WASHINGTON COUNTY

Greening the Code

Final Report

Washington County's Department of Land Use & Transportation
October 2012

ACKNOWLEDGEMENTS

BOARD OF COUNTY COMMISSIONERS

Andy Duyck, Chairman

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DEPARTMENT OF LAND USE AND TRANSPORTATION (LUT)

Andrew Singelakis, Director

Steve Franks, Assistant Director

Stephen Roberts, Communications Coordinator

Bonita Oswald, Graphics Designer

CONSULTANT

John C. Spencer, AICP, Spencer & Kupper

CLEAN WATER SERVICES

Laurie Harris, Engineering Technician III

Carrie Pak, Engineering Division Manager

PROJECT TEAM

Nadine Smith Cook, Principal Planner

John McAllister, Building Official

Terry Lawler, Rural Senior Planner

Ross Van Loo, Urban Senior Planner

Wayne Hayson, Associate Planner

Dyami Valentine, Associate Planner

Jonathan Czerniak, GIS Specialist

Jennifer Pitner, Engineering Associate

Carine Arendes, Current Planning Assistant

John Boren, Current Planning Assistant

Jacob Nitchals, Current Planning Assistant

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EXECUTIVE SUMMARY

Purpose and Overview of Report

Attractive amenities, quality neighborhoods, and growing employment are among the attributes that make Washington County one of the fastest-growing counties in Oregon. Washington County is the economic engine of the state due to its mix of world-class enterprises, family-owned businesses and entrepreneurial startups. It is also renowned for its quality of life with a unique blend of fertile land, mountains, and natural beauty. In today's marketplace, green-conscious practices are seen as an economic development tool necessary to attract talent and business. Building green in Washington County is an investment in the local economy, using resources (energy, water, materials, and land) more efficiently and effectively providing a healthier environment for living, learning and working.

Washington County's Department of Land Use and Transportation (LUT) is working to ensure that new buildings within our jurisdiction can be designed and constructed to save energy, minimize their environmental impacts and encourage investment in our local economy. In summer 2010, LUT, funded by a U.S. Department of Energy (DOE) Energy Efficiency and Conservation Block Grant (EECBG), began evaluating its land use and building codes to identify barriers to energy efficient and sustainable development. This report is intended to establish a common understanding of the issues surrounding green building, summarize the project team's findings and provide a set of options aimed at enabling development that is energy efficient, sustainable and economically viable. The "Why Greening the Code Is Important" section (pg. 7) examines the impacts of conventional building practices. The "National, State, Regional and Local Policies and Programs" section (pg. 11) examines the policy framework for green building. The Sustainable Features: Barriers, Opportunities and Strategies" section (pg. 19) describes highlighted sustainable features, barriers to their implementation, approaches to reducing barriers and suggested next steps.

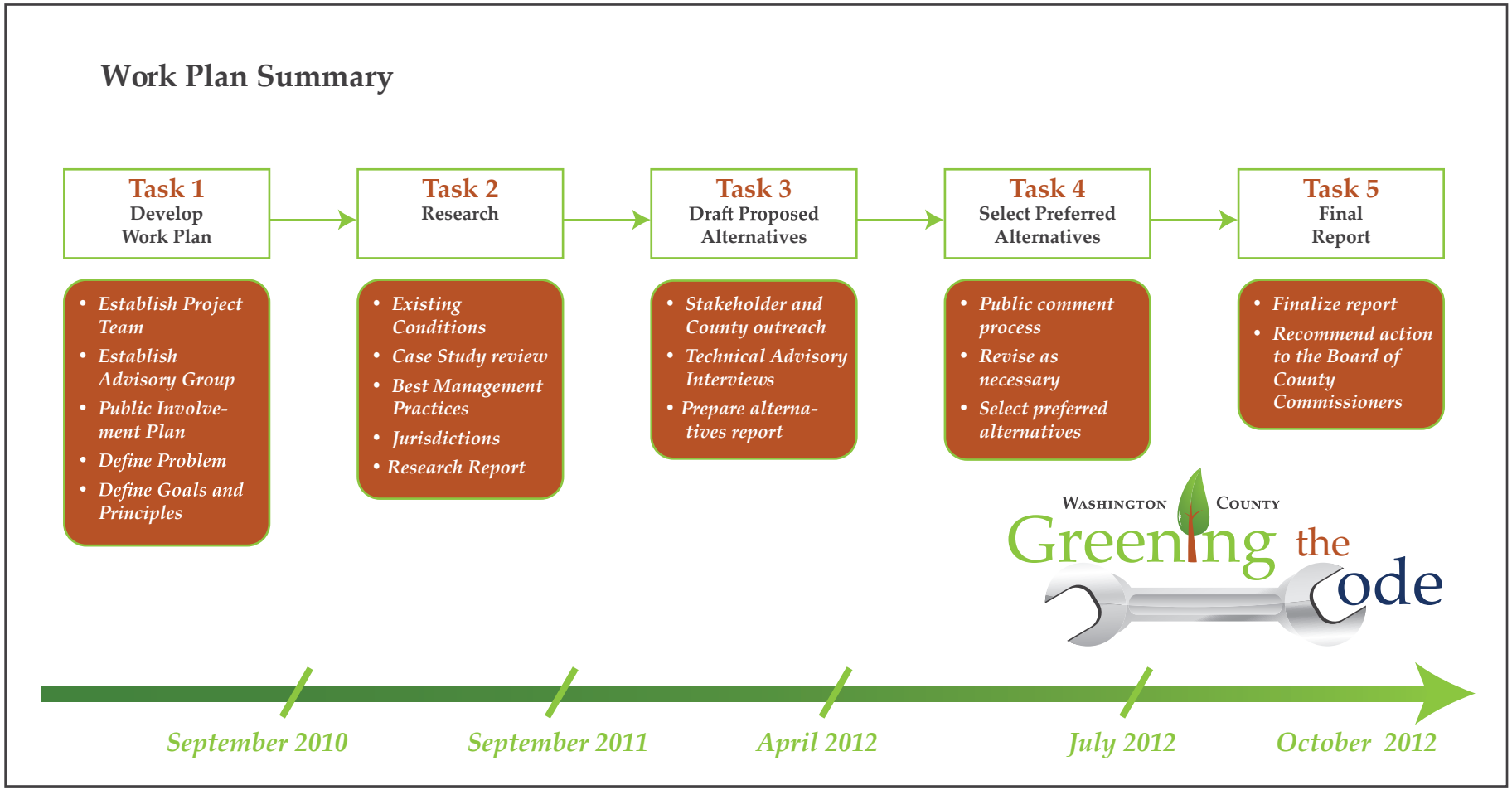


Figure 1: Greening the Code Work Plan Summary

As shown in Figure 1, the project entailed five tasks: (1) project development, (2) research and barrier identification, (3) proposed alternatives, (4) selection of alternatives informed by public and stakeholder engagement, and (5) this final report detailing findings and recommendations.

The original research report produced for Task 2 (and incorporated into this final report) specifically addressed the following questions:

- What are the current conditions for conventional building practices in Washington County?
- What regulatory obstacles may common sustainable building features encounter in unincorporated Washington County?
- How does Washington County's development code compare to codes in comparable cities and counties throughout the United States?
- Do Washington County's codes facilitate use of the criteria of prominent national green building rating systems (i.e. LEED)?

Clean Water Services' Operations Building, opened in 2003, is the first LEED Gold certified public building in Washington County. Through the use of low-flow fixtures and the harvesting of rainwater to flush toilets, water usage is projected to be 66% less than a comparable code building. The use of occupancy sensors, high-efficiency lighting, and underfloor heating and cooling systems are projected to save 45% on energy costs.

The next step in the process involved shaping approaches to removing obstacles to the use of the sustainable features identified by the research. Input from the Board of County Commissioners (board), stakeholders and industry experts was used to assess the feasibility of various approaches. Additional stakeholder and public input helped refine a variety of strategies to remove barriers to green building and sustainable development. Selection of specific strategies (e.g. code revisions, education and outreach, incentives, etc.) will be considered by LUT staff, potential partner agencies/organizations and the board. Additional planning processes and/or public input opportunities may be appropriate to help determine which strategies will best balance community needs, expectations and concerns.

Report Sections

Why Greening the Code is Important

The report begins with a summary of the impacts of conventional building practices and benefits of sustainable features. The economic and environmental impacts of a conventionally constructed and operated building over its life-cycle are significant. Buildings account for a significant portion of our total energy use and CO_2 emissions, which are widely believed to contribute to climate change. Washington County and the Portland region are ahead of many places in the country by already embracing fundamental sustainable development practices, such as directing new growth inside an urban growth boundary, providing high quality transit as an alternative to driving, and focusing compact, pedestrian-oriented development near light rail stations and along transit corridors. A combination of "sustainable" practices in the location, design, construction and operation of buildings can significantly reduce both their economic and environmental impacts for generations to come. Energy efficient building practices and the development of renewable sources of energy will play significant roles in helping meet long-term greenhouse gas (GHG) emission goals. Land use and building codes are primary tools for encouraging sustainable building practices. However, as this report details, energy efficient building practices and renewable energy source development still encounter regulatory obstacles in Washington County.

The Economics of Green Building

A common assumption about green building is that the "green premium" is too expensive to be considered economically feasible. However, a study for the USGBC comparing the costs of 170 green buildings to those of similar buildings using conventional design found an average cost increase of just under 2% for the green buildings. Higher construction costs can generally be avoided by the inclusion of green design from the outset of the project.

National, State, Regional and Local Policies and Programs

The next section provides an overview of efforts underway at the national, state, regional and local levels to reduce GHG emissions, support green building and improve the efficiency of our land use and transportation systems. In response to environmental concerns and rising energy costs, government leaders are increasingly adopting green building policies to help reduce energy, water, electricity and other resource usage in building construction, operation and rehabilitation. Many jurisdictions researched for this project address the impact of building and development practices within the context of a unifying sustainability policy.

At the national level, policy and certification programs are the main drivers. In Oregon, the state regulates the building code, while the responsibility of developing and enforcing land use regulations is primarily delegated to local governments. The Oregon legislature has adopted climate change policies to set greenhouse gas emission reduction targets and require planning to implement location efficient strategies to reduce GHG emissions. It also authorized the development of the Oregon Reach Code to achieve greater energy efficiency in building construction and operation.

Regional policy and regulation adopted by the Metro Council applies to urban Washington County and its associated cities. A Greenprint for the Metro Region identified goals for energy efficiency, greenhouse gas reduction and high performance building. While Washington County does not currently have a green buildings or climate change policy, the Board of County Commissioners has adopted a set of principles and objectives aimed at sustainability — including one that emphasizes land use planning, development, and building policies. Other relevant county policies focus on energy efficiency, increasing the use of renewable energy, and developing and implementing communication and education plans to promote and report on the county's sustainability activities.

Sustainable Features: Barriers, Opportunities and Strategies

There is clear policy support for energy efficient buildings, renewable energy systems and conservation of resources. This report identifies and presents research regarding barriers to these actions in Washington County. It also identifies potential options to address identified barriers. In this section, 22 common green building and sustainable development features are grouped into five broad categories:

Energy Generation

Energy Efficiency

Water Quality and Conservation

Resource Conservation

Policies and Incentives

Each feature profile includes a brief description of the feature, the identified implementation issues in Washington County, relevant findings (research highlights, case study, and precedents), enumeration of potential points and credits under LEED, stakeholder highlights when appropriate, and implementing strategies for consideration by policymakers. As noted above, planning and public engagement is anticipated prior to adoption of any significant changes in policy or regulation. The general finding across features was that the Washington County Community Development Code (CDC) often: lacks standards and definitions applicable to innovative sustainable building strategies and technologies; and is static (little flexibility). The resulting uncertainty and uneven implementation can create financial disincentives for those wishing to employ sustainable practices and features.

Proposed Approaches to Reducing Barriers

This section of the report also identifies possible approaches to address identified barriers, information on the criteria used to assess strategies, and proposed next steps. In most cases, an increase in outreach and education is called for. This includes ensuring county staff are consistently referring customers to existing green building informational materials and resources; creating additional materials; and partnering with industry groups to receive and provide ongoing training in sustainable building methods and practices. A number of code revisions are recommended, from minor (adding definitions), to more extensive (development of specific standards). A consolidation of multiple code-related strategies into a comprehensive package for consideration in future Long Range Planning Work Programs is also suggested. Taken together, these potential actions will encourage innovative and sustainable land use and building practices for an energy smart, economically savvy and resilient Washington County.

Implementing Strategies Matrix

The report concludes with a matrix summarizing the proposed approaches to reducing identified barriers, including proposed next steps.

Photo courtesy of Washington County Visitors Association

WHY "GREENING THE CODE" IS IMPORTANT

Buildings are long-term investments, and the economic and environmental impacts of a conventionally constructed and operated building over its lifecycle are significant. In the U.S., inefficient buildings cost nearly $130 billion each year in lost energy.[1] According to the U.S. Environmental Protection Agency (Figure 2), buildings in the U.S. account for approximately 39 percent of total energy use, 38 percent of carbon emissions and 60 percent of non-industrial waste generation. The burning of fossil fuels – coal, oil, and natural gas – for centralized electricity generation and home heating are the primary sources of emissions. Carbon dioxide (CO_2) emissions are widely believed to be a significant contributor to climate change.[2] The effects of climate change have the potential to greatly impact how our economic, environmental, social and political systems function for the foreseeable future.

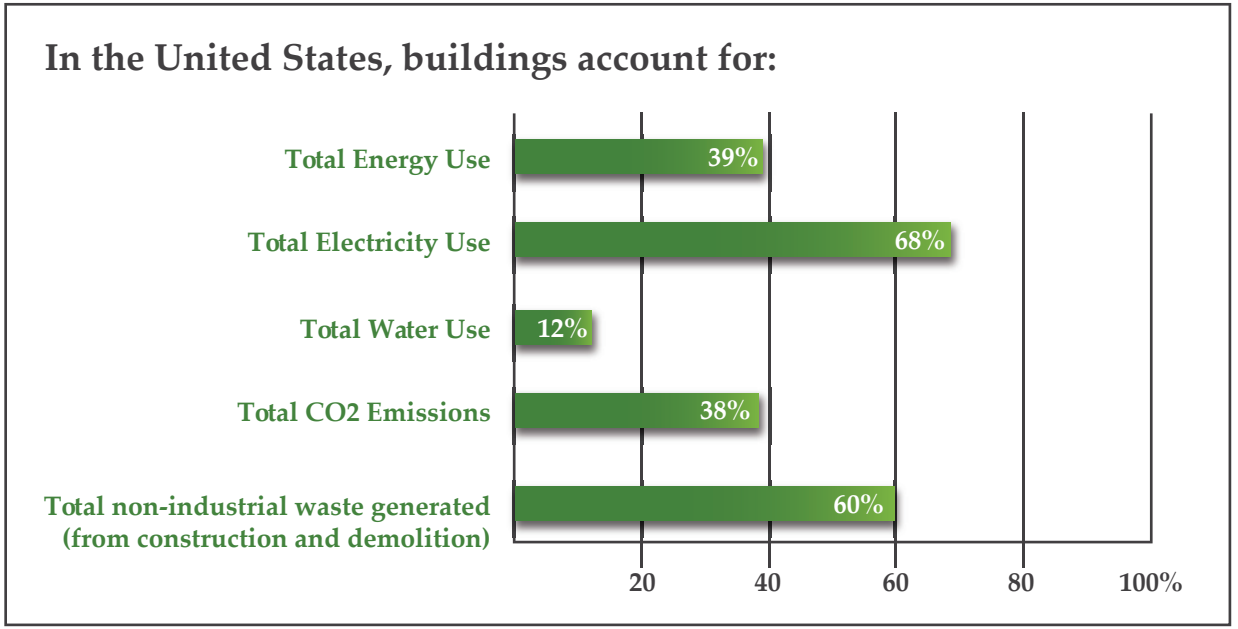


Figure 2: Building Resource Consumption (Source U.S. EPA)

Our region is not likely to be spared from the effects of climate change. A report prepared by the Climate Leadership Initiative (CLI) modeled climate projections based on different greenhouse gas (GHG) concentrations and found the potential for temperature increases of up to 10-15° F in the summer and 3-5° F in the winter, with a loss of snowpack in the Cascades and decreased stream flows in the summer.[3] While CLI projections show that climate change has the potential to significantly impact the region's economy, social welfare, environment and quality of life, the report also found the region well-positioned to take steps to minimize harmful effects. The report also noted that local governments and communities can be more resilient to a changing climate by proactively developing policies and strategies that improve the energy efficiency of buildings, promote compact housing and promote compact urban form.

When viewed nationally, Washington County and the Portland region are ahead of many places in the country by already embracing fundamental sustainable development practices. Metro's 2040 Growth Concept Plan incorporates many broad sustainability practices such as directing new growth inside an urban growth boundary, providing high quality transit as an option to driving, and focusing compact, pedestrian-oriented development near light rail stations.

1 Granade, Hannah Choi, et al. July 2009. Unlocking Energy Efficiency in the U.S. Economy, McKinsey & Company. Cited by Globe Alliance: Climate Change and Building Overview. Available at www.globealliance.org/resources.aspx

2 The Inter-governmental Panel on Climate Change Fourth Assessment Report. Available at www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml

3 Resource Innovation Group's Climate Leadership Initiative: Building Climate Resiliency in the Lower Willamette Region of Western Oregon, 2011. Available at: www.theresourceinnovationgroup.org/building-climate-resiliency

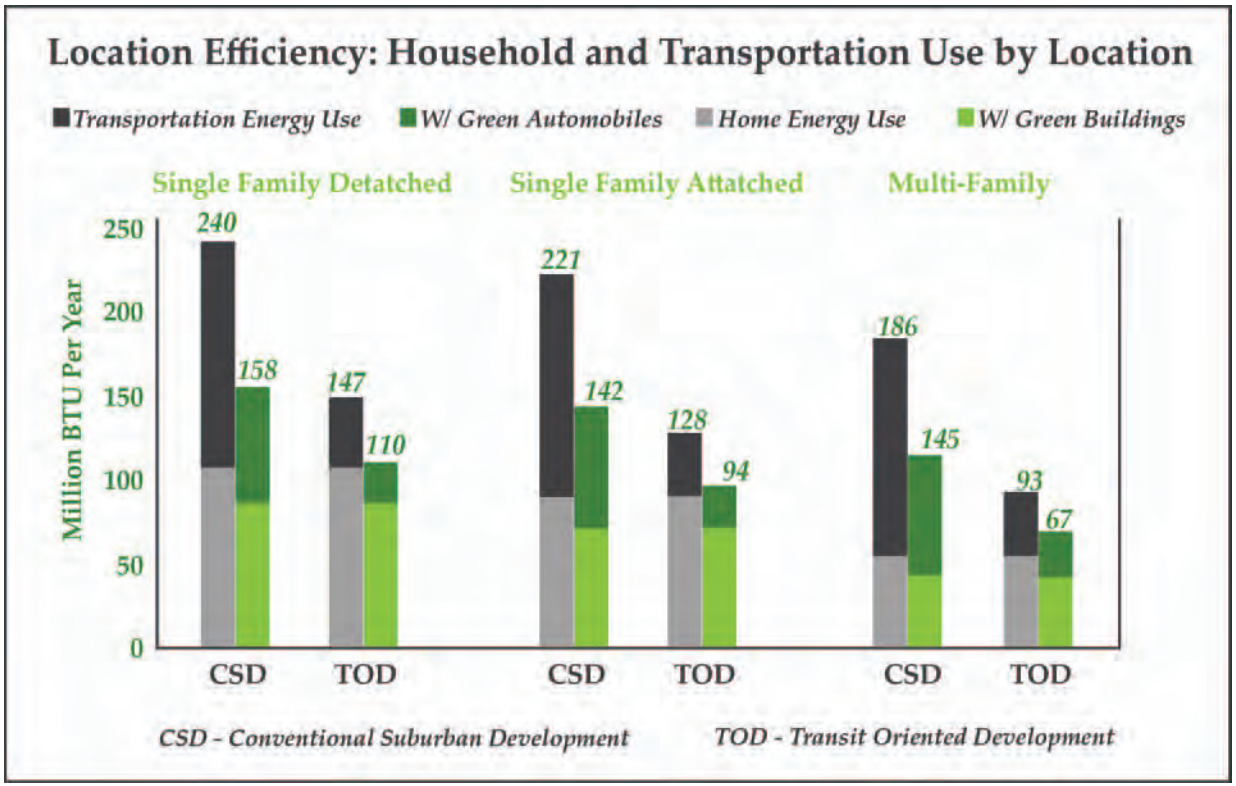


Figure 3: Location Efficiency and Housing Type - Boiling it Down to BTUs (prepared by Jonathon Rose Companies. January, 2011)

The average annual greenhouse gas production per capita in the United States is approximately 24 metric tons, or the equivalent weight of nearly 20 Honda Civics.[4,5] Residents in Washington County do slightly better than the average American, producing approximately 21 metric tons of GHG per person per year, or about 17 Honda Civics.[6] Some locations in the U.S. produce significantly less GHG than others. New York City, for example, emits about ten metric tons of GHG per person per year, less than half of the American average.[7] Although a variety of factors contribute to these locational variations, differences in housing type, integrated and energy efficient design and proximity to transportation options can significantly affect energy consumption.

A study found (see Figure 3) that the total energy consumed by persons living in multi-family housing units located proximal to transit, consume 62 percent less energy compared to persons living in single-family detached units in a suburban neighborhood not serviced by transit.[8]

4 The Cool Planning Handbook (http://www.oregon.gov/LCD/TGM/docs/coolplanninghandbook1312011.pdf?ga=t) suggests describing the weight of GHG gases in terms of something familiar, like a small car. A 2010 Honda Civic, for example, weighs roughly 2,700 pounds or 1 ¼ metric tons. So, we can say that the weight of the greenhouse gases our nation produces each year per person is equivalent to about 20 Honda Civics.

5 A metric ton (or "tonne") is 1,000 kilograms or 2,204 pounds. GHG emissions data are from the Energy Information Administration's "Emissions of Greenhouse Gases" (for 2007) at http://www.eia.doe.gov/oiaf/1605/ggrpt/index.html. As cited in Cool Planning Handbook

6 Emissions stemming from the use of buildings, transportation and other consumptive activities within Washington County are estimated at approximately 11 million metric tons (MMT) of carbon dioxide equivalent (CO_2e) for 2010. Direct and indirect emissions are reflective of annual total consumption of carbon based fuels. The nearly 310 million square feet of building stock in Washington County produced approximately 3 MMT of CO_2e.

7 Hoornweg, Daniel, Lorraine Sugar and Claudia Lorena Trejos Gómez. Cities and greenhouse gas emissions: moving forward. 2011 23: 207. Originally published online 10 January 2011, Environment and Urbanization. http://eau.sagepub.com/content/early/2011/01/08/0956247810392270.abstract

8 Location Efficiency and Housing Type—Boiling it Down to BTUs, prepared by Jonathon Rose Companies. January, 2011. Online http://newurbannetwork.com/sites/default/files/location_efficiency_BTU.pdf

So-called location efficient development can accomplish significant reductions in energy consumption, but will not account for the full reductions necessary to achieve climate stabilization.[9] Energy efficient building practices and the development of renewable sources of energy will play significant roles in meeting long-term GHG emission goals.

Achieving the targets put forth by the Inter-governmental Panel on Climate Change (IPCC) will require both demand and supply-side solutions. With current technologies and practices we can achieve significant emission reductions.

On the demand side, as demonstrated in the previously noted study (Figure 3) the combined benefit of location efficiency and building efficiency is significant (i.e. 240 MBTU for a typical SFR vs. 67 MBTU for MFR in TOD, a difference of 173 MBTU or 72 percent). On the supply side, as of 2010 renewable energy (conventional hydroelectric power, biomass, geothermal, solar/photovoltaic, and wind) accounted for approximately 7.5 percent of total energy generation in the United States.[10] Efforts are underway to increase the share of renewable energy supply. Oregon's Renewable Portfolio Standard requires the largest utilities to provide 25 percent of their retail sales of electricity from newer, clean, renewable sources of energy by 2025. However, as this report details, energy efficient building practices and the development of renewable sources of energy still encounter regulatory obstacles in Washington County.

What is meant by green building?

Green building, sustainable development, and high performance building are commonly used terms that refer to design, construction, and operational practices that significantly reduce resource consumption and environmental impacts through:

- *sustainable site planning;*
- *energy efficiency;*
- *water conservation;*
- *waste minimization;*
- *pollution prevention;*
- *renewable energy;*
- *resource-efficient materials; and*
- *enhanced indoor environmental quality for occupants.*

9 The Inter-governmental Panel on Climate Change Fourth Assessment Report found that in order to achieve climate stabilization, cumulative carbon emission reductions of 80 percent below 1990 levels must occur by 2050.

10 Total Energy Flow, 2010 http://www.eia.gov/totalenergy/data/annual/index.cfm#summary

Building codes and land use standards implement and enforce state statutes and local ordinances. In Oregon, the state regulates the building code and dictates minimum energy efficiency standards for new buildings. The responsibility of developing and enforcing land use regulations, with the exception of farm and forest lands, are primarily delegated to local governments. The county is required to adopt as a minimum standard the state's building code and is responsible for enforcing the code. Adopting land use and building codes that support energy efficient buildings and renewable energy development may be an effective approach to achieving a more balanced energy system and reducing GHG emissions. The next section details efforts underway at the national, state, regional, and local levels to reduce GHG emissions, support green building and improve the efficiency of our land use and transportation systems.

Photo courtesy of Washington County Visitors Association

NATIONAL, STATE, REGIONAL AND LOCAL POLICIES AND PROGRAMS

The purpose of this section is to identify the existing green building regulations, policies and programs impacting Washington County. In response to environmental concerns and rising energy costs, government leaders at the national, state, regional and local levels are increasingly adopting green building policies to help reduce energy, water, electricity and other resource usage in building construction, operation and rehabilitation. Green building policies can be a cost-effective tool for addressing concerns about climate change and energy efficiency in newly constructed or rehabilitated buildings (see call out boxes — this page and page 4).

Most of the cities and counties researched for this project address the impact of building and development practices within the context of a unifying sustainability policy. These policies appear to be rooted in the goal of improving economic viability, public health and quality of life. Among the sample of 24 researched jurisdictions, 75 percent have green building policies and programs. Fifty-eight percent have climate change policies and have completed, or plan to complete, a community-wide greenhouse gas inventory. Counties and municipalities with climate change policies often reference the UN's Intergovernmental Panel on Climate Change (IPCC) findings on climate stabilization targets.

A key question that local governments must resolve is what form green building policies should take to meet broader sustainability goals. A study by the Environmental Law Institute of 25 different municipal policies that promote green building in the private sector found three common approaches: (1) mandating green building practices, (2) providing expedited review of green building projects, or (3) providing other direct financial incentives for green building projects.[11] The approaches a local government adopts are dependent on factors including, but not limited to, costs and benefits, resource availability, and community values.[12]

Benefits of Green Building

Increased Property Values: With energy costs on the rise, the lower operating costs and easy maintenance of green buildings make for lower vacancy rates and higher property values.

Case Study: Investment in energy efficiency and low-priced power at the USAA Realty Company's La Paz Office Plaza in Orange County, CA led to an $0.80-per-square-foot-market value improvement, ultimately a $1.5 million increase in value.

www.usgbc.org/Docs/Resources/043003_hpgb_whitepaper.pdf

11 "Municipal Green Building Policies: Strategies for Transforming Building Practices in the Private Sector", Environmental Law Institute, Washington DC, April 2008. http://www.elistore.org/reports_detail.asp?ID=11295

12 As has been reported by an analysis of green building costs and benefits prepared by MIT, green buildings not only make economic sense, they tend to reflect the values of the community. Kats, Gregory H. "Green Building Costs and Financial Benefits." Massachusetts Technology Collaborative. 2003. Available at: www.nhphps.org/docs/documents/GreenBuildingspaper.pdf

National Initiatives

Climate Change Policy

No national climate change policy currently exists. However, there are national and international efforts to reduce energy consumption and carbon emissions through programs like ENERGY STAR.

Sustainability Goals

Executive Order 13514 signed by the President on October 5, 2009 sets sustainability goals for federal agencies and focuses on making improvements in their environmental, energy and economic performance. The Executive Order requires federal agencies to set 2020 greenhouse gas emissions reduction targets; increase energy efficiency; reduce fleet petroleum consumption; conserve water; reduce waste; support sustainable communities; and leverage federal purchasing power to promote environmentally-responsible products and technologies.

ENERGY STAR www.energystar.gov

ENERGY STAR is a U.S. Environmental Protection Agency (EPA) program helping businesses and individuals fight climate change through superior energy efficiency. Through ENERGY STAR, EPA provides commercial building owners and managers with the tools and resources they need to strategically manage and reduce their buildings' energy use.

Living Building Challenge[13] www.ilbi.org

Living Building Challenge is a certification program created by the Cascadia Green Building Council and administrated by the International Living Future Institute. It addresses four types of development: renovations, landscape and infrastructure, building and neighborhood. Projects may vary in scale and density from a single building or park, to a college campus or a complete neighborhood. Projects are evaluated after 12 months of operation in seven performance areas: Site, Water, Energy, Health, Materials, Equity and Beauty. These are subdivided into twenty Imperatives, each of which focuses on a specific aspect of development. The Living Building Challenge standards seek to define the most advanced measures of sustainability in design, construction and use in the built environment.

Earth Advantage[14] www.earthadvatage.org

Earth Advantage administers multiple third-party certification programs. Projects must earn a minimum number of points in five categories over the course of two verification visits to earn certification. The categories cover energy efficiency, indoor air quality, resource efficiency, environmental responsibility and water conservation. Earth Advantage New Homes is a green certification that incorporates ENERGY STAR standards while evaluating additional sustainability features and building processes. The goal is healthier and more resource-efficient homes. Depending on the number of points earned, Earth Advantage New Homes qualify for one of three levels of certification – silver, gold or platinum.

13 International Living Future Institute™. LIVING BUILDING CHALLENGE™ 2.0: A Visionary Path to a Restorative Future. April 2010. http://ilbi.org/lbc/v2-0

14 Earth Advantage Institute. About Earth Advantage New Homes. http://www.earthadvantage.org/assets/uploads/About_EA_New_Homes_Small.pdf

Leadership in Energy and Environmental Design (LEED)
www.usgbc.org

The United States Green Building Council (USGBC), a national non-profit membership organization, developed the Leadership in Energy and Environmental Design (LEED) system to provide a guideline and point-based rating system for green buildings. The application of LEED standards is widespread and various LEED initiatives have been adopted throughout the United States. Legislation, ordinances and policies can be found in 45 states, 14 federal agencies or departments, and numerous public school districts and institutions of higher education. LEED now encompasses standards for multiple project types: New Construction (NC), Existing Buildings: Operations & Maintenance (EB: O&M), Commercial Interiors (CI), Core & Shell (CS), Schools (SCH), Retail, Healthcare (HC), Homes and Neighborhood Development (ND).

The project team elected to evaluate USGBC's LEED Neighborhood Development (ND) rating system, the most frequently used neighborhood-scale green rating system, for compatibility issues with Washington County's Community Development Code. LEED-ND facilitates the development and retrofit of neighborhoods that integrate the combined principles of smart locations, neighborhood design, and green infrastructure and building. Neighborhoods qualifying for LEED-ND rating have the ability to reduce greenhouse gas emissions from both the building and transportation sectors due to their location, design, and performance. The research found that obstacles do exist in Washington County that would limit the opportunity to qualify a project under LEED-ND. The Sustainable Features: Barriers, Opportunities and Strategies section of this report identifies potential opportunities for selected features to qualify for LEED-ND points and credits. In addition to removing code barriers, some jurisdictions facilitate LEED-ND projects by identifying locations that meet relevant criteria.

In 2012, Hearst Tower (photo on the right) earned a Platinum LEED Rating for Existing Buildings, becoming the first in the United States to receive both Gold and Platinum certifications.

Hearst Tower in New York, New York

Lane County

Lane County identified three goals associated with Goal 13 planning:

1. Develop standards for identifying, evaluating and minimizing the adverse energy consequences of major land development and/or building permit requests.

2. Strive to reduce oil consumption in Lane County by at least the world depletion rate.

3. By 2020, Lane County plans to generate all of its electricity by sources other than coal-fired plants unless all carbon emissions from coal-fired plants are permanently sequestered.

State Initiatives

Oregon's Statewide Planning Goals provide the basis for all land use and transportation planning at the state and local levels. Enabling the sustainable features detailed in this report may require changes to County policies or plans. Several State Goals and statutes provide a strong basis for local adoption of climate change and green building policy.

Goal 13: Energy Conservation

Goal 13 directs planning efforts to maximize the conservation of all forms of energy, based upon sound economic principles. The goal also encourages that land conservation and development actions seek to utilize renewable energy sources whenever possible. There exists little enumeration on the implementation of Goal 13; however, it may provide the basis for state and local energy and climate change planning as these issues become more prominent. Lane County is moving forward on Goal 13 planning as illustrated in the callout box.

Climate Change Policy – Oregon House Bill (HB) 3543

HB 3543 amended Oregon Revised Statues (ORS) Chapter 468A to require state and local governments, businesses, nonprofit organizations and individual residents to prepare for the effects of climate change in order to minimize its social, economic and environmental effect. The bill established statewide greenhouse gas emissions reduction targets of 75 percent below 1990 levels by 2050.

Climate Change Policy – Oregon Senate Bill (SB) 1059

SB 1059 mandates that the six state Metropolitan Planning Organizations (MPO) implement planning strategies that more effectively integrate land use and transportation as a means of reducing greenhouse gas emissions from vehicle use. SB 1059 calls for transportation GHG emissions reductions of 75 percent below 1990 levels by 2050 as required in ORS 468A.205. The premise of this bill is that tackling greenhouse gas emissions, especially from the transportation sector, requires a regional approach. In the Portland metro region, Metro's "Climate Smart Community Scenarios Project" is moving toward planned adoption in 2014.

Solar Energy Technologies in Public Buildings - Oregon HB 2620

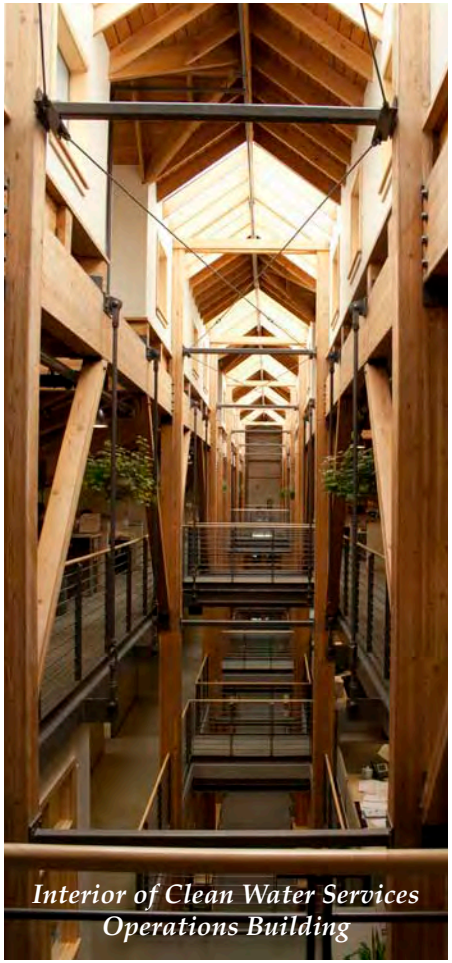
The state enacted House Bill (HB) 2620 in 2007 which required the installation of solar energy systems on new public buildings or major building remodels which had a building contract price of greater than $1,000,000. The other requirement was that the funds spent on inclusion of solar technology into a building project be at least 1.5% of the total cost.

Green Energy Technology in Public Buildings - Oregon SB 1533

Senate Bill 1533, passed in 2012, broadened the allowable renewable energy sources to meet the 1.5% requirement. The menu of green technologies to choose from for state building projects includes geothermal electric, geothermal direct use, solar electric, solar thermal and passive thermal. The addition of geothermal as a means of meeting the original requirement in HB 2620 provides greater flexibility for including renewable energy sources in public buildings.

Energy Efficient Building Policy - Oregon SB 79

In 2009 the Oregon legislature passed a bill that encourages the achievement of net-zero emissions in building operation by 2030. SB 79 also directed the creation of a task force to develop the Oregon Reach code, a set of optional statewide building standards and construction practices designed to increase the energy efficiency of buildings.



Interior of Clean Water Services Operations Building

The Oregon Reach Code

Introduction

The Oregon Reach Code (ORC) is a set of optional statewide building standards and construction practices designed to increase the energy efficiency of buildings and allow for the implementation of renewable energy technologies beyond the state's mandatory building codes. The ORC grew out of a 2009 legislative mandate, Senate Bill (SB) 79, which directed the state's Building Codes Division (BCD) to "adopt, amend and administer a code separate from the state building code, to be known as the Reach Code." The Legislature directed the BCD to look beyond typical operational definitions of "energy efficiency" and broadly defined it as, "the use of construction and design standards, construction methods, products, equipment and devices to increase efficient use of, and reduce consumption of, electricity, natural gas, and fossil fuels in buildings that are newly constructed, reconstructed, altered or repaired."

The majority of the ORC standards are based on the International Green Construction Code (IgCC) Public Version 2.0, with amendments to ensure consistency with existing state codes. Plumbing standards were adopted from the International Association of Plumbing and Mechanical Officials' (IAPMO) Green Plumbing and Mechanical Code to ensure integration with the state's existing use of the IAPMO plumbing code. Residential code standards were developed by a coalition of representatives from the Oregon Home Builders Association, Northwest Energy Efficiency Alliance, Earth Advantage, Energy Trust of Oregon, and the Department of Environmental Quality. In choosing standards to adopt, amend, and omit, the BCD facilitated a year-long public process consisting of the eight-member Reach Code Advisory Committee and numerous public meetings with a variety of presentations and testimonials by industry professionals on a wide range of topics. [15]

How it Works

The extent to which the ORC is followed is left to the discretion of the owner or builder. They may choose to implement a specific feature or practice that the mandatory codes may not be equipped to address. If they choose to build to the standards of the entire ORC, the building will be designated as a "Reach Code Structure" on the certificate of occupancy.

There are two tracks for commercial Reach Code Structures: prescriptive and performance. The prescriptive path requires builders to comply with prescribed code standards. The performance track is flexible and gives builders more discretion in how they meet standards by requiring only that certain performance measures be met. In addition, builders must select and meet the requirements of two appropriate Project Electives, regardless of track.

15 The list of meetings, members, presenters, and discussion topics can be found at: http://www.cbs.state.or.us/bcd/committees/11reachcode.html#purpose.

There are three tracks for residential Reach Code Structures: prescriptive, performance, and selective. The residential prescriptive path is based on the Oregon Residential Structural Code Chapter 11, but includes updated energy conservation and building envelope provisions. Similar to the commercial performance path, the residential performance path requires that performance measures are met, but allows the builder greater flexibility in choosing how to meet the performance measures. The selective path requires builders to meet a point threshold by selecting measures from the "selective measure table." The residential provisions recognize that bigger structures have a proportionately larger energy footprint, and require larger buildings to implement more stringent energy efficiency provisions than smaller ones.

Lastly, the ORC requires all Reach Code Structures not utilizing renewable energy systems to be "renewable ready," making future retrofits for renewable energy systems easier and more cost effective.

Benefits of ORC

The primary objective of the ORC is to provide technically and economically feasible standards for reducing the amount of energy used in constructing and operating buildings, but there are additional benefits:

- The flexibility provided by the commercial and residential performance tracks make it easier for local jurisdictions to issue permits to high performance structures built with unconventional techniques or features.
- For builders wishing to achieve above-code certifications such as LEED, Energy Star or Passive House Building Energy Standard, this flexibility may result in fewer appeals, engineering studies, or other findings to prove the merits of specific proposals, saving builders time and resources.
- The standards in the ORC help assure local jurisdictions that innovative technologies are safe and reliable, while also reducing concerns over liability. They also familiarize building officials with new techniques and technologies that will likely be baseline code standards a decade from now.
- The Oregon Reach Code is expected to facilitate the implementation of innovative building technology across the state, increase acceptance of innovative building practices, standardize a higher level of energy efficiency and ensure Oregon remains a national leader in energy conservation and efficiency.

Implementing Strategies to Consider:

Although voluntary, the ORC applies to all jurisdictions and requires local building officials to interpret whether code provisions have been met. This makes it necessary for staff to stay up-to-date on the newest technologies and practices. There are also opportunities to promote and incentivize the use of the ORC, similar to the existing Think Permits program. Facilitating ORC approvals could encourage the use of innovative efficiency and sustainability technologies. Encouraging more energy efficient buildings will also facilitate meeting the county's share of the HB 3543 GHG reduction targets for the Metro area.

- Continue to educate staff about the ORC and allocate staff training resources to the ORC.
- Stay abreast of future BCD training opportunities, including any future certification offerings.
- Provide prominently displayed literature at the permit counter that explains the benefits of the ORC and "Reach Certified Structures."
- Provide ORC resources on the Building Services website.
- Develop a Reach recognition program to highlight structures that receive Reach approval on the Building Services website and at the permit counter.
- Incentivize ORC implementation in the Community Development Code by allowing for bonuses (height, density, setbacks, etc.).

Regional Initiatives

Metro's Community Greenhouse Gas Inventory

The Portland metropolitan region is a national leader in reducing the rate of increase in greenhouse gas emissions. However, current efforts still fall short of meeting the carbon reduction goals established by the state legislature. HB 3543 mandated reductions of per capita greenhouse gas emissions to 10 percent below 1990 levels by 2020, and 75 percent below 1990 levels by 2050. Metro produced a Regional Greenhouse Gas Inventory for the Portland metropolitan region to establish a baseline of the region's greenhouse gas emission sources. The inventory allows planning efforts and investments to be focused in areas where they will be most effective. According to Metro, energy consumption from buildings accounts for 27 percent of the region's greenhouse gas emissions. Energy sources include natural gas and fossil fuels. Energy uses includes appliance and device use, as well as building HVAC and lighting. Total emissions stemming from activities within the Metro boundary are estimated at 31 million metric tons for 2006. Figure 3 summarizes Metro's findings in regards to GHG emissions from residential and business activities throughout the Portland metropolitan area.

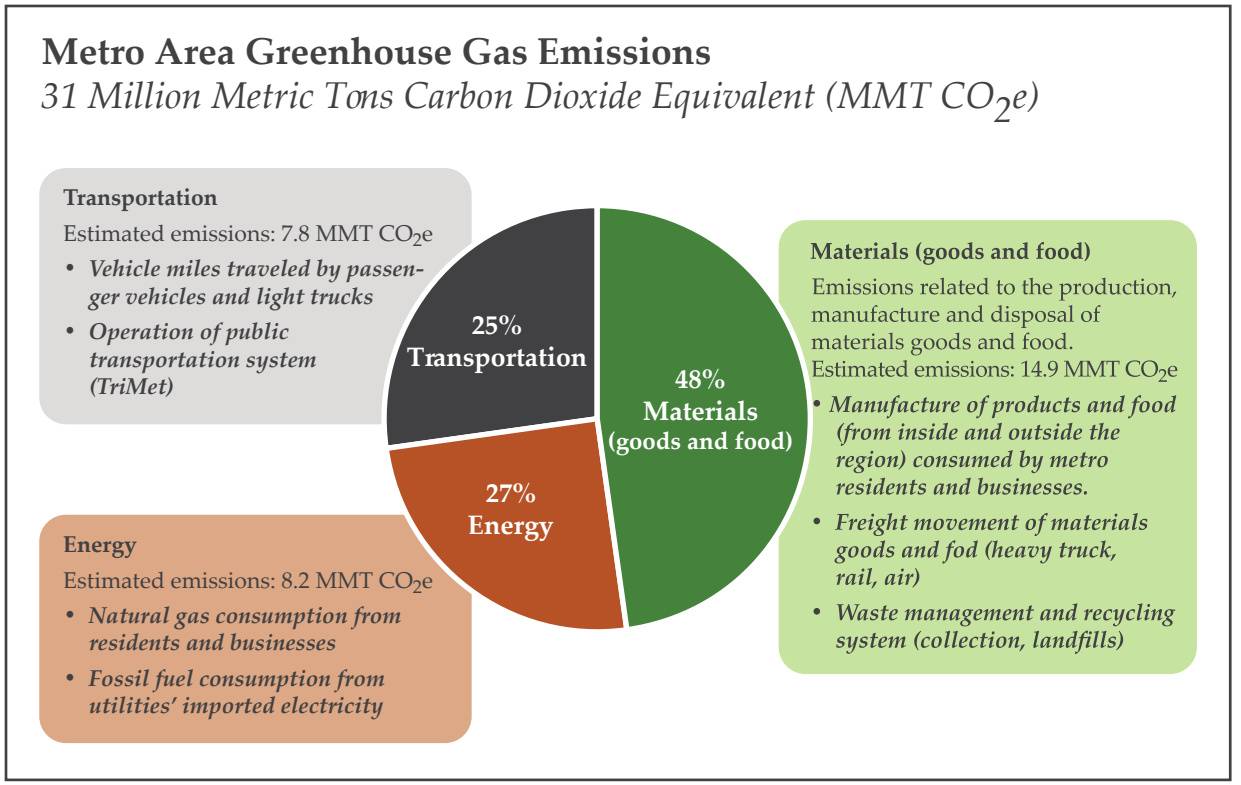


Figure 4: Metro area 2006 greenhouse gas emissions inventory

A Greenprint for the Metro Region is the product of a multi-stakeholder public-private partnership to reduce emissions while stimulating economic prosperity. This initiative was headed by the Portland Sustainability Institute (PoSI) and supported by the national Climate Prosperity Project. The Greenprint establishes a vision for the metro region as a beacon of the clean economy that achieves more economic prosperity and community vitality while producing less environmental impact—given the region's assets and size—than any other region in the world. The Greenprint identified the following goals related to Greening the Code:

- Establish energy efficiency and greenhouse gas reduction targets for the metro region
- For major redevelopment sites, adopt high performance building and infrastructure standards
- Support transportation electrification throughout the region
- Support the regional green development industry

Metro's Eco-Efficient Employment Toolkit is a resource document addressing efficiency, economic development, planning for livability and climate action. Recommendations to respond to climate change and support the next generation of energy efficient building and development include the use of design guidelines, flexible menu approaches, rating systems like LEED-ND, full-site utilization master plans, and performance benchmarking.

Washington County

Removing barriers to constructing energy efficient buildings and installing renewable energy systems and improving the overall conservation of resources are the primary aims of the Greening the Code project. The research highlights local sustainability and climate change policies becoming more commonplace and interconnected with wider regional, state and federal policy objectives. While Washington County does not currently have a green building or climate change policy, it has adopted a set of principles and objectives aimed at greater county-wide sustainability. Several objectives outlined in the county policy pertain to green building and development, including:

- Emphasize land use planning, development, and building policies and practices that promote sustainable communities;
- Prioritize energy efficiency and increase the use of renewable energy; and
- Develop and implement communication and education plans to promote and report on the County's sustainability activities and "best practices."

Cool Planning: A Handbook on Local Strategies to Slow Climate Change

This handbook explores and highlights policies that local governments in Oregon can take to reduce dependence on the automobile.

"Land-use policies, development decisions, street design, road networks, transportation plans – these and other community-shaping factors greatly influence the frequency and distance of our travel and the mode of transportation we use. When local policies enable us to travel less and travel cleaner, we can reduce our carbon emissions and help our planet be a cooler place."

SUSTAINABLE FEATURES: BARRIERS, OPPORTUNITIES AND STRATEGIES

How we identified barriers

To identify potential barriers to implementation of sustainable development features, Washington County's current development and building codes were evaluated against exemplary sustainable projects (or case studies where applicable), best practices identified in LEED standards, and the codes and policies of comparable cities and counties. The project team identified two common themes throughout the research: 1) many sustainable development features, concepts, and technologies are relatively new, and the Washington County Community Development Code (CDC) lacks applicable definitions or standards; and 2) this can lead to uncertainty and inconsistent implementation, resulting in delayed processing and a financial disincentive for developers wishing to utilize sustainable features.

Outreach

After identifying barriers to sustainable development in the building and development codes in the research phase, we prioritized features, engaged the community on a variety of the features, confirmed barriers in practice, and considered options for addressing identified barriers. More intense stakeholder outreach occurred when potential features were within the purview of Development Services and had strong community or board support, or if significant progress or changes could be made quickly or with minimal resources. Other features were analyzed based upon the county's current approach in order to identify future opportunities for engagement or action.

The public involvement strategy for this project employed a variety of approaches for providing information and receiving feedback. Multimedia outreach strategies included managing a webpage on the County's site, an email list-serve and an online virtual open house. Traditional methods of outreach were comprised of county newsletter articles, presentations to the Board of Commissioners, and tabling at local community gatherings by LUT staff. Additionally, project team members reached out to Citizen Participation Organization (CPO) support staff, professional organizations and local jurisdictions across the state.

Activities to gather feedback on the reported features, and more specifically barriers to their implementation, included interviews with local implementers and planning staff in other jurisdictions, a water management strategies focus group, communications at the Planning Directors' level with jurisdictions across the state and an online Virtual Open House. Open House participants were able to provide feedback through an accompanying survey. While response was small, the results of the survey found general support for updating county codes to address identified implementation barriers. Support was strongest for removing barriers to solar energy generation, electric car charging, bicycle parking, green roofs, rainwater harvesting, stormwater reuse, urban agriculture & community gardens, green streets, and reducing construction & demolition waste.

Point of Interest:

In order to offset Washington County's 2010 annual carbon emissions, over two million acres of forest would have to be preserved (five times the area of Washington County).

Proposed Approaches to Reducing Barriers

This report is intended to form the basis for ongoing effort to encourage and support green building practices in Washington County. A variety of approaches could be used to address the barriers listed in this report. The strategies highlighted in this report were developed primarily based on best practices research and feedback from area jurisdictions, local developers, and community members already using these features. For most features, more than one potential strategy could be implemented.

Feature Categories

This section is arranged by common green building and sustainable development features grouped into the following broad categories:

Energy Generation

Energy Efficiency

Water Quality and Conservation

Resource Conservation

Policies and Incentives

Each feature includes:

- a brief description
- the identified implementation barriers specific to the county
- research highlights
- potential points and credits under LEED
- potential implementation strategies to address those barriers.

How were strategies evaluated?

The strategies in this report were evaluated using four criteria:

- Responsible Party
- Resources Needed
- Time Frame
- Priority

The Responsible Party is the agency anticipated to implement a proposed strategy. An estimate of Resources Needed for implementation considered factors including staff time, financial resources, and other resources. When action on the implementing strategies might occur was considered in the Time Frame, based on perceived community interest and leadership priorities, as well as current and anticipated future resources. Priority for implementation also considered community interest, effectiveness of the feature, ability for implementing agencies to execute, and required resources.

Potential Outreach and Education Strategies

Some features could be implemented more widely or with more ease if additional information was readily available. In some cases, developers and community members are not aware of existing programs. In other cases ensuring staff has the right resources easily available would improve responsiveness, increase consistency and ensure more rapid turn-around times. Common outreach and education strategies identified included periodic staff training on new sustainable development practices, the creation of brochures and informational pamphlets for the public, promotion of existing informational materials, and finally, leveraging resources from outside agencies. Seven identified features have an outreach and education component:

- Solar Energy Systems
- Wind Energy & Conversion Systems
- BioEnergy Production Facilities
- Green Roofs & Rain Gardens
- Harvesting Rainwater Using Barrels and Cisterns
- Urban Agriculture/Community Gardens
- Brownfield Redevelopment

Potential Code Revisions

Revisions or additions to the Community Development Code may be needed in order to facilitate implementation of many features considered. Clear definitions and standards for several sustainable development features would assist County staff in more quickly reviewing proposals and would make applications for developers and community members easier to complete. Code revision strategies included in the report range from adding definitions and specific standards for new sustainable development features to allowing a greater range of features in certain types of development. The majority of features have a code revision component.

Implementing Strategies Matrix

Pages 60-64 of this report feature an Implementing Strategies Matrix, which summarizes the information presented in this section of the report.

Energy Generation

There is increasing interest in a range of energy generation choices - from individual property owners to innovative businesses.

Solar panels on the roof of the City of Hillsboro's Intermodal Transit Center

Solar Energy Systems

Description: A device or combination of devices and accessories to collect, convert and/or distribute solar energy for the heating or cooling of a building, heating or pumping of water, and electricity generation.

Issue: Washington County's CDC does not expressly allow or prohibit the use of Solar Energy Systems (SES). This lack of definition and development standards presents barriers to the utilization of SES and may lead to uneven implementation and/or delays in processing development applications in Washington County.

- Height restrictions in some districts may prohibit siting SES on top of buildings.
- District setback standards may restrict placement of SES and related accessory equipment in residential districts.
- Current practice requires a development review process for the placement of ground-mounted accessory SES equipment in urban commercial, industrial and institutional districts, requiring additional time and creating a disincentive.
- In the absence of a definition in the CDC, free-standing solar arrays in rural areas have been defined as "fences" for the purposes of establishing that they are a permitted use and in order to apply reasonable height restrictions.

Research Highlights:

- SES provide an alternative to carbon-based energy sources and do not contribute to greenhouse gas emissions.
- The majority of Case Studies analyzed included solar energy systems for on-site renewable energy generation.
- Fifty percent of researched jurisdictions defined and permitted solar energy systems through a design review or exemption with the majority exempting SES from height restrictions altogether.
- Several jurisdictions identify SES as an accessory use allowed outright with defined siting criteria.
- The majority of jurisdictions that addressed SES provided specific permitting requirements in a checklist form.
- Oregon has several laws that protect access to solar resources and the use of solar energy systems. Since 1979, ORS 105.880 has prohibited the use of covenants to restrict the use of solar energy systems; state law also allows municipalities and local authorities to establish solar access laws, such as those in the county's development code, which are intended to protect solar access to the south-facing roof space of buildings.
- In 2010, the Oregon Solar Installation Specialty Code (OSISC) went into effect, creating the first statewide solar code. Its intent is to provide clarity and promote consistency in the installation and construction standards for rooftop photovoltaic installations, creating a prescriptive path that streamlines the permitting process. It does not address licensing for installers or non-photovoltaic technology.
- In 2012, new legislation went into effect in Oregon to facilitate the installation and use of solar energy systems. House Bill 3516 clarifies that in zones where residential and commercial structures are allowed uses, solar photovoltaic (PV) and solar thermal systems are explicitly allowed as a permitted use, provided a system meets the prescriptive path guidelines above and does not expand the footprint or peak height of the structure.

Precedents:

- City of Austin, TX – Grants height exception for solar installations, also defines solar collectors as accessory uses.
- Salt Lake City, UT – Defines SES as accessory structures that are "roof-mounted, wall-mounted, or ground mounted panel, the primary purpose of which is to provide for the collection, inversion, storage, and distribution of solar energy for electricity generation, space heating, space cooling, or water heating of buildings located on the same property. A small solar energy collection system shall not exceed a capacity of 100 kilowatts (kW)."
- City of Seattle, WA – Permits SES as an accessory use to any principal use. Seattle also permits SES to exceed height limits by a maximum of nine feet when roof-mounted and establishes setback requirements for ground-mounted systems. Greenhouses are considered solar collectors for the purpose of the City's codes pertaining to SES.
- City of Vancouver, BC – Grants height exception for roof-mounted solar installations.
- Boulder County, CO – Exempts SES from land use review if associated with a principal use. Requires a 5-foot setback to property lines.
- Polk County, OR – Categorizes SES as either commercial (for the purpose of generating power available for public purchase) or non-commercial. Commercial SES are to comply with ORS 215.213(2)(g); non-commercial SES are treated as accessory uses.

Rating System Qualifications[16]:

- LEED-ND – up to 3 credits for on-site renewable energy
- LEED-NC – up to 7 points for on-site renewable energy

Stakeholder Highlights:

- Stakeholders confirmed that a lack of definitions and standards in the CDC is a barrier to implementation.
- Development and building codes are not always current on the most comprehensive and technical uses, especially less common uses such as solar thermal (frequently used to heat pools) and ground mounted systems.
- Jurisdictional differences in standards and processes can frustrate installers and increase uncertainty, especially when installing commercial systems or systems outside the prescriptive path.
- Costs, including time, associated with permitting process can be a disincentive.
- Stakeholders noted technological progress towards smaller and more efficient systems generating more kilowatts with less bulk. However under the current state system for electrical permitting, fees are determined based on the generating capacity of the system rather than the amount of installation work required or the system's physical size/bulk. This disincentivizes the most efficient systems, which often have fewer impacts.
- Solar installers also suggested less burdensome processes tailored specifically to alternative energy. Portland has trained some staff members for solar installation issues and has developed an electronic permitting process for residential systems on the prescriptive path.
- Hillsboro was favorably cited for waiving building permit fees for renewable energy systems.

Thin-film solar collection system on the roof of Washington County's Public Services Building (more info on page 25)

16 Many LEED standards, or credits, are worth one point; however, some credits have subsets making them worth more than one point.

Implementing Strategies to Consider:

Without changes, current barriers to the utilization of Solar Energy Systems (SES) will continue to frustrate Washington County land owners, developers, and staff due to inconsistency in direction and implementation which may result in unnecessary permitting delays. Decreased costs and increased efficiency are likely to drive increasing demand for SES implementation, making this a high visibility topic.

Maintaining staff competency as technology changes is crucial. Building Services is already undertaking work to address policy differences between domestic solar thermal and solar thermal pool heating systems. Industry groups and non-profit energy efficiency organizations are likely to be willing partners in increasing the county's communication reach on energy alternatives and would build a foundation on which to engage the community in urban and rural areas.

Improve or increase outreach and education

While not specifically referring to Washington County employees, stakeholders working in multiple jurisdictions stated that inconsistent knowledge by permitting officials and inspectors occasionally led to additional paperwork and review, resulting in permitting delays. Improving education and awareness of the different types of solar systems and existing state codes and statutes for staff and the general public has the potential to increase implementation of SES and builds on existing efforts to improve customer service.

Responsible Party: *Development Services and outside partners*
Resources Needed: *Low*
Time Frame: *Short Term*
Priority: *High*

Simplify electrical permit application and review procedures

Numerous jurisdictions have simplified their permit process by providing dedicated staff, creating an electronic application process for those on the prescriptive path (as set forth in the state's solar specialty code), or producing easily understood supporting materials. These measures can speed up the process and ultimately reduce the cost of installation. Currently the county provides a "Renewable Electrical Energy Permit Application" and prescriptive path checklist for photovoltaic systems. However, the existence of the checklist is not well-known but could be referenced on the permit application. Additional updates to mechanical, plumbing, structural, and electrical permit applications could include a wider range of solar systems. A checklist could also be provided for domestic and pool heating solar thermal systems.

Responsible Party: *Development Services*
Resources Needed: *Low to Moderate*
Time Frame: *Medium Term*
Priority: *High*

Revise CDC to address definitions, standards and approval process

While HB 3516 limits land use review of certain roof-mounted SES, there is no state guidance for ground-mounted systems or roof systems not meeting the provisions of HB3516. Code revisions should address definitional differences between different types of SES, along with siting, screening, and dimensional standards for each type. Standards can also determine whether a SES is a commercial or a non-commercial use. Research revealed two basic approaches. The most common method compares annual energy use to annual generation capacity; if annual use is greater than generation capacity the system is not a commercial use. The other approach establishes a threshold based on either the total amount of power produced (also known as the sticker rating) or the physical size of the system.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate to High*
Time Frame: *Medium Term*
Priority: *High*

In 2012 a thin-film solar array was installed on Washington County's Public Services Building with ARRA funding. The system is designed to generate an average of 67,000 kilowatt hours annually (photo on page 23).

Maximize consistency across jurisdictions

It is not possible for Washington County to eliminate all variations between jurisdictions; however, maximizing consistency across jurisdictions would simplify permitting and increase certainty for installers. Researching and presenting jurisdictional differences in the approval and permitting process within Washington County could be the first step toward developing a more standardized process; this standardization could eventually extend to the regional or state level.

Responsible Party: *Land Use & Transportation, potentially including other local jurisdictions*

Resources Needed: *Moderate*
Time Frame: *Long Term*
Priority: *Low to Moderate*

Modify permitting cost structure and methodology

The Oregon Building Code Division sets the methodology for permitting electrical systems based on generating capacity because risk increases with capacity. Unfortunately, this disincentivizes the most efficient SES. Uncoupling permit fees for SES from generating capacity in favor of other criteria suggested by stakeholders, such as expected or actual review time, physical size in terms of structural impacts, the extent of necessary structural modifications, or other impacts would potentially increase implementation of efficient systems.

Responsible Party: *Oregon Building Code Division (BCD)*
Resources Needed: *Moderate to High*
Time Frame: *Long Term*
Priority: *Low*

Wind Energy Conversion Systems

Description: Wind energy conversion systems (WECS) use electric generators to convert wind energy to emissions-free electricity. WECS provide an alternative to carbon-based energy sources and do not contribute to greenhouse gas emissions. Facilities vary in size and generation capacity, from small systems that support single residential or farm uses to utility scale mega turbines. Small wind systems are sometimes further divided into two categories, very small 'micro' systems and small systems. Most feature three blades of 2-15 feet in length, a generator located at the hub, and a tail. In turbine systems, the turbine is mounted on a steel tower 35-140 feet high, which is designed as a freestanding monopole (like a street light), a lattice tower (like a radio tower), or a guyed monopole (like a street light with support cables from mid-tower to the ground).

Issue: Washington County's CDC and Building Codes do not expressly allow or prohibit the use of Wind Energy Conversion Systems. The lack of definitions and development standards presents a barrier to the utilization of WECS in Washington County. Other issues relating to WECS include the following:

- Viable wind energy production (beyond micro to small-scale) is limited to the Coast and Chehalem Mountain ranges.
- Height standards in all districts currently restrict free standing and building-mounted wind turbines from being constructed.
- Community acceptance and support for siting WECS may hinge on concerns related to noise, view obstruction and other environmental impacts.

What Stakeholders Told Us: Various suggestions regarding WECS development regulations

- *In rural areas, change communication tower regulations in favor of generalized tower regulations that would apply to turbine towers and communication towers*
- *Exempt turbine towers from height restrictions in specific rural zones*
- *If standards are adopted, refrain from requiring third party certifications*
- *Restrict use to rural areas with minimum lot sizes and setbacks from property lines*

Research Highlights:

WECS vary in size and design, with dramatically different community impacts and benefits. Many jurisdictions make distinctions between commercial-scale systems (primarily designed as electric power generators for utility systems or wholesale power markets) and non-commercial systems (designed primarily to provide power to a single residence or business). The former use large turbines rising hundreds of feet in the air and have a capacity measured in megawatts. They are typically (but not always), part of a wind farm system with other similar turbines covering many acres of land. The latter are, by contrast, quite small in terms of generating capacity, height, and frequency in the landscape.

- 25 percent of researched jurisdictions defined and permitted WECS with varying restrictions on size, height, capacity and purpose.
- Granting height exemptions to base standards for roof-mounted small scale WECS is a common approach.
- A number of analyzed Case Studies include small-scale WECS.
- In January 2009, the Oregon Department of Land Conservation and Development adopted administrative rules to define and provide specific standards for the siting of commercial wind generation utility facilities. The regulations are focused on preserving the quality and future cultivation of high-value farmland soils. In other areas, the county would have more discretion in regulating WECS.
- The Energy Facility Siting Council of the Oregon Department of Energy regulates energy facility siting but defers authority for land use review to the local government for wind energy facilities below a peak generating capacity of 11.66 megawatts.

Precedents:

- The CDC currently allows for telecommunication towers extending up to 200 feet in height.
- Polk County is the best local example of a WECS ordinance. Polk County has specific siting criteria establishing height and setback limits for free-standing and building-mounted WECS. The county revised its “Communication Tower” standards to “Tower” standards to include wind energy systems. Inside an urban area. WECS may not exceed 100 feet. In the rural area a WECS may extend up to 150 feet.
- Salt Lake City’s code, which is representative of other jurisdictions, defines “small wind energy system” as a wind energy conversion system consisting of a wind turbine, a tower, and associated control or conversion electronics that has a rated capacity of not more than 100 kilowatts (kW) and that is intended to generate electricity primarily for buildings and/or uses on the same property, thereby reducing on-site consumption of utility power.

Rating System Qualifications:

- LEED-ND – up to 3 credits for on-site renewable energy
- LEED-NC – up to 7 points for on-site renewable energy

Stakeholder Highlights:

- WECS projects will only occur when they are financially feasible. Wind speed, duration and consistency at specific sites affect what size system is appropriate and whether and/or how quickly a return on investment is possible. 'Micro' wind systems are most appropriate for urban environments, where wind patterns are disrupted and reduced wind speeds create marginal conditions for the financial feasibility of large scale wind turbines.
- While financial feasibility includes costs associated with permitting, other factors may play a more significant role. The decrease in federal and state incentives, including tax credits, increases the costs of WECS.
- Concerns regarding wiring, lighting, voltage, and impacts such as noise and visual aesthetics could be addressed by land development and building codes. Appropriate regulation of WECS in urban and rural areas can also decrease uncertainty and clear the way for more widespread deployment, particularly if incentives return or technological innovations lead to more efficient systems.

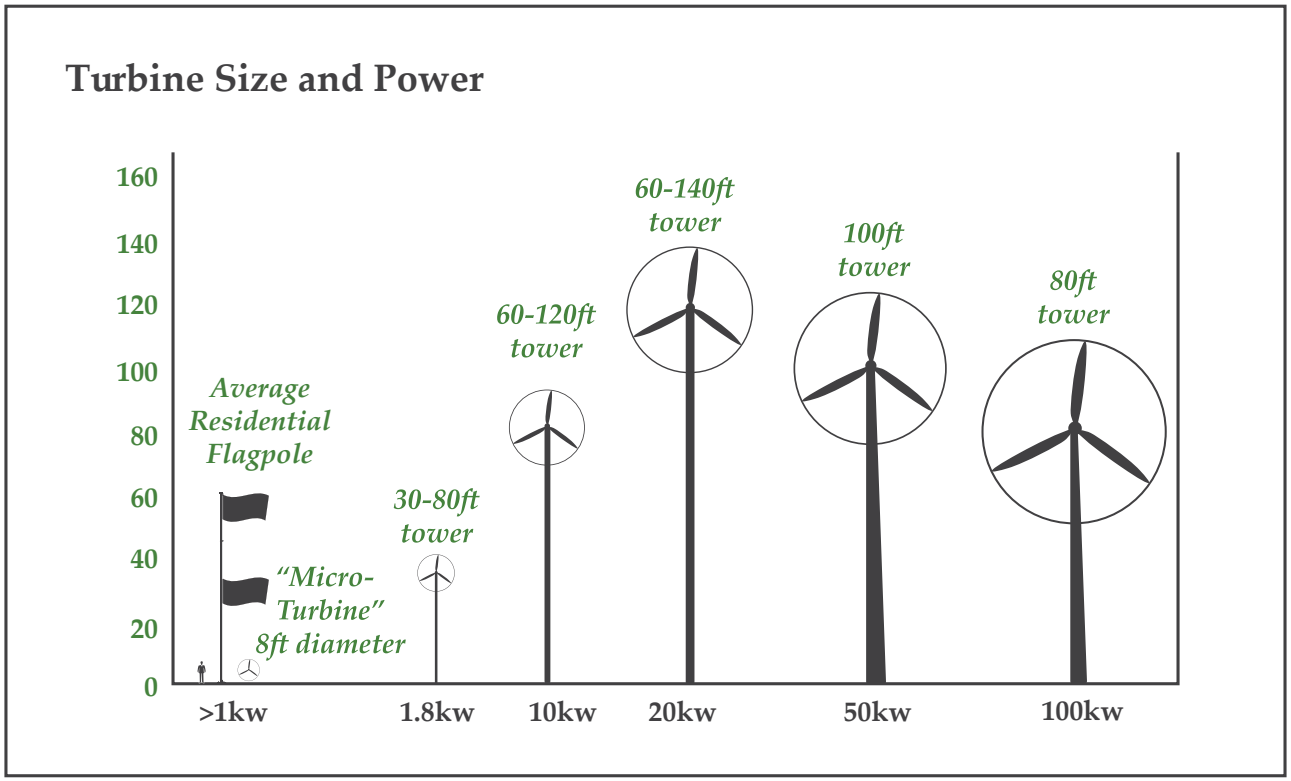


Figure 5: Turbine Size and Power

Implementing Strategies to Consider:

Without a change in policy or regulations on wind energy conversion systems there will likely be continued uncertainty and inconsistency for property owners and staff alike. The permitting process is likely to remain time and resource intensive, decisions may be subject to appeal when regulations lack clarity, and some impacts of wind energy systems may not be regulated.

Industry groups and non-profit energy efficiency organizations would be likely partners for increasing the county's communication reach on energy alternatives to build a foundation on which to engage the community on these issues. Understanding community interest and assessing potential conflicts in both urban and rural settings is likely to increase implementation.

Increase outreach and education

Industry groups and non-profit energy efficiency organizations have existing resources that can be leveraged. These groups can increase the county's communication reach on energy alternatives and support of the county sustainability resolution's objective to "emphasize land use planning, development, and building policies that promote sustainable communities." Engaging these outside agencies and the community on these issues will increase the likelihood of implementation. Following the initial outreach effort, the Department of Land Use and Transportation could follow up with a planning process that gauges community interest and addresses potential conflicts of interest in both urban and rural settings.

Responsible Party: *Development Services and outside agency partners*
Resources Needed: *Low*
Time Frame: *Short Term*
Priority: *High*

Revise CDC to address definitions, standards and use

Consider regulations on the purpose and elements of WECS. These may include factors such as scale, height, generating capacity, noise, and aesthetics, with potential differentiation between urban and rural contexts. The quantity and complexity of new regulations will determine difficulty and resource needs. CDC provisions could allow WECS as an accessory use, if specific standards are met in urban residential and commercial zones (similar to recent legislation on solar siting).

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate to high*
Time Frame: *Long Term*
Priority: *High*

District Energy

Description: The supply of electricity, heating, cooling or hot water from a central source to a group of buildings. District Energy Systems may be public or private. Private district energy systems are most commonly used by large industrial and institutional campuses, while district energy systems owned or operated by municipalities may provide services to a variety of property owners. District systems, also known as cogeneration or combined heating and power districts (CHPD), are flexible: they use a range of fuel inputs, including fossil fuels, biomass, and renewable energy; can be updated to utilize new fuel sources; and can store excess wind or solar-generated power via heat pumps and thermal stores.

Issue: Utility uses are not permitted in several districts and district energy systems are not defined in the CDC. Inconsistency in use regulations among land use districts and the lack of definitions and development standards present barriers to the implementation of district energy and associated energy generation and distribution facilities in Washington County.

Case Studies: Portland's Brewery Blocks district cooling system. Proposed northwest and northeast Portland district energy systems.

Research Highlights:

- District energy systems require steep initial investments in infrastructure, a geographically concentrated cluster of service users, potentially complicated service agreements (when users are private entities separate from service provider), and a dedicated supply of fuel.
- There is wide variety in ownership models. Systems may be leased to or owned by a public utility, non-profit or for-profit corporation; privately owned & operated municipal cogeneration systems; or operation may be an unregulated subsidiary of an investor-owned utility.
- Local examples in Beaverton, Portland's Brewery Blocks and on Portland State University's campus are heating and cooling systems, rather than systems that generate or store electricity, but may be implemented as a crucial element in proposed Eco-Districts in Portland, Beaverton and Hillsboro.[17]
- Depending on the district systems' design, state agencies may require permitting, including the Department of Environmental Quality. Many systems with underground storage will require such permits, while air quality permits may be required for systems involving sewage treatment, boilers or fuel-burning equipment.

Precedents:

- Both the City of Portland and the City of Bellingham allow small scale or community utility facilities as a conditional use.
- The City of Beaverton owns and operates a district energy facility in a mixed use commercial district. Utility facilities are allowed as a conditional use in all land use districts except Town Center High Density Residential (TC-HDR).

Rating System Qualifications:

- LEED-ND – up to 2 credits for district energy systems.

Implementing Strategies to Consider:

Development of campus-type district energy systems by an individual property owner motivated by potential energy savings is a possibility in unincorporated areas of Washington County. Due to small parcel sizes, single-owner systems aren't as practical in urban areas, but willing property owners can develop a shared system. Introducing definitions for new types of energy generation technologies would set the stage for innovative energy options. Future work could include identifying which types of alternative energy generation systems are appropriate for unincorporated areas of Washington County.

Revise CDC to address definitions and standards

Adding definitions and standards for district energy systems would allow innovative cooperative cogeneration partnerships to emerge in urban areas and also support broader implementation of single-owner systems for uses such as business parks and college campuses.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate to high*
Time Frame: *Medium Term*
Priority: *Low*

Revise CDC to allow industrial energy generation on-site

Similar to feed-in systems for solar generation, allowing onsite energy generation that meets specific standards in industrial zones would facilitate the implementation of small scale systems.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate*
Time Frame: *Long Term*
Priority: *Low*

17 In addition to the use of district energy, Eco-Districts include additional elements such as high capacity public transit and the potential to preserve "green infrastructure," or restore ecological services through daylighting and restoring natural waterways, integrating vegetated facilities into streets/ROW & building design, and reducing impervious surfaces.

BioEnergy Production Facility

Description: Typically, a 5-7 acre facility located in industrial or agricultural districts where agricultural byproducts, wood waste or municipal wastes are delivered and processed for energy production. In addition to electricity, other byproducts may be produced including ethanol, wood bricks for residential heating, and compost for plant fertilization.

Issue: There are no provisions or definitions in the CDC for bioenergy production facilities. Bio-fuel facilities are currently permitted in the CDC, but state restrictions on the size of the facility and the source of the organic inputs present barriers. Permitted use requirements in urban and rural industrial districts and in high-value farmland districts are also barriers.

Research Highlights:

- Urban examples of biomass energy generation may use either existing incineration infrastructure or Municipal Solid Waste (MSW) for biofuel or landfill methane capture to generate heat and electricity used onsite. Anaerobic digesters in sewage treatment plants (STP) are another common urban bioenergy application.
- In Oregon, the U.S. Department of Energy and the U.S. Forest Service research on bioenergy facilities has focused on woody debris as a fuel source, which is most feasible for use in combined heat and electricity systems co-located with or in close proximity to forest product processing facilities.
- An Energy Trust of Oregon report concluded that landfill, wood mill and STP generation have the greatest near to mid-term power potential but noted that transmission costs associated with bioenergy projects less than 5 MW in size are generally not offset by revenue.[18]
- Community concerns over particulate emissions and the expiration of federal incentives necessary for commercial feasibility exemplify common obstacles to urban bioenergy generation.
- Urban jurisdictions tend to require bioenergy facilities to utilize fuels produced on-site to offset energy consumed on-site. This is due to concerns over transportation impacts and the potential to consume as much energy in transit as produced. Another common provision in urban areas prohibits energy generation for sale, constraining production to on-site consumption.
- In rural Klamath County, such facilities are utilities classified as Extensive Impact Services and permitted as a conditional use in almost all zones.

Case Study: Willamette Valley Bioenergy Production Facility Business Plan.

Precedents:

- Lane and other Willamette Valley counties, where significant amounts of agricultural waste are produced, are planning for bioenergy facilities.
- Placer County, CA has instituted the Wildfire Protection and Biomass Utilization Program, which collects woody biomass removed from forests and residential properties and converts it to electricity using a bioenergy facility.
- Clark County, WA amended its code to define biomass energy as a renewable energy source and allow such facilities in Master Planned Developments in the Heavy Industrial (MH) zone to streamline the permit process and attract renewable energy projects to the county.

Rating System Qualifications:

- LEED-ND – up to 3 credits for on-site renewable energy resources.

18 Phase II Biopower Market Assessment: Sizing and Characterizing the Market for Oregon Biopower Projects. CH2MHill. April 2006. Prepared for the Energy Trust of Oregon, Inc.

Implementing Strategies to Consider:

Opportunities for bioenergy generation from waste streams may be increasing locally. Metro recently initiated a study of the region's trash system, including an outreach effort to gauge public opinion and support for bioenergy facilities fueled by municipal solid waste. Providing the community more information on bioenergy generation, including existing projects would be beneficial. Introducing definitions and clarifying the land use categorization of bioenergy production facilities would provide more direction for staff and increase clarity.

Increase Education and Outreach

Currently, the most prominent local use of bioenergy occurs at Clean Water Services' (CWS) Durham and Rock Creek sewage treatment plants, which generate nearly 10 million kilowatt hours of electricity from methane capture, or approximately 20% of the total electricity used by CWS to treat wastewater. This example and others could be used in print and web communications.

Responsible Party: Outside agency partners and Land Use and Transportation
Resource Needs: Low
Time Frame: Short Term
Priority: Moderate

Revise CDC to apply biofuel production facility siting standards to BioEnergy Production Facilities

The use of extensive bioenergy utilities on land zoned for exclusive farm or forest & conservation uses under Oregon state land use laws is currently viewed as unlikely, although it is possible for other rural lands to be utilized for such uses. However, agricultural and timber uses also produce large amounts of waste biomass. Applying the state's biofuel production facility siting provisions to other types of bioenergy generation facilities in rural areas may decrease barriers to developing such facilities.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate*
Time Frame: *Long Term*
Priority: *Low*

Point of Interest:

Effective July, 2011 the United States Environmental Protection Agency granted combustion-based bioenergy plants a three year exemption from Clean Air Act emission standards while it undertakes further research into the industry's long-term Greenhouse Gas effects. Once the exception expires, considering whether bioenergy technology is an appropriate alternative energy generation option in either urban or rural settings (or both), could move forward.

Revise CDC to include BioEnergy Production Facilities

Generating capacity, location and purpose affect land use categorization and siting of bioenergy facilities. Facilities under 25 MW of generation do not require an OR DOE site certificate and can be permitted at the county level. While the county depends on state definitions for BioFuel (ORS 315.141) and Forest Uses (ORS 527.610-730 & 527.990), there is an opportunity to define Bioenergy Production Facilities and to consider whether such facilities could be evaluated under the existing CDC standards for Public Utility (CDC 430-105), Utility Facility for Generation of Power (430-141), or BioFuel Production Facility. Due to the large thermal load needed to justify the infrastructure expense for bioenergy facilities, allowing the sale of energy generated onsite for both urban and rural uses would increase financial feasibility and likelihood of implementation.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate to High*
Time Frame: *Long Term*
Priority: *Low*

Energy Efficiency

Alternative modes of transportation and building practices are significant pieces of the energy efficiency puzzle. Through policy and code changes, the following features can be allowed and encouraged. This category includes features that conserve energy and facilitate greener modes of transportation.

Extension of Eaves into Setbacks

Description: Large roof overhangs (1 ½ to 3 feet), also known as eaves, help protect buildings from weather, and they help conserve energy by regulating the thermal envelope and improving a building's overall energy efficiency.

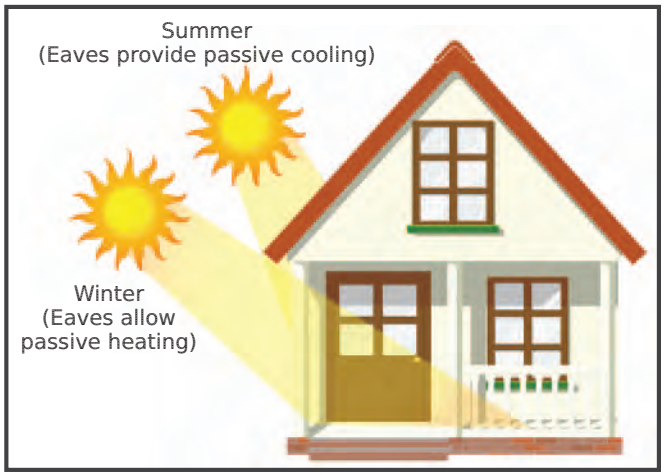


Figure 6: Seasonal Eave Perspective

Issue: The CDC currently allows eaves to extend just 2 inches into the building setback for every foot of setback required. In typical single-family residential districts in Washington County, side setbacks of 3 to 5 feet permit eaves to extend just 6 to 10 inches into the setback, limiting the ability to use larger eaves for passive heating and cooling.

Research Highlights:

- Allowing eaves to extend further into setbacks provides for passive solar heating in the winter while increasing shading in summer, lowering cooling loads.
- The intent of property line setbacks is to allow access for emergency personnel and to prevent the spread of fire from structure to structure. Increased fire resistance ratings are required the closer buildings are built to one another. Technological innovations have produced increasingly fire-resistant building materials.
- As infill and small lot development increases, builders are now much more familiar with techniques for building close to or within setbacks, as well as requests for setback variances.

Precedents:

- A third of researched jurisdictions allow eaves to project further into setbacks than current CDC.
- The majority of jurisdictions with larger eave standards allow projections into side yard setbacks of 18-36 inches.

Rating System Qualifications:

- Design features that reduce energy consumption are LEED criteria.

Implementing Strategies to Consider:

Continuing current building and land use regulations will result in lost opportunities as builders are prevented from developing structures that optimize passive heating and cooling to decrease energy costs. The added protection from weather also conserves resources by extending the lifespan of building materials. The development code could be revised to allow eave extensions that meet building code safety requirements.

Revise development code to allow extension of eaves:

Modify land use code to allow eaves and other passive screens to extend into setbacks, subject to compliance with applicable building codes in effect at the time. This will allow developers to use newer techniques to maximize passive heating and cooling systems, although the higher costs associated with most fire-resistant building materials could limit implementation.

Responsible Party: *Development Services*
Resource Needs: *Low*
Time Frame: *Short Term*
Priority: *High*

Bicycle Parking

Description: Cycling reduces vehicle demand on the transportation system and vehicle miles traveled (VMT). Reducing VMT can help meet GHG reduction goals. Bicycle parking is comprised of infrastructure and equipment to enable secure and convenient parking of bicycles. Examples include lockers, stands, bicycle corrals, and automated facilities.

Issue: The CDC does have minimum bicycle parking requirements, but the parking facilities design standards, specifically covered parking requirements, are not as rigorous as other jurisdictions.

Research Highlights:

- Encouraging bicycle use is part of a comprehensive strategy for reducing VMT, and resultant GHG emissions.
- A number of Case Studies include bicycle parking and accessory facilities to encourage biking as an alternative to auto use.
- A common strategy used to encourage bicycle commuting is employer-provided secure bicycle parking along with showering and changing facilities.
- The DLUT recently created a Bicycle Facility Design Toolkit to aid staff in determining which types of bicycle facilities are most appropriate for a given roadway project.
- Planning staff is currently working on the Bicycle and Pedestrian Improvement Prioritization Project aimed at identifying and prioritizing gaps in the urban major street bicycle and pedestrian network.[19]
- DLUT is currently updating the county's Transportation System Plan (TSP), which includes a review of the Pedestrian and Bicycle Plan. Considering changes in bicycle parking facility design standards in the TSP update process would be an efficient use of resources and could be accomplished in the short term.
- Washington County recently received two grants to support bicycle-related research. The first grant is to study possible neighborhood bicycle routes, and the second is to study multi-modal performance measures.

19 Funded by the same U.S. DOE grant that is funding the Greening the Code project.

Precedents:

- Santa Monica requires bicycle lockers, attended parking or indoor storage for long-term parking facilities. Santa Monica also requires audits of businesses with more than 50 employees to track their carbon footprint.
- Portland allows for alternative bicycle storage designs, and recently added minimum design standards for long-term parking in multi-family housing developments.
- Local examples of enhanced bicycle parking include secure facilities at the Sunset Transit Center, Beaverton Transit Center, and Hillsboro Intermodal Transit Center.

Rating System Qualifications:

- LEED-NC – up to 1 point for bicycle storage and changing room.

Stakeholder Highlights:

- Jurisdictions reported mixed levels of support for minimum bicycle parking requirements. The development community was generally amenable to them with the following caveats:
  - Many viewed covered bicycle parking requirements as an added expense that did not add value to their projects.
  - Some felt the minimum parking requirements were too high for certain uses with typically low ridership, such as industrial projects.
  - Some felt that too much emphasis was placed on design standards instead of simply providing more secure bicycle parking.
- Other stakeholders reported specific objections regarding requirements for size of spaces and distance between bicycle parking facilities.

Implementing Strategies to Consider:

Given the lack of consistent stakeholder findings and support, a more comprehensive planning effort may be warranted to evaluate the demand for increased bicycle parking facilities and to provide an opportunity to consolidate and update county policies on multi-modal transportation options.

Washington County Commissioner Dick Schouten parks his bike at the Sunset Transit Center

While there are no real code-related barriers to providing bicycle parking, developers must go above and beyond code to provide facilities that meet current best practice guidelines. Upgrading CDC standards for bicycle parking facilities could help achieve greater bicycle use, reducing VMT and GHG emissions, and would be consistent with regional and state goals.

Increase flexibility through Parking Demand Studies

Allowing bicycle parking requirements to be determined based on bicycle parking demand findings may decrease developer resistance to bicycle parking in general. This could be applied to sites with low bicycle parking demand in predominately rural areas, and would allow differentiation between short- and long-term parking needs based on proximity and access to residential and work sites or transit facilities.

Responsible Party: *Development Services*
Resource Needs: *Low*
Time Frame: *Medium Term*
Priority: *Moderate*

Require covered parking

Some jurisdictions require a percentage of short-term bicycle parking to be covered when a certain number of parking spaces are required. This may increase the probability of commuters utilizing bicycles.

Responsible Party: *Development Services*
Resource Needs: *Moderate*
Time Frame: *Medium Term*
Priority: *High*

Review required space/spacing

Reviewing the code to ensure space and spacing requirements for bicycle parking are appropriate (i.e. required space to park each bike, space between racks and buildings, and aisles between bike racks) has the potential to reduce developer resistance. It may increase the quantity of parking supplied if bicycles can be parked closer than codes currently require.

Responsible Party: *Development Services*
Resource Needs: *Moderate*
Time Frame: *Medium Term*
Priority: *High*

Require/encourage indoor bicycle parking facilities

Adopting standards requiring commuter facilities inside of buildings for developments over a specific size would encourage bicycle commuting. Best practice guidelines suggest providing secure indoor or covered parking facilities, as well storage lockers and bathing facilities for commuters. Adopting such standards facilitates healthy, active lifestyle choices.

Responsible Party: *Development Services*
Resource Needs: *High*
Time Frame: *Long Term*
Priority: *Moderate to Low*

Offer “fee in-lieu” provision

Offering a fee-in-lieu for those who do not want to provide on-site bicycle parking allows jurisdictions to fund other bicycle and pedestrian facilities and amenities in transit orientated districts, which could include public bicycle parking facilities.

Responsible Party: *Development Services*
Resource Needs: *Moderate to high*
Time Frame: *Long Term*
Priority: Low

Electric Vehicle Parking/ Charging

Description: A parking space with a plug-in charger to service a plug-in hybrid or electric vehicle.

Issue: No provisions or definitions in CDC for electric vehicle parking.

Research Highlights: The Electrification Coalition has established a goal of 75 percent of all light-duty vehicle trips in 2040 being powered from electricity. It is estimated that achieving a 75 percent trip share would result in a four-fold oil consumption reduction. The U.S. Department of Energy announced in 2009 that Oregon was selected as one of seven test markets for the largest deployment of electric vehicles (EVs) and the associated charging infrastructure in history. The goal of the project is to deploy EV charging stations and analyze the use of the stations and the behavior of EV drivers to guide widespread adoption throughout the country.

Precedents: .

- Clackamas County allows electric vehicle charging/parking spaces to count towards minimum off-street parking requirements.
- Santa Monica requires a minimum of one accessible electrical outlet for the purpose of recharging electric vehicles in buildings of 15,000 square feet or more
- The State of Hawaii requires at least 1% of all parking spaces to be EV designated for all developments with 100 or more parking spaces.
- Portland includes residential EV charging stations in the state's "minor label program," which requires only 1 in 10 homes to be inspected for electrical permitting approval.

Rating System Qualifications

- LEED-NC – up to 3 points for providing 5 percent of total parking spaces designated for alternative fuel or low-emitting vehicles.

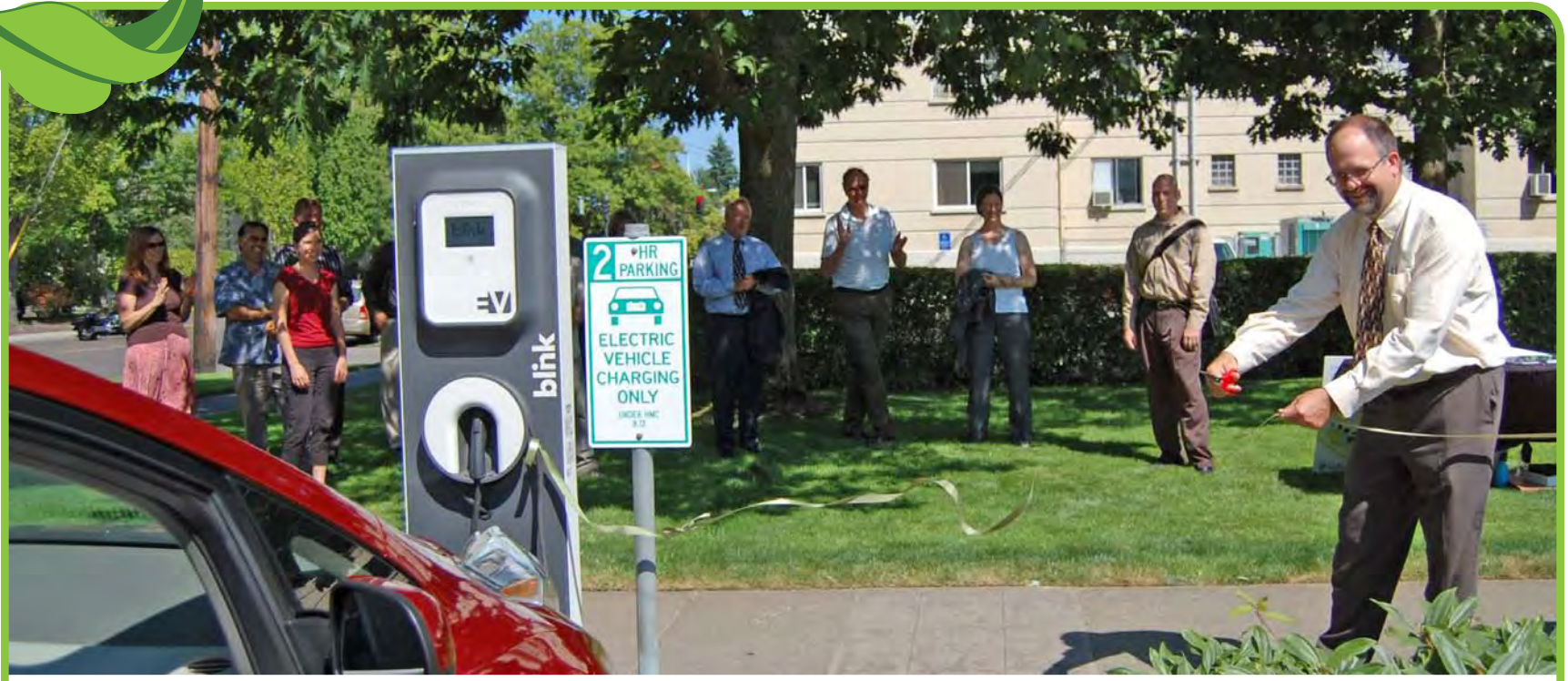
Stakeholder Highlights: Stakeholders reported two contrasting viewpoints: some developers and businesses view EV charging stations as a way to attract customers and tenants, while others are concerned that charging stations take up prime parking spaces already in short supply. Regardless of viewpoint, developers and businesses have largely stopped pursuing EV charging stations as grant funding has declined.

Implementing Strategies to Consider: Without action, electric vehicle charging stations will continue to be installed sporadically. However, use of electric vehicles is expected to rise in the future, increasing demand on EV infrastructure. The current lack of CDC standards may result in lost opportunities to provide dedicated EV facilities and spaces. Ensuring that barriers to EV infrastructure and ownership are removed will help the state and region meets GHG emission reduction goals. Proactively addressing EV infrastructure will help ensure Washington County residents are able to successfully transition to EVs.

Add EV definitions and standards to the CDC

Possible terms to define include electric vehicle, EV charging station, level 1, 2, and 3 chargers, and battery exchange stations. Change standards to allow a limited use of the public right of way for public EV charging stations and ensure that EV charging stations and battery exchange facilities will be an allowed use in all relevant land use districts.

Responsible Party: *Land Use and Transportation*
Difficulty: *Moderate to High*
Time Frame: *Medium Term*
Priority: *Moderate*



In keeping with Washington County's commitment to sustainable practices, including programs that support multi-modal transportation, three new electric vehicle (EV) charging stations were made available for public use in July 2012 at the Charles D. Cameron Public Services Building. County Commission Chairman Andy Duyck cut the ribbon to commemorate the occasion.

Revise CDC to encourage EV charging stations

Options might include granting an off-street EV parking reduction incentive at a ratio of 1:2 (i.e. one EV charging station satisfies the requirement for two standard off-street parking spaces), or granting reductions in landscaping requirements in parking lots that provide EV charging stations.

Responsible Party: Land Use and Transportation
Difficulty: *Moderate*
Time Frame: *Medium Term*
Priority: *High*

Reduce inspection burden

Follow Portland's lead and include residential EV charging stations in the state's "minor label program," which requires only 1 in 10 home units to be inspected for electrical permitting approval. This will make the inspection process faster and more cost effective, freeing up county resources that could be deployed elsewhere or used to incentivize energy efficient development practices.

Responsible Party: *Development Services*
Resource Needs: *Low*
Time Frame: *Short Term*
Priority: *Moderate*

Water Quality and Conservation

Managing stormwater runoff, reducing water use and encouraging water reuse improves water quality, conserves resources and reduces expenditures. This category includes features that reduce, treat and store stormwater runoff. It also includes toilets that use little or no water. The entire community benefits from investments made by private property owners into these features.

Green Roofs, Green Walls, Eco Roofs and Roof-top Gardens

Description: All, or a portion of a roof covered with a layer of vegetation planted in a growing medium over a waterproof membrane, with a drainage system to manage runoff when capacity to absorb stormwater is exceeded. There may be a root barrier to protect the waterproof membrane. There are two main types of green roofs, extensive and intensive.

Extensive green roofs, often called ecoroofs, consist of a thin layer of lightweight growing medium supporting hardy plants with shallow roots that require little maintenance. Fully saturated, extensive green roofs weigh slightly more than traditional roof systems and can be installed on roofs with a slope of 45° or less, making installations possible on a wide range of buildings with minimal structural reinforcement. They are usually installed for environmental and energy-related benefits, and are not intended for recreational use.

Intensive green roofs, often called roof gardens, have a deeper growing medium that supports a wide variety of plants, from grass to trees. They require substantial maintenance and greater structural support. They are significantly heavier than traditional roofs, reducing the feasibility of retrofitting existing buildings. Roof gardens are usually installed for the amenity value they provide in addition to environmental and energy benefits.

Issue: Washington County's CDC does not expressly allow or prohibit the use of green roofs and roof gardens in new or existing development. The lack of definition within the CDC presents a barrier to incorporating green roof design into new or existing buildings. Without a clear review process in place, developers are less likely to utilize green roof technology as it may require additional review time and engineering expense.

Research Highlights:

- Green roofs and roof gardens effectively retain and infiltrate rainfall, while also providing a variety of additional environmental and energy efficiency benefits.
- They filter air pollutants, reduce energy demands, insulate buildings, mitigate urban heat islands, sequester carbon, and supply buildings and communities with aesthetic benefits.
- A third of all researched jurisdictions defined, permitted and/or created incentives to promote the inclusion of green roofs.

Precedents: Several cities nationally and in the region have adopted incentives, standards and design guidelines for green roofs.

- Portland removed inherent barriers in its code by exempting green roof installation from design review. Portland also offers financial incentives for green roof installation.
- In Clackamas County, green roofs may count towards site landscaping requirements.
- Chicago has identified the use of green roofs as an important approach to mitigating the urban heat island effect. To advance that effort, the city provides a grant program to assist small business and residential developments in the construction of green roofs.

Rating System Qualifications:

- LEED-ND – up to 5 credits for green roofs.
- Green roofs may achieve up to 14 points towards other LEED accreditations in five categories

Stakeholder Highlights:

- Retrofitting existing buildings can be cost-prohibitive due to possible structural reinforcements and associated inspections to ensure the additional load of the green roof is properly supported.
- Stakeholders also reported that appropriate plant species are not always available when needed.
- Green roofs as defined by Clean Water Services on multi-family and non-residential buildings are counted as pervious surfaces, reducing connection fees and monthly stormwater service charges.

Implementing Strategies to Consider: The lack of a defined review process in the Community Development Code and the lack of readily available information makes the construction of green roofs an uncertain proposition. Development Services is well positioned to provide additional materials and resources to those property owners and developers who are interested in building green roofs. Considering pursuing interagency cooperation or ordinances to facilitate and encourage the development of more green roofs would be a longer term and more resource intensive process. Finally, incentives for constructing green roofs and garden roofs could facilitate greater adoption throughout Washington County.

Provide resource and referral information

Create a brochure and/or provide third party materials with information about the financial and environmental benefits of green roofs, existing CDC incentives, CWS stormwater management incentives and programs, local green roof installers and vendors, and other relevant information.

Responsible Party: *Development Services*
Resources Needed: *Low*
Time Frame: *Short Term*
Priority: *Moderate*

Work with Clean Water Services to examine feasibility of improved Green Roof incentives

Although it is outside the scope of this project, the county could engage Clean Water Services in a collaborative assessment process to determine the extent to which green roofs could benefit the county and to explore the feasibility of additional monetary incentives and/or fee reductions.

Responsible Party: *Land Use and Transportation, Clean Water Services*
Resources Needed: *High*
Time Frame: *Medium Term*
Priority: *Low*

Revise CDC to include more incentives to encourage Green Roofs

Currently the CDC allows up to a 20% reduction of the required on-site landscape area if a “vegetated roof” is installed. The CDC could also be revised to include additional code-related incentives, such as: providing FAR, density, and height bonuses, or setback reductions in exchange for providing green roofs; and when publicly accessible, allowing green roofs to meet open space requirements.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate*
Time Frame: *Medium Term*
Priority: *Low*

Revise CDC to require Green Roofs on certain developments

Revise code to require green roofs or other approved on-site stormwater management techniques on large multi-family and non-residential developments.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate*
Time Frame: *Medium Term*
Priority: *Low*

Rainwater Harvesting Systems

Description: Rain barrels and cisterns are vessels used to capture and temporarily store rainwater for future use. A rain barrel can be connected to a downspout from a roof; rain that is caught can later be used for watering the lawn and garden. A traditional residential rain barrel includes a sealed, leaf/mosquito screen on the lid; a connection to a downspout; drain-hose or angled runoff pipe for overflows; and a spigot, usually connected to a garden hose. Often the barrel is placed on cement blocks or on a gravel foundation.

Issue: Washington County's Community Development Code and Building Code do not expressly allow or prohibit the use of rain cisterns in new or existing development. Standards for building setbacks limit placement of above-ground structures such as cisterns in required setbacks. The lack of standards presents a barrier to incorporating rain cisterns.

Research Highlights:

- Encouraging rain water cisterns contributes to water conservation and stormwater management strategies.
- A number of Case Studies include rain water harvesting systems. Corvallis Co-Housing is a good example.
- The Oregon Statewide Alternative Method Ruling OPSC 08-03, which applies to non-potable uses of rooftop collected water systems, exempts systems from its requirements provided they do not interact with the potable water supply, sanitary sewer or septic system, or cause damage to property.
- Rooftop collected water stored above ground and used for irrigation through gravity fed system promotes on-site resource conservation with minimal risk to public health and safety.
- Above-ground cisterns or barrels only require building permits for systems that use electric pumping and/or are piped into structures.

Precedents:

- Portland allows rainwater harvesting systems in rear and side yard setbacks.
- Clackamas County identifies rainwater harvesting systems as one of a menu of alternative methods to achieve low-impact development.

Benefits of Green Building

Water Conservation. Recycling rainwater and grey-water for purposes like urinal flow and irrigation can help preserve potable water and yield significant water savings.

Rating System Qualifications:

- LEED-NC – 1 point for reuse of stormwater for non-potable uses such as landscape irrigation, toilet and urinal flushing, and custodial uses.
- LEED-ND – Up to 5 points for storm water management.

Stakeholder Highlights: In general, systems that require plumbing and engineering approval received the highest level of scrutiny from permitting authorities. However, homeowners may implement systems that don't require any electrical, plumbing or mechanical permits.

- Wide variety of materials requiring different standards constrains opportunity for a prescriptive path.
- More complex systems, such as those with electrical pumping systems may require new meters and need permits.
- Rainwater collected from impervious surfaces is exempt from Oregon's prior appropriation water laws.
- In Portland, water collection systems used solely for irrigation do not require a building permit. Land use regulation of cisterns varies depending on whether they are considered "minor features of a building" directly attached to, or part of, the primary building or a separate accessory structure.
  - If collected water is piped inside the house, a plumbing permit is required for both potable and non-potable uses.
  - Community Design Standards in design overlay zones and conservation districts include standards to reduce visibility.
- Below-ground storage tanks are subject to site and building-specific designs. Impacts on safety and health are more numerous in these cases and in Washington County they require engineered design prior to permitting.

Implementing Strategies to Consider: Without changes in rainwater collection guidelines, such activities will likely continue to occur, but without oversight. Additional clarity in the effective use of rainwater harvesting could be accomplished through development of educational materials and minor code revisions that further specify where this practice is appropriate. Adopting building standards for underground cisterns would provide developers and county staff greater certainty and could streamline review processes. Considering an ordinance update to allow cisterns as accessory uses and to address and clarify issues surrounding water collection for non-potable uses would maintain health and safety standards while encouraging conservation of an important resource.

Develop educational materials

Educational materials clarifying which rainwater harvesting system elements require permits would ensure the public is aware of current requirements and that consistent information is provided to residents and contractors.

Responsible Party: *Development Services*
Resources Needed: *Moderate*
Time Frame: *Short Term*
Priority: *Moderate*

Revise CDC to address definitions, standards and approval process

Adding definitions and setback exemptions to the CDC to allow above ground, covered cisterns in rear and side setbacks, if below a specified height, will encourage water conservation and have minimal offsite impacts.

Responsible Party: *Development Services*
Resources Needed: *Low to Moderate*
Time Frame: *Medium Term*
Priority: *Moderate*

Adopt construction standards for underground cisterns

Adopting standards based on industry-accepted rainwater harvesting processes and materials has the potential to streamline review and permitting of such systems. Standards addressing size, height, soil considerations, water table, and other relevant issues would increase clarity for residents, developers, contractors and staff.

Responsible Party: *Development Services*
Resources Needed: *Moderate to high*
Time Frame: *Long Term*
Priority: *Low*

Stormwater Treatment, Storage and Reuse

Description: Stormwater is collected from the building roof, filtered, sterilized with ultraviolet radiation and distributed to sinks, toilets and other gray-water applications.

Issue: Washington County's Community Development Code and Building Code do not expressly allow or prohibit the use of non-traditional stormwater systems for treatment and water reuse. Until non-standard stormwater systems are better understood, it is likely that duplicate traditional fresh water systems would also be required, acting as a financial obstacle to innovation.

Case Study: Tyson Creek Rural Housing, Omega Center for Sustainable Living, and various examples in the Metro area including OHSU's South Waterfront Facility.

Research Highlights: Based on typical water consumption needs and site storage capacity limitations, it is difficult for rainwater harvesting systems to meet all water usage needs on-site in most situations. Supplemental non-potable systems have been allowed since 2008. Such systems may require additional filtering systems, and must meet Oregon Plumbing Specialty Code (Chapter 16 Water Reclamation) requirements, remain separate from the potable system, be tested annually, and, if using an electrical pump system, obtain an electrical permit.

Additionally, the Oregon Department of Environmental Quality (DEQ) introduced a permitting program for external use of gray water (wastewater collected from bathtubs, showers, bathroom sinks, and washing machines for reuse). An alternative method for permitting potable use would require similar review and inspection of engineering, plumbing, and mechanical systems, structural aspects and testing of the water purification system.

Rating System Qualifications: LEED-ND includes minimum building water efficiency as a prerequisite and up to 5 credits for storm water management.

Stakeholder Highlights:

- Storage and treatment costs limit water reuse in buildings.
- Most permitted systems are associated with large-scale projects.
- Jurisdictions are not expected to request review from DEQ.

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Implementing Strategies to Consider: Without changes to current Washington County practices, non-traditional stormwater systems are not likely to be utilized. Providing further information about unique stormwater systems as well as a consolidated permitting process are strategies that support the use of these systems.

Provide more information to public and staff

Ensuring that information on various types of systems and their requirements is readily available will foster interest in and use of such systems.

Responsible Party: *Development Services*
Resources Needed: *Low*
Time Frame: *Long Term*
Priority: *Low*

Create a consolidated permitting process

For systems that require plumbing, electrical and building review, having a consolidated permitting process for permitting may help foster the use of non-traditional systems.

Responsible Party: *Building Services*
Resources Needed: *Low to Moderate*
Time Frame: *Short Term*
Priority: *Moderate*

Waterless and Composting Toilets

Description: Waterless toilets that produce compost suitable for fertilizer. This feature would most typically be proposed in rural and agricultural areas.

Issue: Waterless composting toilets were not anticipated by current code language. Currently, replacement dwellings in resource zones (EFU, AF-20, EFC) must demonstrate indoor plumbing is connected to a "sanitary waste disposal system," typically understood to be a septic or drain field system. Otherwise, indoor plumbing is required to connect to existing sewer lines. Neither option permits a composting toilet disconnected from a disposal system.

Case Study: Tyson Creek Rural Housing.

Precedents: Various technologies are currently available.

Rating System Qualifications:

- Waterless toilets would contribute to the LEED-ND prerequisite of minimum building water efficiency.

Stakeholder Highlights:

- Systems still require a connection to traditional water and sanitary facilities due to health and safety concerns.

Implementing Strategies to Consider: Current Washington County regulations do not permit waterless toilets that are not connected to a disposal system. Projects incorporating this feature may be implemented by determined parties, however the approval process and associated costs will remain uncertain, and specific conditions will vary considerably, slowing likelihood of implementation. An alternative approval process, expedited review and partnerships with Clean Water Services and County Health and Human Services would reduce barriers to the use of waterless and composting toilets.

Develop alternative approval process checklist

Work with the applicable health agencies (county health department and/or state Department of Environmental Quality) to consider potential alternative approval methods for projects wishing to eliminate plumbed facilities. If an alternative process can be developed, provide a process/documentation checklist to assist permittees.

Responsible Party: *Building Services, Washington County Health and Human Services and Department of Environmental Quality*
Resources Needed: *Moderate*
Time Frame: *Medium Term*
Priority: *Moderate*

Expedited review

Speed up "typical" review timeframe for such projects by creating a prescribed pathway for approval and permitting.

Responsible Party: *Building Services*
Resources Needed: *Moderate*
Time Frame: *Medium Term*
Priority: *Moderate*

Develop a limited review in partnership with CWS

Having a limited review option with less stringent analysis requirements for projects with a narrow scope may increase developer support when willing landowners are interested in waterless or composting toilets.

Responsible Party: *Development Services, Clean Water Services, Washington County Health and Human Services and Department of Environmental Quality*
Resources Needed: *Moderate to high*
Time Frame: *Long Term*
Priority: *Low*

Green Streets

Description: Green streets are public or private streets that incorporate a system of stormwater detention and treatment within the right-of-way. Green streets:

- Minimize runoff that is piped to streams and rivers;
- Make visible a system of "green" infrastructure;
- Maximize street tree coverage to intercept stormwater, mitigate ambient air temperatures, and improve air quality; and
- Require a broad-based alliance for planning, funding, maintenance and monitoring.

Issue: No provisions are defined in CDC for green streets other than allowing for pervious paving for private streets and driveways. While developments will continue to meet Clean Water Services (CWS) and Department of Environmental Quality (DEQ) requirements for water quality control, some vegetated and Low Impact Development Approaches (LIDA) may be less expensive than traditional piped infrastructure. Current Washington County Road Design Standards do not specifically allow "green streets" for public roads. This approach requires developers seeking to build green streets in the public right-of-way to apply for a Road Standards Exception, which adds uncertainty, time and costs to development projects.

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Research Highlights:

- Washington County protects urban stream health through development review on Natural Resource land, the use of CWS mandated stream buffers and erosion control measures, and urban street tree provisions.
- Washington County uses vegetated "green ditches" as a natural alternative to curbs and gutters in rural areas. Stormwater management in urban areas has focused on compost filters and traditional stormwater runoff strategies.
- There has been limited implementation of green streets in urban areas due to the low infiltration rate in Washington County and concerns over ongoing maintenance.
- CWS recommends the use of LIDA to manage stormwater and surface water runoff. The most common LIDA techniques used in conjunction with streets and roadways are infiltration planters, vegetated filter strips and swales, and porous or pervious pavement.
- CWS is spending $6 million on a green infrastructure project to plant trees and shrubs along the Tualatin River and its tributaries rather than spending as much as $80 million on an artificial temperature control 'chiller' system to cool effluent from its existing wastewater treatment plants.
- Incentives are available to CWS customers who treat more than 75% of their impervious surface area with LIDA. Many stormwater management applications provide lower costs through design and require clear maintenance agreements.

Precedent: City of Portland and the City of Seattle are promoting the incorporation of green street design into new development and are proactively retrofitting existing public streets.

Rating Systems Qualifications:

- LEED-ND – Up to 6 points for tree-lined streets and stormwater treatment facilities.

Stakeholder Highlights:

- There was a positive public response to green streets from Washington County residents during the Greening the Code outreach.

Implementing Strategies to Consider: A recent report demonstrated that vegetated and LID approaches for managing pavement runoff are frequently less expensive than traditional piped infrastructure. The current county approach, requiring developers seeking to build green streets to apply for a Road Standards Exception, could result in lost opportunities. A higher level of cooperation on policy and implementation between CWS and LUT is recommended on this issue.

Explicitly allow green street treatments on private streets

The CDC does not explicitly allow or preclude green street treatments on private streets. Similar to the County's provision allowing pervious pavement on private streets, green streets could also be permitted on private streets when landowners enter into a perpetual maintenance agreement that runs with the land, similar to currently-required private street maintenance agreements.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Low*
Time Frame: *Short Term*
Priority: *Low*

Allow voluntary green street treatments on all streets

Amend the Washington County Road Design and Construction Standards manual to allow green streets when accompanied by perpetual maintenance funding agreements. A collaborative interagency working group involving county Land Use and Transportation, Road Engineering and Operations/Maintenance staff and Clean Water Services staff could work to develop mutually acceptable green street construction and maintenance standards to facilitate voluntary implementation by willing developers.

Responsible Party: *Land Use and Transportation, Clean Water Services*
Resources Needed: *Moderate to High*
Time Frame: *Long Term*
Priority: *Low*

The City of Tigard incorporated a vegetated drainage swale in the reconstruction of a portion of Main Street in 2011.

Revise CDC to address definitions

Defining green streets and other LIDA lays a foundation for possible future work on stormwater and other water quality issues. To be most effective, definitions should be added in tandem with one of the other implementing strategies listed.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Low*
Time Frame: *Short Term*
Priority: *Moderate*

Resource Conservation

Thoughtful design and construction of the built environment can conserve land and material resources, reducing costs and minimizing the environmental impacts of urbanization.

Reduction of Off-street Vehicle Parking

Description: Traditional pavement materials seal the soil surface, eliminating rainwater infiltration and natural groundwater recharge. Urban areas cover only three percent of the U.S., but the National Academy of Sciences estimates that runoff from these impervious surfaces are the primary source of pollution in 13 percent of rivers, 18 percent of lakes and 32 percent of estuaries[20]. Impervious surfaces collect solar heat in their dense mass. When the heat is released, it raises air temperatures, producing urban "heat islands," increasing ground level ozone and increasing energy consumption required to cool buildings.

Issue: In the Washington County CDC, there are two components to off-street parking reduction provisions: the action required to receive a reduction and the total amount of reduction allowed. Developers may qualify for reduced parking requirements when sites are close to transit, or when transit amenities, vanpool/carpool or bicycle parking is provided. The total reduction cannot exceed 40 percent.

Additional provisions in the CDC decrease overall off-street parking without reducing the minimum number of required spaces through voluntary shared parking agreements, the use of compact spaces, and maximum parking standards for some uses to avoid oversized and inefficient parking areas. Yet many properties are developed without taking advantage of the current provisions.

Research Highlights:

- Twenty five percent of researched jurisdictions allowed greater parking reductions than CDC.
- A number of Case Studies include exceptions to minimum parking requirements and reduced maximum parking standards.
- Jurisdictions use a wide range of strategies for off-street parking reduction, often in exchange for the provision of transit-related infrastructure or pedestrian plazas, tree preservation, electric vehicle parking, motorcycle and scooter parking, participation in a Transportation Management Association or Employee Transportation Demand Management (TDM) plan, and/or the provision of locker-room and showering facilities.
- Additional methods for reducing off-street parking include:
  - In-lieu fees [instead of providing facilities; for example in Bend, a development fee funds city supplied public parking];
  - Credit for on-street parking spaces;
  - Mixed-use calculations that permit non-primary uses to meet only a portion of the required parking;
  - Use of Director's discretion to reduce requirements for certain uses;
  - Designating areas with reduced or no minimum requirements, such as adjacent to transit, and;
  - Parking demand studies which demonstrate a lack of negative impacts on nearby uses from the proposed reduction.

20 National Academy of Science. Urban Stormwater Management in the United States, Report in Brief. Available online: http://dels.nas.edu/resources/static-assets/materials-based-on-reports/reports-in-brief/stormwater_discharge_final.pdf

Precedents:

- City of Portland allows new development to have no off-street parking when within 500 feet of frequent transit service, though this policy is currently under review.
- City of Eugene allows no minimum off-street parking in specific designated areas, such as the West University district.
- In the City of Eugene and King County, WA, applicants may request up to 50 percent parking reductions, depending on overlay zones, provision of urban amenities or shared parking, or if reduced parking demand can be demonstrated.
- Clackamas County provides incentives to green development by allowing reductions in parking minimums.

Rating System Qualifications:

- LEED-ND – up to 1 credit for reduced parking footprint.

Stakeholder Highlights:

- Despite the wide range of options, most existing off-street parking reduction strategies are not widely implemented by the development community. Developers report that off-street parking is highly valued by residential and commercial tenants, and lenders. Development community stakeholders shared the perception that reducing the number of off-street parking spaces will devalue their property and place it at a competitive disadvantage in the marketplace, which works as a disincentive to off-street parking reductions.
- When they are utilized, reductions are usually sought in order to address unique site constraints rather than the belief that less off-street parking is desirable. On sites where meeting off-street parking requirements poses significant obstacles, developers may choose to take advantage of reductions rather than scaling back the project or providing costly parking measures such as underground, structured or automated parking.
- Projects located extremely close to transit or in dense urban environments are more likely to seek reductions. The most commonly reported reductions are proximity to transit and bicycle parking substitutions.

Implementing Strategies to Consider: While the existing CDC parking reduction provisions are not extensively used by developers, the current standards remain a potential barrier for those developers committed to projects that emphasize sustainability aspects such as reduced impervious surface area, transit supportive, etc. Areas zoned for Transit Oriented Development may be slow to develop with the current parking standards in place. Without further action, developers are likely to continue providing more parking spaces than are truly necessary to support their development—and opportunities will be missed to reduce impervious surfaces, improve water quality, and minimize urban heat islands. Amending the CDC to accommodate those projects wishing to exceed the existing parking reduction standards is unlikely to lead to significant negative impacts, but would increase flexibility for green-minded developers.

Use studies and director's discretion to allow for reductions

Provide for limited use of off-street parking reductions greater than 40%, based on parking demand criteria and director's discretion. The criteria could be crafted to require other sustainable features to be provided in exchange for providing less off-street parking.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate*
Time Frame: *Medium Term*
Priority: *High*

Significantly revise CDC and create new ordinances

More significant code revisions could provide for additional reduction provisions and an increase in the 40% reduction cap in areas of the County where dense development is either desired or expected. This effort could be incorporated into the ongoing 2035 Transportation System Plan (TSP) update currently being performed by LUT. The TSP update is currently developing goals and policies and studying existing conditions and is currently scheduled to be completed in the fall of 2013.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate to high*
Time Frame: *Medium Term*
Priority: *High*

Urban Agriculture/ Community Gardens

Description: Urban agriculture consists of cultivation, either by individuals or groups, in any area specifically zoned for urban uses. Community gardens can be any piece of land cultivated by a group of people, and may be located in urban, suburban or rural areas. A variety of produce and plants may be cultivated on one community plot or on many individual plots. Typical locations include schools, hospitals, parks and vacant urban lots. Items may be grown for individual, community or commercial use.

Issue: No provisions are defined in the CDC for community gardens on vacant lots in urban districts, and accessory structures related to community gardens are not permitted. Lack of definitions and clarity may discourage adoption of urban agriculture. Encouragement of urban agriculture and community gardens may lead to more self-sufficiency and would increase inexpensive, local and healthy food options.

Research Highlights:

- Nearly a quarter of the researched jurisdictions identify urban agriculture or community gardens as an allowed use. The majority of these jurisdictions identified local food production as a key sustainability policy objective.
- A number of Case Studies include urban agriculture.

Precedents:

- The City of Seattle has specific design guidelines for accessory structures associated with a community garden.
- Clackamas County allows produce stands in low density urban residential districts.
- Vancouver, BC provides specific language for farmers' markets. The markets are allowed in all land use districts as special uses.

Rating System Qualifications:

- LEED-ND – Up to 1 credit for local food production.

Stakeholder Highlights:

- Frustration over lost time and added costs when the development process was extended due to unanticipated permitting requirements for grading, irrigation installations and greenhouses was frequently cited.
- Lack of standards to address farm stands selling produce from multiple suppliers.
- Uncertainty over ability of Community-Supported Agriculture (CSA) owners to operate distribution sites for CSA customer pick ups.
- Potential impacts on adjacent properties, such as use of pesticides/herbicides and compost, waste disposal, litter and pests, traffic and noise (heavy or motorized equipment), signage, and animal husbandry, should be considered. Additionally, some jurisdictions make use distinctions based on the scale or purpose of site.
- Options for mitigating community garden impacts include parking and delivery standards, allowing (or requiring) fencing or screening along frontages, and setback requirements.
- Locally, businesses such as Intel, Tektronix and Nike have employee gardens onsite and schools from Bonny Slope Elementary School to Portland Community College's Rock Creek campus have thriving garden programs. Making sure such organizations have clear guidelines will help them succeed.
- Community gardens and urban agriculture have connections to other issues including farmland preservation, industrial-scale urban agriculture (vertical farming), water rights, food security, local food production, edible landscaping and economic development.

Implementing Strategies to Consider: While not expressly prohibited by the CDC, establishing urban gardens may take longer than anticipated without changes to existing Washington County practices. Potential impediments to urban gardens may include a perception that gardens are unwelcome or difficult to establish and uncertainty about regulations for residents, cultivators and staff, and an inability to regulate the impacts of urban agriculture. Developing clear standards and providing more information and clarity on types of permits required in establishing urban gardens will support existing community interest and facilitate growing community demand for a wide variety of garden types. These steps could help institutionalize food production as an important community value, while providing healthy eating options and economic development opportunities. Providing clear guidelines on operations will promote good neighbor relationships and reduce potential conflicts over urban agriculture activities operating.

Provide more information about current regulations

Clarifying which urban agriculture activities require permits would provide greater clarity for citizens wishing to establish urban food production gardens. Additionally, ensuring this information is readily available in the Development Services lobby and online may facilitate more urban agriculture.

Responsible Party: *Development Services*
Resources Needed: *Low*
Time Frame: *Short Term*
Priority: *High*

Revise CDC to allow cultivation as an accessory use in urban residential zones

Providing clear guidelines for urban agriculture activities in residential areas may lead to increased local food production. Include criteria for accessory structures and for addressing potential impacts on adjacent uses.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Low to Moderate*
Time Frame: *Medium Term*
Priority: *High*

Consider a broader planning process to address urban agriculture issues in all zones

Issues to address include adopting definitions, allowing such spaces to meet landscaping requirements where applicable, use changes in specified zones to permit or allow outright, exceptions to dimensional standards, eligibility for density bonuses in multifamily developments, eligibility for urban agriculture gardens to qualify as “open space” in TODs and other potential incentives. This may increase implementation of urban cultivation and allow current “under the radar” activities to mainstream and expand their activities.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate to High*
Time Frame: *Long Term*
Priority: *High*

Photo courtesy of Tualatin Hills Park and Recreation District

Skinny Streets

Description: Skinny streets are typically local residential streets with two travel lanes and parallel parking with a curb-to-curb dimension of about 25 feet. Sidewalks and landscaping are also included. The advantages of skinny streets are decreased land requirements, lower construction costs, lower traffic speeds and an overall benefit to pedestrian safety.

Issue: Skinny streets are currently permitted, but concerns from road operations and emergency services agencies result in few examples actually being built in Washington County.

Research Highlights:

- Oregon's Transportation Planning Rule requires jurisdictions to "minimize pavement width and total right-of-way consistent with the operational needs of the facility…in order to reduce the cost of construction, provide for more efficient use of urban land, provide for emergency vehicle access while discouraging inappropriate traffic volumes and speeds, and…accommodate convenient pedestrian and bicycle circulation…" (OAR 660-012-0045(7)).
- In 2000, a statewide workgroup of diverse stakeholders, including representatives from Washington County and Tualatin Valley Fire and Rescue (TVF&R), developed a consensus that balanced the above needs with emergency responders on three recommended model neighborhood street standards: a 20-foot street with no parking, a 24-foot street with parking on one side, and a 28-foot street with parking on both sides[21].
- Washington County has codified these model standards into its Road Design and Construction Standards manual, which implements the policies of the Comprehensive Plan. However, due to fire and life safety concerns, TVF&R often limits on-street parking on 24 and 28 foot streets.

Precedent: Many cities throughout the country have workable design standards for skinny streets developed in conjunction with emergency services and transportation engineers.

Rating Systems Qualifications:

- LEED-ND – Up to 12 credits are available for walkable streets.

Implementing Strategies to Consider: Skinny streets have the potential to provide safety benefits and less burdensome land and construction costs as compared to traditional street widths. In order for skinny streets to become more widely utilized throughout Washington County, stakeholder concerns must be addressed.

Work with stakeholders to determine viability

Current Planning Staff has recently been engaged in informal conversations with a TVF&R Fire Marshal over the applicability of the Uniform Fire Code on public streets. This conversation could be formalized and expanded to include additional representatives from Washington County's Department of Land Use and Transportation and TVF&R to work toward a mutual understanding. The Neighborhood Street Design Guidelines handbook, which received buy-in from the Oregon Office of the State Fire Marshal, Oregon Fire Chief's Association, and Oregon Fire Marshal's Association, could be used to lead the conversation.

Responsible Party: *Land Use and Transportation, Tualatin Valley Fire and Rescue*
Resources Needed: *Moderate*
Time Frame: *Near Term*
Priority: *Low*

21 Neighborhood Street Design Guidelines: www.oregon.gov/LCD/docs/publications/neighstreet.pdf

Benefits of Green Building

Waste Reduction. *Construction and demolition generates a huge portion of solid waste in the United States. Building deconstruction as an alternative to full-scale demolition results in massive decreases of waste production.*

Construction and Demolition Waste Reduction and Recycling

Description: Construction and demolition (C&D) debris results from construction, remodeling, repair or demolition of buildings, roads or other structures. It includes (but is not limited to) wood, concrete, drywall, masonry, roofing, siding, structural metal, wire, insulation, asphalt, and packaging materials related to construction or demolition. C&D waste reduction measures include reuse, recovery or remanufacturing into a reusable product.

Issue: No provisions for construction and demolition waste reductions are defined in the CDC. Without guidelines or requirements, there is no formal framework to encourage, incentivize or mandate reduction and recycling of C&D waste.

Research Highlights:

- A number of Case Studies include waste reduction measures incorporated into their construction programs.
- May require coordination with the Washington County Department of Health and Human Services, which coordinates waste and waste reduction programs.
- Washington County is an active partner with other jurisdictions supporting the Green Building Hotline (GBH) and associated outreach and provides these materials in the LUT lobby.

Precedents:

- Santa Monica and Salt Lake City land use codes require waste management plans and establish clear guidelines for proper recycling and disposal of C&D waste.
- King County has a comprehensive incentive-based construction waste program managed by the Solid Waste Division.

Rating System Qualifications:

- LEED-ND – Responsible construction management is a prerequisite, while the use of recycled content may qualify for 1 point for green infrastructure.

Implementing Strategies to Consider: While Land Use and Transportation has little oversight over waste reduction policies, Development Services has a unique opportunity to engage developers on this issue as they move through the construction and demolition process. Front counter staff should be knowledgeable and comfortable sharing information and resources on this topic. For significant county-funded construction projects, leadership could consider adopting a policy to require a C & D waste reduction and recycling plan.

Increase outreach and education

Ensure front counter staff has resources available to share with interested parties. Various actions could include the following: create county specific promotional fliers on the issue for Development Services lobby area or print hard copies of GBH materials, add links to GBH resources to Development Service web pages, and provide training opportunities to Development Services staff.

Responsible Party: *Development Services*
Resources Needed: *Low to moderate*
Time Frame: *Short Term*
Priority: *Moderate*

CDC revision to require C & D waste plans

Add a definition of construction and demolition waste and associated terms to code. Requiring construction waste plans prior to issuance of building or demolition permits will increase the likelihood of construction companies reducing waste during the development process.

Responsible Party: *Land Use and Transportation, Health and Human Services*
Resources Needed: *Moderate*
Time Frame: *Medium Term*
Priority: *Low*

Include C & D plans in county contracting requirements

Build on county sustainable policy actions and the Recycle at Work program to initiate requirements for county contractors to complete a C & D waste plan for county projects (including county funding) and adopt C & D waste reduction as an institutional value. It would also provide valuable experience to construction contractors active in the county.

Responsible Party: *Washington County*
Resources Needed: *Moderate*
Time Frame: *Medium Term*
Priority: *Low*

Policies and Incentives

This final category explores the use of policy changes and incentives to increase options for sustainable development. Topic areas include efficient housing types, agricultural processing, brownfield redevelopment and the urban heat island. These features may yield both economic and public health benefits.

Non-Traditional Housing Options: Live/Work Units, Cluster Housing, & Mixed-income Housing

Ensuring a wide range of housing options throughout the county will help meet the needs of an increasingly diverse population while improving resource efficiency and affordability. The existing CDC and Building Code present barriers to three distinct types of alternative housing identified in this category. The possible approaches for addressing barriers to these more efficient housing types have been considered together due to their similarities.

Recent and ongoing county planning efforts in Aloha-Reedville and North Bethany incorporate housing concerns. The ongoing Aloha-Reedville Study and Livable Community Plan, a joint-effort between Land Use & Transportation and the County's Department of Housing Services identifies the range of needed housing types; and detailed recommendations for ensuring housing affordability will be developed during the study's final phase, beginning in 2013. In 2011, Washington County's CDC was amended to introduce the North Bethany Subarea Plan Overlay District, which includes provisions for Live/Work dwelling units, Cottage Housing, and mixed-income Work Force housing. Currently, these provisions apply only within the North Bethany Subarea. These housing options have the potential to be more land, resource, and energy efficient, resulting in less environmental degradation. They also tend to be more affordable than traditional single-family homes.

Live/Work Units

Description: A live/work unit is a dual-purpose space containing both a dwelling unit and a business establishment, where the dwelling unit is the principal residence of the business operator. This arrangement uses land more efficiently, conserving both environmental and economic resources. Eliminating vehicle trips to and from work reduces GHG emissions and transportation costs. Live/work units are often located in mixed-use districts, which tend to be higher density, transit-supportive and resource-efficient than traditional single-use developments. Housing a residence and business under the same roof can also lead to reduced rents and energy costs when compared to the costs of each individually.

Issue: The current CDC provides for "Home Occupations," which allow temporary use of up to 25 percent of a dwelling's floor area for a home office or similar use. However, aside from the North Bethany Subarea, no provisions are defined in the CDC for true live/work units, resulting in few opportunities to realize the benefits they could provide in other parts of the county.

Research Highlights:

- A new ordinance allows Live/Work Housing in higher density residential districts (R-24 NB & R-25+ NB) of the North Bethany District. It defines Live/Work Housing and provides development standards that address minimum first floor size, parking requirements, façade design and entrance features among other factors.

Precedents: City of Portland and the City of Hillsboro are promoting the incorporation of live/work units for economic development and reduction of vehicle miles traveled.

Rating System Qualifications:

- LEED-ND – Up to 3 points for housing diversity in the Mixed-Income and Diverse Communities section.

Implementing Strategies to Consider: *see page 55*

Cluster Housing (Co-housing, Courtyard and Cottage Housing)

Description: Cluster Housing is a category of single-family detached or attached housing consisting of smaller dwelling units and lot sizes than traditional suburban homes. Buildings are clustered together around a common area, often a natural area or other type of green space, and developed with a coordinated design for the entire site, resulting in densities from 15 to 20 units per acre. Reduced indoor and outdoor space is offset through the provision of shared amenities and community spaces. Cluster Housing's smaller dwelling units and more efficient use of land have the potential to reduce environmental impacts and be more affordable than traditional suburban single-family developments.

Issue: Small-lot housing projects are not defined in the CDC. Detached single-family residential units are generally prohibited in TODs (Transit Oriented Districts) and higher density zones, regardless of the densities that can be achieved with small-lot or cluster housing.

Research Highlights:

- The total energy consumed by persons living in multi-family housing units located near transit is less than half that of persons living in single-family detached units in a suburban neighborhood not serviced by transit.
- In the North Bethany Subarea Plan Overlay District, Cottage Housing is defined as a grouping of 4 to 12 detached or attached single-family units oriented around a common open space.
- Cottage Housing is currently permitted only in North Bethany Planned Developments at maximum densities ranging from 6 to 15 units per acre

Case Study: Corvallis Co-Housing.

Precedent:

- The City of Seattle identifies cottage housing as an allowed use and provides specific design guidelines.
- The City of Beaverton allows detached single-family cluster housing in multi-family zones as long as minimum densities are met.

Rating System Qualifications:

- Co-housing may meet a variety of LEED-ND prerequisites and credits.

Implementing Strategies to Consider: *see page 55*

Mixed Income Housing

Description: Ideally, mixed-income developments contain energy efficient units and are located in walkable areas near employment centers and other basic resources, reducing energy and transportation costs. These characteristics may reduce the overall cost of housing. The commonly accepted affordability guideline is that 30% or less of a household's gross income be spent on housing.

Issue: The CDC provides for a Planned Development approval that would be a suitable framework for developing high density projects with a diverse set of housing types and a mix of uses to facilitate a mix of income levels. However, the Planned Development option is infrequently used by developers. It is perceived as expensive to prepare, hard to administer, and inflexible, in part due to the significant open space requirement. Planned Developments are not currently allowed in TODs, where the additional flexibility provided by Planned Development standards could facilitate more creative solutions for mixed-income housing.

Research Highlights:

- Work Force Housing is defined in the CDC for the North Bethany Subarea as attached or detached ownership units affordable to households earning up to 80 percent of median income, and attached or detached rental units affordable to households earning up to 60 percent of median income.

- A minimum percentage of Work Force Housing units are required to qualify for a density bonus. Density bonuses incentivize the building of affordable housing in exchange for allowing the developer to build more market rate units than would be otherwise allowed. The required percentage depends on the minimum period of affordability and whether units are for rent or sale.
- North Bethany is the first area in Washington County to require the provision of Work Force Housing for density bonuses in Planned Developments. Housing standards require that the units have a similar exterior design and range of unit sizes as the market rate units, and be distributed throughout the development.

Precedents:

- Austin offers expedited review for projects pursuing SMART (Safe, Mixed-Income, Accessible, Reasonably-Priced, and Transit-Oriented) Housing.
- Sonoma County, CA has an "Affordable Housing combined district," which regulates building intensity, development standards and regulations, and affordable housing agreements.

Rating System Qualifications:

- LEED-ND – Up to 7 points for mixed-income/ diverse communities.

Implementing Strategies to Consider for Non-Traditional Housing:
Without changes to existing housing policy and the CDC, non-traditional housing development will be limited in Washington County. Further community input can inform the feasibility and desirability of a wide range of non-traditional housing types.

In addition to its efforts on the Aloha-Reedville Study and Livability Community Plan, Washington County's Department of Housing Services (DHS) is leading a Mixed-Income Work Group which includes LUT and municipal staff and private sector housing development professionals. The goal of the Work Group is to determine whether Mixed-Income Housing is an appropriate housing type in Washington County and to develop policy recommendations within the timeframe of the 2010-2015 Consolidated Housing Plan.

Future efforts could build on findings and recommendations of the Mixed-Income Work Group and the previous work undertaken in the North Bethany and Aloha-Reedville areas. This would efficiently utilize LUT planning resources and build on lessons learned to facilitate a greater variety of housing types countywide.

Incorporate non-traditional housing into Aloha-Reedville Study and Community Plan

One focus of the Aloha-Reedville Study and Livable Community Plan is preserving and increasing the supply and variety of affordable housing types through the implementation of community-initiated objectives and strategies. It provides an opportunity to gauge community interest in all of the housing types addressed in this report. If the community finds Mixed-Income, Cluster Housing or Live/Work dwelling units to be suitable and desirable, LUT will be well-positioned to take advantage of the housing work completed for the North Bethany District and Mixed-Income Housing Work Group.

Responsible Party: *Land Use and Transportation, Department of Housing Services*
Resources Needed: *Low*
Time Frame: *Short Term*
Priority: *Moderate*

Revise CDC to allow for non-traditional housing

Future efforts to engage the broader community, including local planning organizations, housing developers, service providers, and other stakeholders, on a wide range of housing types, including those in this report, could then leverage the experience gained during the Aloha-Reedville and North Bethany planning efforts. If support for non-traditional housing is found, amendments to the CDC could be drafted, and considered by the appropriate decision making body.

Responsible Party: *Land Use and Transportation, Housing Services*
Resources Needed: *Moderate*
Time Frame: *Long Term*
Priority: *Moderate*

Standards for Agricultural Processing Facilities

Description: Facilities for processing agricultural products.

Issue: In agricultural and Exclusive Farm Use districts there are no zoning standards that address non-residential agricultural buildings. Residential buildings in these districts are limited to a maximum height of 35 feet. There are no building standards for Agricultural Processing Facilities allowed as a permitted use. The practice has been to apply residential standards to Agricultural Processing Facilities, which limits flexibility and presents potential barriers to developing more efficient local agricultural production facilities.

Case Study: Stoller Winery has a gravity flow system which is more efficient, but requires higher buildings as measured against a sloping site.

Precedents:

- In Napa County, free standing towers & water towers may extend no more than 15 feet above height limit of 35 feet.
- Sonoma County allows agricultural buildings and structures up to 50 feet. Additional height may be permitted provided that site plan approval is first secured.
- Walla Walla exempts agricultural structures from the 35-foot height limit in Ag/Rural districts.
- Yamhill County permits a 45-foot height for non-residential buildings in the agricultural zones, and appurtenances and storage towers not intended for human occupancy are not subject to height limitations.

Research Highlights:

- The CDC does not specify permitted heights for agricultural structures, which results in the practice of applying residential standards to agricultural structures. This has resulted in inflexibility and reduced options available for more efficient agricultural production facilities. The most straightforward solution is to clarify maximum height limitations for agricultural structures in the agricultural and EFU districts.

Implementing Strategies to Consider: The lack of CDC standards pertaining to permitted heights for agricultural structures forces the application of residential standards to these structures. This results in less flexibility to allow for efficient production facilities. Outreach efforts to determine appropriate permitted heights for such facilities, based upon input from stakeholders, would help a code amendment process.

Implement appropriate height standards for non-residential agricultural buildings

Determining appropriate height standards for non-residential agricultural buildings could be achieved through outreach to Washington County agricultural stakeholders. Potential code amendment language could then be developed to implement the preferred option in applicable agricultural and EFU districts.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate*
Time Frame: *Short Term*
Priority: *High*

Brownfield Redevelopment

Description: A brownfield is defined as a former industrial or commercial site where future use is affected by real or perceived environmental contamination. Mitigation, or removing and containing any contamination, is a prerequisite to redevelopment.

Issue: The Urban Growth Boundary (UGB) effectively directs development towards the urban core, including sites of previous industrial or manufacturing uses. The County has infill standards (Section 430-71) that encourage good design and mitigation of impacts. However, no specific provisions in the CDC encourage the redevelopment of brownfield sites.

Research Highlights:

- Oregon's Department of Environmental Quality (DEQ) has no unincorporated Washington County properties listed as a brownfields. However, DEQ only lists sites that have received some level of inquiry. Redevelopment potential remains for existing brownfield sites such as gas stations and dry cleaners in unincorporated Washington County.

Precedents:

- City of Portland has a brownfield program that provides technical and financial resources to developers and property owners.
- Clackamas County has done extensive work identifying both brownfield sites and resources for remediation in an attempt to spur economic redevelopment of potentially contaminated sites.

Rating System Qualifications:

- LEED-ND – 1 point for brownfield redevelopment. A site must be designated a brownfield by a state, local or federal agency and remediated to meet appropriate standards for development.

Stakeholder Highlights:

- The DEQ Brownfields Program provides resources for owners or prospective owners of brownfields including information on site cleanup and liability, grant assistance and technical assistance.
- Grant support for clean-up activities requires oversight by DEQ. When a property owner is unwilling or unable to investigate and mitigate, sites may be referred to DEQ's Orphan Site Program.
- The current voluntary assessment and mediation process is expensive and highly dependent on voluntary partners. This process has led to a developer-driven model in which cleanup projects are limited to areas that are most likely to recoup cleanup costs for developers.
- Preliminary outreach revealed stakeholder doubt concerning the ability of code language to stimulate or facilitate brownfield redevelopment because legacy pollution and liability concerns cannot be addressed with these tools.

Implementing Strategies to Consider: Currently, brownfield redevelopment is not a pressing issue in unincorporated Washington County; however as land uses change and development pressures increase within the UGB, the possible need for future brownfield redevelopment will increase. Brownfield redevelopment can be a valuable tool for economic development as well as an opportunity to provide urban amenities such as parks and transit.

Improve access to brownfield information

Increase employee and public access to brownfield resources. Doing so would signify the county's commitment to infill development of brownfield sites, addressing contamination in the urban environment, reducing pressure on agricultural lands through urban infill, and economic development. Future activities to increase funding and planning for redevelopment on industrial sites could be undertaken as needed, including applying for EPA or HUD grants in a public-private partnership.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Low*
Time Frame: *Long Term*
Priority: *Low*

Heat Island Reduction

Description: Developed urban areas tend to have higher average temperatures than nearby undeveloped or rural areas due to a combination of building and paving surfaces that absorb and radiate solar heat, heat producing activities such as automobile traffic and manufacturing processes, and reduced natural shading from vegetation. These areas are known as heat islands. According to the EPA, regions with populations of 1 million or more can have mean air temperatures that are 1.8–5.4°F (1–3°C) warmer in the daytime, and up 22°F (12°C) higher in the evening compared to the surrounding area. These increased temperatures, or heat islands, are associated with increased summertime peak energy demand, higher air conditioning costs, greater air pollution and greenhouse gas emissions, and risk due to heat-related illness and mortality.

Issue: Long-term population growth is projected to result in a total of nearly 1 million residences in Washington County within the next 40 years, which means an intensification of land use within the UGB. There are no provisions in the CDC to mitigate for the urban heat island effect. Additionally, the County does not have a tree preservation program other than limited protection of trees within identified Goal 5 resource areas.

Research Highlights:

- Stormwater management techniques that increase or protect vegetative canopy also reduce heat island impacts.
- Clean Water Services is engaged in a tree planting campaign to reduce stream water temperatures, but their focus is not in urban intensive areas.
- Street tree requirements mitigate some of the street paving's heat island effect once trees reach maturity.
- Facilitating the use of the Oregon Reach Code will promote "cool roofs" and other reflective surfaces.

Precedents:

- The City of Chicago has specific guidelines, incentives and policies to reduce the heat island effect by incorporating green roofs and/or reflective roof material into all new construction.
- The Oregon Reach Code (ORC) specifies optional heat island mitigation standards for commercial developments such as low solar reflectance materials, shading, or vegetative roof covering on no less than 50% of the site's hardscape.

Rating System Qualifications:

- LEED-ND – 1 point for urban heat island reduction measures.

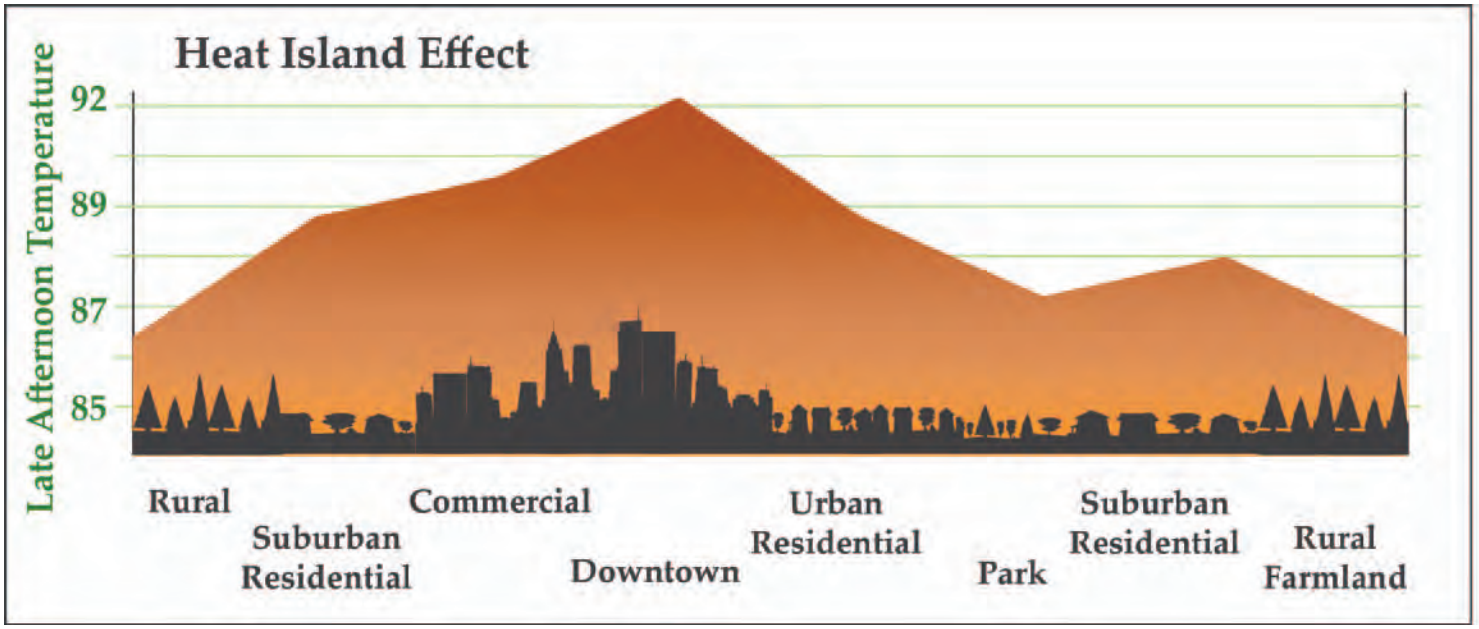


Figure 7: Heat Island Effect

Implementing Strategies to Consider:

As Washington County continues to grow and urbanize, there will be a greater imperative to reduce the heat island effect. Creating green building standards and a countywide tree policy are possible options for heat island reduction. Beyond reducing regulatory barriers to sustainable development, it may be desirable to be more proactive and provide incentives to promote desired behavior to see significant changes.

Sustainable features included elsewhere in this report that can have an impact on the heat island effect include larger eave extensions, expanding community gardens, green streets, green roofs and decreasing off-street parking. Reducing barriers to these and other sustainable features will benefit the county as a whole.

Create green building standards for county-funded projects

By creating new "green building" standards for county funded projects, the County will be leading by example while also complying with the most recent Sustainability Work Plan. The 2012-13 County Sustainability Work Plan proposes the Facilities and Parks Services Division create green building guidelines for all new or renovated county property. Green building standards that reduce the heat island effect include increasing vegetated areas, decreasing the ratio of impervious to pervious surfaces and choosing building materials with high reflective values. Setting policy to increase the implementation of green building standards would not only help reduce heat island effects, but also demonstrate county support for sustainable development principles and provide examples of sustainable practices for the community.

Responsible Party: *Facilities and Parks Services Division*
Resources Needed: *Low to Moderate*
Time Frame: *Short Term*
Priority: *Moderate*

Create a countywide tree preservation policy

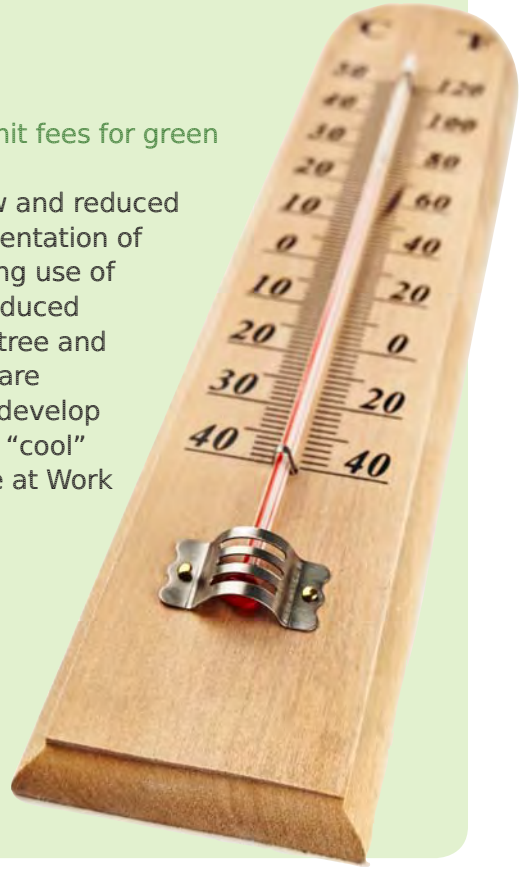
Public interest in a countywide tree policy has already been demonstrated and could be coupled with a program to evaluate a variety of site-based standards that also meet Oregon Reach Code elective standards. Increased tree canopy may reduce urban temperatures, decrease the proportion of impervious surfaces and increase vegetative filtering of surface runoff. Developing a comprehensive tree preservation policy would help realize these benefits.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate*
Time Frame: *Medium Term*
Priority: *Moderate*

Expedite review and/or reduce permit fees for green building projects

Incentives such as expedited review and reduced permit fees in exchange for implementation of a flexible "menu" of options including use of reflective roofing material and/or reduced impervious surfaces and increased tree and other vegetation plantings on sites are common. A low cost incentive is to develop an awards program that recognizes "cool" development, similar to the Recycle at Work businesses program.

Responsible Party: *Land Use and Transportation*
Resources Needed: *Moderate*
Time Frame: *Medium Term*
Priority: *Moderate*



IMPLEMENTING STRATEGIES MATRIX: *Summary of the information presented in pages 22-59.*

Green Development Strategy	Why?	Action	Responsible Party	Resources Needed	Time Frame	Priority
Oregon Reach Code (ORC): Optional high performance building standards						
Continue ORC staff training and allocate resources to the ORC	Clear standards for high performance structures built with unconventional or innovative techniques would save time and ease the permitting process.	Education & Outreach	DS	Moderate	Short-term	High
Pursue future BCD training opportunities for ORC certification		Education & Outreach	DS	Moderate	Short-term	High
Provide materials on the benefits of the ORC and "Reach Certified Structures" at the permit counter		Education & Outreach	DS	Moderate	Short-term	High
Provide ORC resources on the Building Services website		Education & Outreach	DS	Low	Short-term	High
Develop a Reach recognition program to highlight structures that receive Reach approval		Policy Change	DS	Low	Mid-term	Moderate
Incentivize ORC implementation in the CDC		Code Revision	LUT	Moderate	Mid-term	Moderate
Energy Generation: A range of energy generation choices for individuals & innovative businesses						
Solar Energy Systems (SES)						
Build awareness of existing SES opportunities	The CDC does not expressly allow or prohibit the use of Solar Energy Systems (SES). This lack of definition and development standards presents barriers to the utilization of SES and may lead to uneven implementation and/or delays in processing applications.	Education & Outreach	DS, Outside Agency Partners	Low	Short-term	High
Simplify electrical permit application and review procedures		Application Process	DS	Low to Moderate	Mid-term	High
Review SES approval process and add definitions and standards		Code Revision	LUT	Moderate to High	Mid-term	High
Maximize consistency across jurisdictions		Application Process	LUT, Other Jurisdictions	Moderate	Long-term	Low
Modify permitting cost structure and methodology		Application Process	BCD	Moderate to High	Long-term	Low
Wind Energy Conversion Systems (WECS)						
Increase access to information and leverage resources through outside partners	The CDC and Building Codes do not expressly allow or prohibit the use of Wind Energy Conversion Systems. The lack of definition and development standards presents a barrier to the utilization of WECS.	Education & Outreach	DS, Outside Agency Partners	Low	Short-term	High
Review WECS approval process and add definitions and standards		Code Revision	LUT	Moderate to High	Long-term	High

BCD - Oregon Building Code Division | *BS - Building Services* | *CDC - Community Development Code* | *CWS - Clean Water Services* | *DEQ - Department of Environmental Quality*
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IMPLEMENTING STRATEGIES MATRIX: *Summary of the information presented in pages 22-59.*

Green Development Strategy	Why?	Action	Responsible Party	Resources Needed	Time Frame	Priority
District Energy						
Define and add standards for District Energy	Utility uses are not permitted in several districts nor are district energy systems defined in the CDC.	Code Revision	LUT	Moderate to High	Mid-term	Low
Allow on site energy generation in industrial districts		Code Revision	LUT	Moderate	Long-term	Low
BioEnergy Production Facilities						
Increase awareness of existing facilities using BioEnergy	There are no provisions or definitions in the CDC for bioenergy production facilities. Bio-fuel facilities are currently permitted in the CDC, but state restrictions on the size of the facility and the source of the organic inputs present barriers.	Education & Outreach	LUT, Outside Agency Partners	Low	Short-term	Moderate
Apply biofuel production facility siting standards to bioenergy production facilities siting		Code Revision	LUT	Moderate	Long-term	Low
Revise CDC to include BioEnergy Production Facilities		Code Revision	LUT	Moderate to High	Long-term	Low
Energy Efficiency: Efficient use of energy resources in buildings and transportation						
Eaves in Setbacks						
Allow extension of eaves into property setbacks as long as structures met applicable building codes	The CDC restricts extensions into property setbacks limiting passive heating and cooling potential.	Code Revision	DS	Low	Short-term	High
Bicycle Parking						
Increase flexibility through Parking Demand Studies	Developers must go above and beyond code to provide facilities that meet current best practice guidelines and lack of financial incentive to do so.	Code Revision	DS	Low	Mid-term	Moderate
Require covered parking and review space requirements		Code Revision	DS	Moderate	Mid-term	High
Review bicycle facilities standards within TSP Update		LRP Workplan	DS	High	Long-term	Moderate to Low
Offer "fee in-lieu" provision		Code Revision	DS	Moderate to High	Long-term	Low
Electric Vehicle (EV) Parking/Charging						
Add EV definitions and standards to the CDC	The current lack of standards in the CDC for EVs may result in lost opportunities to provide dedicated EV facilities and spaces.	Code Revision	LUT	Moderate to High	Mid-term	Moderate
Revise CDC to encourage EV Charging Stations		Code Revision	LUT	Moderate to High	Mid-term	Moderate
Reduce inspection burden		Process	DS	Low	Short-term	Moderate

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IMPLEMENTING STRATEGIES MATRIX: *Summary of the information presented in pages 22-59.*

Green Development Strategy	Why?	Action	Responsible Party	Resources Needed	Time Frame	Priority
Water Quality & Conservation: Managing storm water runoff, water use and reuse to conserve and improve water quality						
Green Roofs and Roof Gardens						
Provide resource and referral information	The CDC does not expressly allow or prohibit the use of green roofs and roof gardens. Without clear standards and review process, developers are less likely to utilize green roof technology as it may require additional time and expense.	Education & Outreach	DS	Low	Short-term	Low
Examine feasibility of improved Green Roof incentives with CWS		Policy Change	LUT, CWS	High	Mid-term	Low
Add bonuses or reductions in exchange for green roof provisions or allow as open space		Code Revision	LUT	Moderate	Mid-term	Moderate
Require Green Roofs for specific uses in certain districts		Code Revision	LUT	Moderate	Mid-term	Low
Rainwater Harvesting Using Barrels and Cisterns						
Develop resource and referral materials	The CDC and Building Code do not expressly allow or prohibit rain cisterns in new or existing development. Without guidelines, such activities may occur without oversight.	Education & Outreach	DS	Moderate	Short-term	Moderate
Review approval process and consider definitions and standards		Code Revision	DS	Low to Moderate	Mid-term	Moderate
Adopt construction standards for underground cisterns		Code Revision	DS	Moderate to High	Long-term	Low
Stormwater Treatment, Storage and Reuse						
Provide more information to public and staff	The CDC and Building Code do not expressly allow or prohibit the use of non-traditional stormwater systems for treatment and water reuse.	Education & Outreach	DS	Low	Long-term	Low
Create a consolidated permitting process		Application Process and Policy Change	BS	Low to Moderate	Short-term	Moderate
Waterless and Composting Toilets						
Provide an alternative approval process	Current regulations do not permit waterless toilets that are not connected to a disposal system.	Policy Change	BS, HHS, DEQ	Moderate	Mid-term	Moderate
Expedite review based on prescriptive pathway		Policy Change	BS	Moderate	Mid-term	Moderate
Develop a limited review in partnership with CWS		Policy Change	DS, CWS, HHS, DEQ	Moderate to High	Long-term	Low

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IMPLEMENTING STRATEGIES MATRIX: *Summary of the information presented in pages 22-59.*

Green Development Strategy	Why?	Action	Responsible Party	Resources Needed	Time Frame	Priority
Green Streets						
Add green street standards for private streets	No provisions are defined in CDC for green streets other than allowing for pervious paving for private streets.	Code Revision	LUT	Moderate	Mid-term	Low
Allow voluntary green street treatments on all streets		Policy Change, Code Revision	LUT, CWS	Moderate	Mid-term	Low
Add Green Street and other Low Impact Development Approach definitions		Code Revision	LUT	Moderate	Mid-term	Low
Resource Conservation: Mitigating urban impacts, conserving resources and reducing costs in the built environment						
Reduction of Off-Street Parking						
Use parking studies and director's discretion for parking reductions	Underutilization of current parking reduction provisions indicates a need for alternative approaches to provide for appropriate off-street parking reductions.	Code Revision	LUT	Moderate	Mid-term	High
Increase 40% reduction cap and consider alternative methods for reducing off-street parking		Code Revision	LUT	Moderate to High	Mid-term	High
Urban Agriculture/Community Gardens						
Provide more information about current regulations	No provisions are defined in the CDC for community gardens on vacant lots in urban districts, and accessory structures related to community gardens are not permitted.	Education & Outreach	DS	Low	Short-term	High
Revise CDC to allow cultivation as an accessory use in residential zones		Code Revision	LUT	Low to Moderate	Mid-term	High
Consider a broader planning process to address urban agriculture issues in urban districts		LRP Workplan	LUT	Moderate to High	Long-term	High
Skinny Streets						
Work with stakeholders to determine viability	Safety and access concerns inhibit construction of skinny streets.	Policy Change	LUT, TVFR	Moderate	Short-term	Low
Construction and Demolition Waste Reduction and Recycling						
Create printed and web based informational materials	Without definitions or standards there is no formal framework to encourage, incentivize or mandate reduction and recycling of C & D waste.	Outreach & Education	DS	Low to Moderate	Short-term	Moderate
Add Construction and Demolition (C & D) Recycling Waste and Waste Plan definitions		Code Revision	LUT, HHS	Moderate	Mid-term	Low
Include C & D Waste Plans in county contracting requirements		Policy Change	County	Moderate	Mid-term	Low

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IMPLEMENTING STRATEGIES MATRIX: *Summary of the information presented in pages 22-59.*

Green Development Strategy	Why?	Action	Responsible Party	Resources Needed	Time Frame	Priority
Policies & Incentives: Flexible development regulations to promote sustainable urban and rural land uses						
Housing Options						
Gauge public interest in housing options through various planning/outreach efforts	Non-traditional housing options that conserve resources and increase efficiency are not permitted or are limited in Washington County.	LRP Workplan	LUT, DHS	Low	Short-term	Moderate
Review standards for housing options		Code Revision	LUT, DHS	Moderate	Mid-term	Low
Standards for Agricultural Processing Facilities						
Set height standards for agricultural processing buildings in agricultural and EFU districts	Inappropriate standards have limited flexibility and efficient operational designs for production facilities.	Code Revision	LUT	Moderate	Short-term	High
Brownfield Redevelopment						
Provide more resource and referral information	No specific provisions in CDC encourage the redevelopment of brownfield sites.	Education & Outreach	LUT	Low	Long-term	Low
Heat Island Reduction						
Create green building standards for county-funded projects	There are no provisions in CDC to mitigate for the urban heat island effect.	Policy Change	Facilities	Low to Moderate	Short-term	Low
Create a county-wide tree preservation policy		LRP Workplan	LUT	Moderate to High	Mid-term	Moderate
Expedite review and/or reduced permit fees		Application Process	LUT	Moderate	Mid-term	Moderate

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CONCLUSION

Population growth over the next 50 years will require meeting new energy demands with a combination of energy conservation and the development of new, more sustainable energy resources. Washington County can be better positioned in the long term by removing obstacles to increasing the energy efficiency of new buildings, enabling the development of renewable energy projects and improving the overall conservation of resources. The Greening the Code project is a small piece in a larger puzzle.

This report used a research approach to gather information intended to inform future decisions regarding sustainable development in the county. Impacts of conventional buildings on the environment and policies that are influencing the transformation of building practices were researched. Barriers to energy efficient and sustainable development and building practices in Washington County were identified. Approaches successfully utilized by other local governments to address those barriers were also identified. Potential implementing strategies were developed for consideration for adoption in Washington County.

A number of barriers to green building and sustainable land development features and practices can be found in the county's Community Development Code (CDC), Building Code, and its transportation policies and procedures. There are precedents throughout the United States for addressing the identified barriers. Common jurisdictional approaches involve amending the zoning or land use regulations and building standards to provide for more flexibility and to include provisions to respond to new technologies. Many of the obstacles identified can be addressed through amendments to the CDC and encouraging the use of the state's Commercial and Residential Reach Codes.

Next Steps

Remaining competitive in a changing economy and responsive to community needs will require changes in the current regulatory and development environment. The implementing strategies proposed in this report are some of the many possible tasks the County will invest in each year. Conserving energy and other resources, encouraging innovative technologies and enhancing community choice provide long term community advantages. The implementing strategies set forth in this report can help position Washington County to take advantage of innovative technologies and conservation strategies to better meet the economic and environmental needs of the future.

Washington County's Department of Land Use & Transportation
Development Services Division
155 N. First Avenue, Suite 350
Hillsboro, OR 97124
503-846-8761