwater systems.

To increase the adaptability of Eugene's natural resource systems, management approaches must consider the variety of natural resources—soil, trees, wildlife, and water—and manage them together across the urban landscape.^{[47],[48]} Similarly, natural resource planning must be flexible, holistic, and considerate of the dynamic biological systems and potential impacts that climate change can bring.

Efforts Underway

Eugene residents value their parks, rivers, forests, and wetlands. Several natural resource area plans, including the Ridgeline Vision and Action Plan, the Willamette River Vision Plan, and the Metro Waterways Plan, have been developed to preserve the quality of these resources. Local utilities that manage the community's drinking water supply are planning for the potential impacts of climate change. In addition, the Eugene Fire Department and Parks and Open Space staff are managing City lands near residential areas to reduce fuels and minimize wildfire risks.

^[47] "Preparing for Climate Change in the Upper Willamette River Basin of Western Oregon," Climate Leadership Initiative, USDA Forest Service, National Center for Conservation Science and Policy, 2009.

^[48] "A New Era for Conservation: Review of Climate Change Adaptation," National Wildlife Federation, 2009.



OBJECTIVES AND ACTIONS FOR URBAN NATURAL RESOURCES:

Objective 26:

Protect sensitive urban natural areas including riparian areas, wetlands, and floodplains, for multiple benefits including improved water and air quality, reduced water and air temperatures, and reduced flooding.

Many of the adaptation goals of this section, including increased shading, decreased flooding, and improved wildlife habitat, can be met by managing for multiple benefits. These natural resources are interdependent; success with one goal can mean success with multiple goals. In areas where soils are protected from compaction, for example, trees that provide shade grow healthier and are more resilient, and stormwater can better infiltrate the soil, thus reducing flooding. When streamside flood zones are protected from development, buildings are less likely to flood, and stream banks can support shade trees that cool the stream and provide maximum wildlife habitat value.

High Priority Actions:

- 26.1.** Increase funding for public acquisitions of property to facilitate the combined goals of stormwater management, flood abatement, stream shading, headwaters protection, and increased connectivity between wildlife corridors. Some priorities for property acquisition are outlined in the Ridgeline Vision and Action Plan, the Willamette River Vision Plan, and the Metro Waterways Plan.
 - 26.2.** Update urban forestry management plans to promote urban forest management on a city-wide scale, expanding beyond individual lots or streets.
 - 26.3.** Identify and remove barriers, including City code, that may discourage or prevent use of Low Impact Development (LID) practices during construction on public and private property.
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**Objective 27:
Manage and update urban natural resource information, and make data available to public and policy-makers.**

Information on climate change and fuel price volatility is evolving rapidly and relevant, up-to-date information about urban natural resources must be centralized and easily accessible so that planners, managers, policy-makers, and the public are able to respond to changes with well-informed decisions. This information will also assist in setting future targets and measuring success among a variety of natural resource goals.

High Priority Actions:

27.1. Compile and maintain an inventory of urban natural resources that is current and accessible to the public and policy-makers.

27.1a) Create a list of climate-sensitive urban natural resources that should be tracked: inventories of City-managed trees, stormwater resources, riparian buffers, opportunities for food production, solar resources, soil classifications, publicly-owned land, etc.

27.1b) Identify a central coordinator of information, such as Lane Council of Governments (*LCOG*).

27.1c) Utilize existing inventories.

27.1d) By 2013, identify any information gaps and create a plan to fill them.

27.1e) Fill any information gaps by 2015.

**Objective 28:
Update vegetation management plans.**

High Priority Actions:

28 .1. Plan for increased fires in the forests surrounding the urban area.

28.1a) Re-examine urban forest management policies to ensure that focus is placed on reducing susceptibility to the likely increase in wildfires.

Objective 29:**Educate community members about the importance of urban natural resources.**

It is important that community members remain informed about the importance of stormwater, urban trees, watershed health, and water quality as these resources relate to a changing climate.

High Priority Actions:

- 29.1.** Provide educational resources to students, teachers, residents, and businesses about the benefits of trees, watershed health, and water quality.

29.1a) Build on existing community efforts.

Objective 30:**Manage stormwater to reduce flooding, recharge groundwater, and improve water quality.**

Climate change is expected to increase downpours, and cause more intense winter storm events. In order to minimize local flooding during these events, stormwater must be slowed and allowed to infiltrate the soil. This type of stormwater management, although not actively encouraged for existing buildings, is required by City policy on new or redeveloped sites,^[49] and includes the use of tools such as bioswales, *pervious pavement*, and *rain gardens*. Because the majority of the buildings that will be standing in Eugene in 2020 already exist, making stormwater retrofits is an important strategy for improving the resiliency of the community's stormwater system.

High Priority Actions:

- 30.1.** Manage stormwater and riparian areas to meet multiple goals: improved water quality, lowered stream temperatures, increased infiltration, increased capacity, and improved native plant and wildlife habitat.

- 30.2.** Develop a program to encourage onsite treatment of stormwater from existing buildings and facilities.

30.2a) Identify incentives to encourage property owners to retrofit existing structures and facilities.

CLIMATE CHANGE is predicted to reduce summer stream flows, increase drought, and put stress on plants and animals alike. In order to adapt, many animals will need space to move away from stresses and into areas that are more livable. And as fuel prices increase, residents of Eugene may seek recreational opportunities closer to home. Eugene is fortunate to have a Parks and Open Space system that not only provides outstanding recreational opportunities, but preserves an incredible array of habitats in several large and varied natural areas. In west Eugene, over 3,000 acres of protected wetlands form a well connected, integrated system of prairies, creeks, pond areas and seasonal pools. The Ridgeline system to the south contains over 1,900 acres of protected upland prairies, oak dominated communities and conifer forests. Along the valley floor, the Willamette river flows through several parks, providing habitat for fish, beaver, herons, and bald eagles. Together these areas support a diverse group of animals and plants including several listed as rare and endangered.

Wildlife corridors such as Amazon Creek, help connect large wetland, upland, and river habitats. This connectivity facilitates the migration of wildlife, seeds, and genes that help plant and animal populations be resilient.

In addition to supporting plants and wildlife, the trails and paths that weave through these extensive natural areas provide valuable opportunities for our community to experience, explore, and learn firsthand the value of nature.

^[49] "Stormwater Management Manual," City of Eugene, 2008.

TREES are an integral part of Eugene's health. They cool our community by providing shade; they provide wildlife habitat, improve air and water quality, raise property values; and, when properly sited, reduce energy costs year-round.

Recognizing this community value, volunteers with the non-profit Eugene Tree Foundation (ETF) have helped plant nearly 1,400 street and yard trees, as well as hundreds more in Eugene's natural areas and along roads and bike paths.

Since 1997, ETF members have created a healthier urban forest and strengthened community bonds through tree planting, stewardship, education and advocacy. ETF organizes monthly volunteer work parties to plant, inspect, prune, water, and care for trees—often collaborating with the City of Eugene's NeighborWoods, Stream Team, and Volunteers in Parks programs.

Beginning in late 2010, ETF will pilot a new neighborhood-based planting program in several neighborhoods in coordination with the Portland nonprofit Friends of Trees. This work will plant the next generation of trees in Eugene and create a network of volunteers to help care for trees and natural areas throughout the community. Learn more by visiting www.eugenetreefoundation.org.



Objective 31:
Expand public and private programs to manage, and invest in, trees to cool buildings, pavement, and waterways.

Mature trees can help meet several natural resource goals by reducing flooding, improving air quality, cooling streams and cooling the urban heat island, a condition that occurs when the urban area is warmed by dark pavement, roof shingles, and buildings. The temperature of hard surfaces shaded by a tree may be up

to 35° F lower than in full summer sun.^[50] Tree shade also reduces energy needed to heat and cool buildings.^[51] The greatest benefits will come from shading roadways, buildings (the south and west sides), and streams. Trees frequently take ten to twenty years before they provide a significant amount of shade; however tree planting is an inexpensive investment in the future livability of our community that can be taken on by just about anyone.

High Priority Actions:

- 31.1.** Increase planting, preservation, and maintenance of trees and shrubs.
 - 31.1a)** Build on existing initiatives and partnerships.
 - 31.1b)** Seek additional financial and volunteer resources.
 - 31.1c)** Plant a diversity of species, including species native to the Willamette Valley, to increase the percentage of survivors under changing conditions.
- 31.2.** Control invasive species, such as English ivy, on City and County parks in order to maintain the health of existing urban area native habitats.
- 31.3.** Create incentives to encourage residents and businesses to plant trees.

^[50] "The Benefits of Urban Trees," Chris Hastie, July 2003.

^[51] "Urban Forest Values: Economic Benefits of Trees in Cities," Kathleen L. Wolf, Ph.D., 1998.

Objective 32:
Encourage ongoing water conservation.

High Priority Actions:

- 32.1. Increase existing water conservation education and water quality initiatives as outlined in the Buildings and Energy section.
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Objective 33:
Strengthen protections of drinking water sources.

When considering the impacts of climate change, water quantity and quality will continue to be critically important to the livability of Eugene. Fortunately, the McKenzie River provides Eugene residents with a seasonally stable, ample, high-quality water supply.^[52] Continued protection of the quality and availability of this resource is essential.

High Priority Actions:

- 33.1. Strengthen and expand protections to maintain surface water quality and prevent the contamination of shallow wells.
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Appendices can be downloaded separately at
www.eugene-or.gov/sustainability

^[52] "Deep Groundwater Mediates Streamflow Response to Climate Warming in the Oregon Cascades," Tague, C. et. al., 2008.