Growing the Green Building Industry in Lane County

A Report for the Lane County Sustainable Business and Jobs Project

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Background and Acknowledgments

As we enter the new millennium, the residents of Lane County face a number of important economic, social, and environmental challenges. The economy is struggling, unemployment is high, government revenues are falling, and water quality, fisheries, and other environmental resources are at risk. Decision makers seek appropriate steps to resolve these problems in a manner that will simultaneously enhance the economy, workers, and the environment, but often are unclear about how to achieve these multiple goals.

In the winter of 2003, the Program for Watershed and Community Health (PWCH), a research and technical assistance program affiliated with the Institute for a Sustainable Environment at the University of Oregon, initiated a project to help decision makers throughout the southern Willamette Valley understand sustainable business and job development and identify strategies to secure and expand the local sustainability sector. The PWCH seeks to provide accurate, objective, and easy-to-understand information about the size and scope of the existing sustainability sector and to assess the potential costs and benefits associated with expanding the sector and assisting others to adopt sustainable practices. A team of seven graduate students from the Department of Planning, Public Policy, and Management at the University of Oregon served as the research staff for the project. An informal group of local government and economic development specialists served as the steering committee for the project. This report is one of a series of reports to be produced as a result of this effort.

AUTHORS

Naoko Atsusaka, a graduate student in the Department of Planning, Public Policy, and Management at the University of Oregon, researched and wrote the majority of this report with assistance from UO graduate student Shanda LeVan. Bob Doppelt, director of The Program For Watershed and Community Health, supervised the overall project.

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Executive Summary

In winter 2003, a team of graduate student researchers working with the University of Oregon Program for Watershed and Community Health initiated a project to analyze the costs, benefits, and potential opportunities for expanding the "Green Building" Industry in Lane County. This report summarizes the findings. Information and data were obtained through a review of the literature and websites, informal telephone interviews, meetings with local trade associations, and discussions with local government representatives. Information was also obtained from surveys of public agencies and of businesses deemed to be potentially part of the local sustainability sector.

Green Building refers to "*innovative building and site design techniques that improve the quality and performance of buildings while simultaneously reducing stress on the environment.*" The main characteristics of Green Building include:

- Energy-Saving Practices and Technologies
- Water-Saving Practices and Technologies
- Pollution and Toxicity Reduction Practices and Technologies
- Stormwater Runoff-Reduction Designs and Practices
- Forest-Conserving Practices
- Practices that Reduce Construction Waste and Increase Jobsite Recycling
- Use of Local Products and Materials
- Careful Material Selection

Our research found that the main benefits of green building are economic, social, and environmental. They include:

- Some construction costs can be reduced (although, at least initially, others may be more expensive than traditional construction)
- Reduced operating costs
- Increased return on investment and asset values
- Improved labor productivity
- Enhanced local economic vitality
- Improved environmental conditions
- Improved human health

As other local municipalities employing Green Building programs have experienced, we found a number of obstacles to expanding green building in Lane County including:

- Lack of monetary incentives to finance upfront costs
- Absence of information and education that creates fear about new products and the unknown
- Lack of communication and integration among and between builders, material suppliers, and consumers
- Lack of clear standards and criteria for Green Building among local governments and the sector as a whole

Although we found that the industry in Lane County faces a number of obstacles, we also found the potential for resolving them by examining the experiences and strategies employed by other

municipalities. Based on our investigation of how other communities have approached green building, we offer the following recommendations for overcoming the obstacles and for expanding the economic potential of the Green Building industry in Lane County:

- Government agencies should partner with building trade associations and others to institute educational programs for builders, building suppliers, public employees, government, and consumers.
- Local, state, and federal government agencies should lead by example and explicitly apply green building practices to new construction and to renovations.
- Local governments should establish clear green building standards within each community
- Local governments and economic development agencies should partner with the construction industry to identify and help overcome regulatory and cost barriers.
- Because financing is usually based on appraised values, an educational effort should be developed to provide information to real-estate appraisers about the long-term monetary value of green building.
- A county-wide steering committee could be established composed of public, private, non-profit, and academic leaders to identify the best ways to assist small communities to achieve the goals above and to develop linkages and networks that can help to expand the green building industry.

Our research found that the successful Green Building programs we examined across the U.S. had the active involvement of all levels of government as well as the private sector, non-profits, and academia. That broad scale of involvement was essential for their success. The way we design and construct commercial and residential buildings affects the economy, our quality of life, and the environment. The strongest recommendation we can make is that public, private, and non-profit entities in Lane County concerned about those effects must take active leadership roles in learning about green building, implementing it, and finding solutions to the barriers that constrain the growth of green building. This report offers a number of suggestions regarding why and how these activities can be organized. Additional informational resources on green building are provided in the appendices of the report.

I. Introduction

In February 2003, the University of Oregon Program for Watershed and Community Health initiated the Lane County Sustainable Business and Jobs Project. This analysis of the Green Building Industry is one component of the project. Within this component, UO graduate student interns tried to determine the costs, benefits, and potential opportunities for expanding green building in Lane County. Information and data were obtained through a review of the literature and websites, informal telephone interviews, meetings with local trade associations, and discussions with local government representatives. Information was also obtained from a survey mailed to more than 160 businesses deemed to be potentially part of the local sustainability sector and from a survey mailed to public agencies requesting information about the degree to which they have or desire to implement sustainability practices.

The specific goals of this report are to: 1) illustrate the economic benefit of expanding the green building industry, 2) identify obstacles to expanding green building, and 3) demonstrate possible solutions to the obstacles in Lane County.

Starting with a general description and background of the green building industry, at both the national and local level, our research found that once designers, architects, and builders drill down to "break through the cost barriers" green building can generate a number of economic benefits. In addition, although we found a number of obstacles to expanding green building in Lane County, we also found that they can be resolved. In the end of this report we share a suite of recommendations for overcoming the obstacles and for expanding the economic, social, and environmental potential of green building in Lane County.

II. What is Green Building?

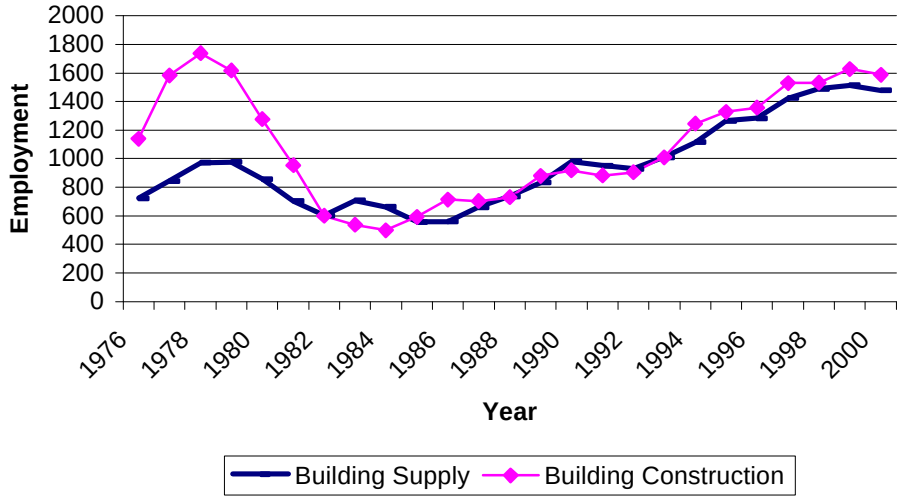
The Green Building Division operated by the City of Portland's Office of Sustainable Development (OSD) defines green building as "*innovative building and site design techniques that improve the quality and performance of buildings while simultaneously reducing stress on the environment.*" This definition underscores that green building encompasses a broad range of activities: highly efficient management of energy and water resources, use of renewable energy, use of low or non-toxic substances and materials, careful management of material resources and waste, protection of health and indoor environmental quality, and integrated design approaches. Green building practices not only preserve the environment, they also provide quality comfortable living, and long-term economic benefits.

III. Why Focus on Green Building?

The building industry is the nation's largest manufacturing activity, representing 13% of Gross Domestic Product, and provides nearly 10 million professional and trade jobs. More than 50% of the nation's reproducible wealth is invested in constructed facilities[1].

The building industry in Lane County includes 438 companies[2] that employ 9,030 workers[3]. The average annual local wages are $36,889 and annual gross revenues are $90,904,200. In Lane County, both building construction and building/garden supplies have consistently grown since 1985, as shown in Figure 1.

Figure 1. Lane County. Covered Employment of Building Construction and Building Supply, 1976-2000.



Source: Oregon Employment Department

Because the building industry has a tremendous impact on the economy, even modest changes that promote resource efficiency in building construction and operation can make major contributions to economic prosperity and environmental improvement. Building structures, both commercial and residential, affect areas beyond their immediate location, because they also affect watersheds and air quality. According to the National Science and Technology Council, buildings consume a large portion of all resources within the United States. For example:

- 36% of total energy
- 65% of electricity
- 25% of the timber harvest
- 16% of fresh water
- 30% of raw material [4]

Also, buildings generate huge amounts of secondary outputs such as:

- 30% of total waste output, which accounts for 136 million tons annually
- 40% of municipal solid waste destined for local landfills
- 35% of the world's CO2 emissions
- 50% of ozone-depleting CFCs still in use

These statistics demonstrate that buildings have many significant impacts on resource use, economic security, public health, and the environment. For this reason, the adoption of green building practices and technologies is an essential component of the transition toward sustainability.

IV. Characteristics of Green Building

One of the most important elements of a green building project is the design, which must be based on site-specific characteristics. A site assessment should be done to determine climate, sun location, shade, native vegetation, and soil types. The site assessment should be used to develop a design and

orientation that utilizes all of these factors at the highest levels of efficiency. The integration of all aspects of a building design is a fundamental requirement for successful initial cost savings in green buildings. Simply adding on a green building practice or technology to an existing traditional design or building may not generate cost savings and may even add costs in the short run. Green building practices can reduce costs only when the design of all aspects of a building project is assembled in an integrated manner. Green building includes the following practices and designs:

Energy-Saving Practices

Energy-saving practices reduce the amount of electricity, natural gas, and petroleum used for space heating, water heating, and lighting of homes and offices. Particularly innovative techniques include furnaces equipped with clock thermostats, skylights for closets and dark hallways, office occupancy sensors, triple-glazed windows, passive solar, and energy efficient appliances.

Water-Saving Practices

Water-saving practices reduce water use indoors and outdoors. To reduce water consumption, a green building incorporates low-flow showerheads, aerating faucets, low-flow toilets, and high-efficiency washers. Exterior water systems collect rainwater from roofs and reuse household gray water for lawns and gardens.

Pollution and Toxicity Reduction

Pollution and toxicity reduction practices limit the use of toxic materials and substances in construction such as particleboard, cabinetry and carpets made with non-formaldehyde based glues and non-toxic stains, sealants, and paints. Reducing pollutants outside of the home or office is also important. Green building uses native plants rather than exotic plants (non-native) in landscape designs, which decreases the need for expensive and environmentally harmful fertilizers and pesticides.

Stormwater Runoff-Reduction Practices

Stormwater runoff-reducing practices limit the amount of stormwater that surges into streams during rains, primarily by retaining stormwater on-site and reducing the amount of impervious surface on the property. Techniques include on-site drainage ponds, rainwater catchments, and the use of pervious materials, such as gravel or crushed stone, rather than asphalt or concrete.

Forest-Conserving Practices

Forest-conserving practices include using materials harvested from nature in an environmentally sound manner (generally through the use of sustainably harvested and certified lumber) and following the three “Rs” – Reduce, Reuse, and Recycle. These practices conserve forests while lowering the demand for new timber and other natural resources. The practices also include using salvage timber and advanced framing systems that use less wood.

Reduce Construction Waste and Jobsite Recycling

Green building saves on waste disposal costs with the practice of separating and recycling wood, metal scrap, cardboard, drywall, asphalt roofing, and concrete/asphalt. This is accomplished by designating an area on site to collect scrap materials for reuse later in the project or in another project.

Use of Local Products and Materials

Use of local products is one of the most important green building principles. Since green building practices are based on the characteristics of the site, local knowledge is very important throughout the entire design and construction process. Also, green building tends to use products that originate from the area or region of the building site. For example, the use of sustainably certified oak for wood flooring makes sense in a location dominated by oak forests. Use of local materials provides a market for local producers. It also reduces the costs of transportation and associated environmental impacts, such as CO2 emissions.

Careful Material Selection

Many alternative building materials function as well as or better than traditional materials. These materials contribute to and enhance the characteristics listed above. Therefore, material selection is a very important element of green building practices.

V. Green Building and Its Benefits

The economic benefits of green building are critical to the viability of projects. Architects and contractors can benefit from the marketability of green commercial and residential buildings, and because green buildings promise lower future utility bills, buyers can spend more on the structure. Homeowners benefit because green homes use less electricity, water, and sewer capacity, saving a typical homeowner about $500 or more each year. Preferential mortgage rates may become available for green-built homes. Businesses and commercial tenants of green buildings pay up to 35 per cent less for lighting, heating and cooling, water, and sewer. Workers in green buildings often are more productive because they are exposed to fewer toxic building materials and they work in natural daylight. Taxpayers and ratepayers benefit, because conserving electricity and water lowers the need for expensive new power plants and water treatment plants.

Our research found the following economic, social and environmental benefits of Green Building:

Some Construction Costs Can Be Reduced (While Others May Rise—At Least in the Short Term)

- Energy efficient buildings need less equipment: some equipment can be downsized, such as chillers, or eliminated, such as perimeter heating.
- Integrated design can use the financial payback from one practice or technology to pay for others.
- Using paving and other runoff prevention strategies can reduce the size and cost of stormwater management structures.
- Possible earnings from sales of reusable items removed during building demolition.
- A decrease in the number of employee health problems that result from poor indoor air quality and toxic material use reduces health care costs and absenteeism and increases productivity.
- Businesses can achieve lower landfill dumping fees and associated hauling charges through reuse and recycling of construction and demolition debris.
- Lower site-cleaning costs can result from minimizing site disruption and movement of earth.

It should be noted that although some costs can be reduced, they usually only accrue after an investment of time, energy, and money in developing new designs and learning new skills.

For example, Green Buildings today often have higher initial design costs than conventional buildings. Energy-efficient mechanical and electrical systems may cost more than conventional systems. Until the new practices and technologies are fully developed and understood and market demand stimulates high volume production some costs will be higher. However, as the industry matures, these costs will diminish.

Reduced Operation Costs

- Energy Efficiency: The use of climate-sensitive designs and energy technologies can reduce heating and cooling energy consumption by 50% in buildings. Returns on investment for energy efficiency measures can be higher than rates of return on conventional and even high-yielding investments.

- Water Efficiency: Water efficient appliances and fixtures, behavioral changes, and changes in irrigation methods can reduce consumption by up to 30% or more. A typical 100,000 square foot office building can yield annual savings of $4,000 or more by installing high efficiency measures and reducing water consumption by 30% compared to the average conventional building.

- Waste Reduction: Construction and demolition waste recycling can result in significant savings of not only landfill space but also waste hauling and tipping fees. The Portland Trailblazers Rose Garden arena construction/demolition project saved an estimated $186,000 through waste diversion and recycling. More importantly, recycling creates jobs, especially for low-skilled workers. Diverting these materials to local processors instead of local landfills creates new economic opportunities.

- Toxicity Reduction: The use of less-toxic or non-toxic materials reduces operating costs by cutting the costs of special training for workers, special storage space, special handling and disposal permits, and risk management for workers to deal with toxic materials. By eliminating toxic pollution, governments can save numerous costs that are traditionally spent to clean up pollutants and soil and water contamination at landfills.

Increased Investment Returns and Asset Values

- Green buildings have a lower life-cycle cost than conventional buildings. Life-Cycle Cost Analysis[5] looks at the net present value of design options as investments. It is used to value buildings, because it is important to take into account the future benefits that are likely to be derived from green buildings. Within a building's total life span, initial building costs account for approximately 2% of total life-cycle costs, while operations and maintenance costs account for 6%, and personnel costs account for 92%. Thus, many green building measures can be thought of as investments, which will gain value over time, over and above investments at market interest rates.
- Green homes and office buildings are often more marketable, with faster sales and lease-up rates. Also, Green Building measures may allow building owners to charge higher rents.
- Professional liability insurance companies have indicated a willingness to offer design professionals lower insurance premiums for higher operating-procedure standards that lead to improved indoor air quality.[6]

Improved Productivity and Human Health

- Studies have shown that enhanced daylighting and reduced toxicity in indoor environments can increase employee productivity by up to 16%. The US Environmental Protection Agency ranks indoor air pollution among the top five environmental risks to public health. One third of all conventional buildings in the U.S. have poor indoor air quality.
- Research also shows that employees in buildings with healthy interiors have less absenteeism and tend to stay in their jobs longer. Sick Building Syndrome and Building Related Illnesses are estimated to cost $60 billion per year in medical expenses and lost worker productivity in the United States.
- Ensuring healthy indoor air can reduce insurance and operating costs and reduce liability risks. The EPA faced a lawsuit from employees who became ill after new carpet was installed during a renovation. The employees won the lawsuit, worth approximately one million dollars.

Enhanced Local Economic Capacity

- Green building helps the local economy by increasing the demand for local building materials and products. For example, on a national level, the EPA cites the potential creation of more than 200,000 jobs through aggressive implementation of its Green Lights retrofit program.
- Green building practices extend the life of public infrastructure such as power plants, landfills, and water treatment plants.
- Social equity can also be enhanced through the inclusion of community groups and special populations in the site and building design process.

Social and Environmental Benefits

Public Health and Community Benefits

- Green buildings improve local air, thermal, and acoustic environments.
- Green buildings place less strain on local infrastructure such as sewer and energy systems.

Environmental Benefits

- Green buildings conserve ecosystems and biodiversity through the use of sustainably certified wood, environmentally sound site design, energy and water efficiency, renewable energy, reuse, recycling, and other practices.
- Green buildings reduce solid and toxic waste.
- Sustainable construction conserves natural resources.

VI. Trends in Green Building

The market demand for green building is growing rapidly. In 1999, the US Green Building Council's LEED (Leadership in Energy and Environmental Design) registered square footage of buildings in the United States was identified as "not applicable." In 2000, approximately 8,400,000 square feet were registered, and by September 2002, over 71,000,000 square feet of space had been registered to certify within the program. Due to the rapid increase, developers that meet credible Green Building criteria may have a competitive advantage over their competition today by incorporating green building practices.

Well Known Criteria – the U.S. Green Building Council LEED rating system

Headquartered in Washington, D.C., the U.S. Green Building Council (USGBC) is the nation's leading coalition working to promote green building. Established in 1993, the USGBC provides various products and services in the advancement of the design, construction, and maintenance of sustainable buildings. Council membership consists of more than 275 organizations including: product manufacturers, building and design professionals such as the American Institute of Architects, retailers and building owners, and environmental leaders such as the Natural Resource Defense Council and Audubon Society. In 2000, a regional chapter of the USGBS, the Cascadia Chapter, was formed and includes Washington, Idaho, Montana, and Oregon. Chapter members support the activities of the USGBC and the implementation of LEED as a market transformation tool.

One of the products of the USGBC is the LEED ™ (Leadership in Energy and Environmental Design) rating system. An increasing number of organizations, including federal, state, and local governments, have adopted the LEED system as their green building criteria. LEED is a certifying system designed for rating new and existing commercial, institutional, and high-rise residential buildings.[7] In summary, LEED is an independent, third party certification system created to:

- Define "green building" by establishing a common standard of measurement
- Promote integrated, whole-building design practices
- Recognize environmental leadership in the building industry
- Stimulate green building competition
- Raise consumer awareness of green building benefits
- Transform the building market

The five major environmental categories included in the standards are: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environmental Quality. Certified Silver, Gold, and Platinum levels of green building certification are awarded based on total credits earned.

The LEED standards have been adopted nationwide by federal agencies, state and local governments, and interested private companies as the guideline for sustainable building.

VII. Local Government Examples

The U.S. Green Building Council has helped state and local governments (as well as federal agencies) develop and administer Green Building guidelines by modifying the LEED rating system to their region. The states include California, Maryland, Massachusetts, New Jersey, New York, and Pennsylvania. Local governments include Austin (TX), Arlington (VA), Boulder (CO), Cook County (IL), Los Angeles (CA), Portland (OR), San Diego (CA), San Jose (CA), and Seattle (WA)[8].

It is important to note that some small communities have adopted green building standards and practices, such as the City of Santa Monica (CA), Berkeley (CA), Pleasanton (CA), and the City of Frisco (TX). Among the leading local government programs, Portland and Seattle provide good examples of how green building could be expanded in Lane County due to their geographic similarities. Austin, Texas, provides another excellent model.

The City of Portland

City government in Portland has contributed significantly to the growth of green building in the region. In 1994, the City of Portland adopted Sustainable City Principles that encourage elected officials and city staff to develop links between economic vitality and environmental impact. Both the city and the Portland Development Commission (PDC) adopted green building policies that require facilities built or financed by the City to meet or exceed the Portland LEED Certified level. Moreover, projects are encouraged to meet the requirements for the more stringent "Silver" standard or higher as appropriate. Future community centers, firehouses, and PDC commercial development projects will be built to the Portland LEED standard.

In addition, the City of Portland Office of Sustainable Development's Green Building Division focuses on increasing the applications of green building practices to non-public building projects. The city has increased access to technical resources and helped local expertise mature. For example:

- Outreach and training activities have further expanded market demand for green buildings among building users and owners by creating the "G/Rated green building brand."
- To improve the links between consumers, city government, and green builders, the city established a green building kiosk where builders and community members can get fact sheets, technical briefs, resource guides, and other information.
- To accelerate green construction, the city developed a "Bidders Recycling Economics Worksheet," which all bidding contractors must use to evaluate the cost difference between on-site recycling and landfill disposal.
- When green builders find an obstacle related to an existing code or regulatory issue, the city provides on-going code and other regulatory conflict assistance.
- Financial incentives helped expand green building practices by reducing the higher front-end costs of green building projects. Through fiscal year 2002, the city's Green Investment Fund distributed $800,000 to 69 projects of both housing and commercial constructions.

The City of Seattle

The City of Seattle joined the USGBC in 1999. Since that time, the City of Seattle has required all city-financed facilities and buildings over 5,000 gross square feet of conditioned space (as defined by the Seattle Energy Code) to meet the LEED Silver rating. The purpose of a citywide policy on green building is to demonstrate the city's commitment to environmental, economic and social stewardship, to yield cost savings to the City's taxpayers through reduced operating costs, to provide healthy work environments for staff and visitors, and to contribute to the city's goals of protecting, conserving, and enhancing the region's environmental resources. Additionally, by taking a leadership role in green building, the City helps to provide a model for others to follow. Instead of having a specialized office in city government, an inter-departmental group of city employees, the Green Building Team, serves as a coordinating body for implementation of the policy, and serves as resident experts on elements of green building.

Austin, Texas

A central characteristic of green building is that communities rely on local materials. An example of an economic development approach based on green building is provided by the Center for Maximum Potential Building Systems in Austin, Texas. Their strategy is to use indigenous building materials and passive climate design (architecture stressing solar energy and the use of shade and wind).[9] In addition to the indigenous products, local wastes are recycled for use as raw

materials in other projects or products. In 1994, the City of Austin adopted guidelines for municipal buildings, and encouraged voluntary private sector compliance, including the center. Austin is now one of the model sustainable cities in the U.S. In addition, by implementing green building practices, the City of Austin has created opportunities to involve at-risk youth in projects related to the recycling process. Austin's green building program is just one of many community successes.

VIII. Current Green Building Activities in Lane County

City of Eugene

The City of Eugene is a member of USGBC and is working toward adopting a LEED program for public projects. In April, Eugene released a draft Sustainable Building Policy aimed at internal city governmental operations. The draft states:

> "The purpose of a Citywide policy on sustainable building is to demonstrate the City of Eugene's commitment to environmental, economic, and social stewardship, to yield cost savings to the City's taxpayers through reduced operating costs, to provide healthy work environments for staff and visitors, and to contribute to the City's goals of protecting, conserving, and enhancing the region's environmental resources. Additionally, the City is in a position to set a community standard of sustainable building practices."

The city hopes to adopt a policy requiring all new construction, additions, and remodels encompassing more than 5,000 gross square feet of building area to achieve the equivalent of a "certified" level of the U.S. Green Building Council's LEED Green Building Rating System. Also, the draft says that the policy should include the statement of "sustainable manner," with which all City of Eugene buildings and facilities are to be maintained and operated[10].

Although the City of Eugene has not adopted a formal community-wide Green Building program, city staff is seeking opportunities to support local organizations in the area of sustainable development through education and collaboration. For example, the city co-sponsored seminars held in the spring of 2003, including a presentation in Eugene by David Eisenberg, a director of the Development Center for Appropriate Technology in Tucson, Arizona. He provided education and support to building officials, designers, and builders to promote sustainable construction and development practices. The seminars were co-sponsored by the Northwest EcoBuilding Guild, Eugene Water and Electric Board, and Eugene's Planning and Development Department. Eisenberg also met with local code officials, designers, and builders to facilitate discussion about strategies for enhancing acceptance and approval of alternatives within building and special codes.

Other local efforts include those by the EcoBuilding Guild, which offers monthly presentations on green building on the first Wednesday evening of the month at the McNail-Riley House, 601 W. 13th Ave. The American Institute of Architects' Committee on the Environment hosts monthly educational meetings. The Eugene Water and Electric Board has been actively supporting local efforts by providing resources, meeting space, and advertising.

Other Green Building Examples in Lane County

There are four LEED registered public building projects in Lane County: McKenzie-Willamette Hospital, Lillis Business Complex at the University of Oregon, the U.S. Courthouse (planned), and

the new Eugene Public Library. Details on the Lillis Complex and the Library are listed below. In addition, some individual homeowners have shown interest in green building in Lane County.

University of Oregon, Lillis Business Complex

Designed to meet LEED silver certification, the new $41 million, 196,500-square-foot facility features many sustainable design elements such as perimeter daylighting, extra thermal mass in its concrete structure to moderate building temperatures, recycled materials, certified hardwoods, and energy-efficient mechanical systems. The structure incorporates photovoltaic panels, shade controls to regulate temperature and glare, and "smart" lighting. It will be 50% more energy-efficient than state code requires.[11] The green nature of the business complex also fits into a vision for sustainability across the UO campus. The university's Sustainable Development Plan, implemented in 2000, requires that design principles such as those expressed in the Lillis plans be applied to all new building projects. Christine Taylor Thompson, an associate in the UO Office of University Planning, said, "The Lillis project is an excellent example for the university community and the community at large. It shows how sustainability can be integrated into a design without compromising the intended functions or costing significantly more; in fact, the sustainable measures will enhance the comfort and beauty of the building and result in substantial cost savings. It just makes sense."

Eugene Public Library

Due to feedback received during the public hearing process, the public library construction project team decided to incorporate green building principles. The design addresses energy efficiency, extensive use of daylighting, minimizing indoor air pollutants, resource reuse, use of certified woods products, construction waste management, and use of building materials manufactured locally where possible. Energy analysts estimate the 130,000-square-foot library will cost only $8,000 per year more to run than the old 30,000-square-foot library building. City Project Manager Bill Black said the green elements remained untouched when bids for the project came in several million dollars over budget. However, he said, "we heard from the community that the green nature of the building was important."

Private Buildings

A newly built home on Canoe River Street qualified as an "Earth Advantage" home (a program of Portland General Electric) and boasts many green features. This house uses non-toxic materials that do not off-gas harmful chemicals, fiber cement siding constructed with recycled paper, concrete floors made with recycled fly ash, and two heating systems.12

Another example of a green home is located on Garfield Street. The owner of the house has a pool heating system that uses a network of panels arrayed on the home's south-facing roof to heat water. The system only operates four to five months a year, but during that time it saves the owner more than $1000 in pool heating costs.

A house on Hilyard Street installed a solar panel in the 1970s. It is one of the oldest still in operation in Eugene. This example proves that energy-efficient design actually works and pays off in the long run. A retrofit of this house addressed a serious thermal problem of the house – a massive south-facing chimney overheated the house in the summer by conducting the sun's heat indoors. The addition of a greenhouse in front helped to reduce this effect, as thermal water panels store the sun's heat. A fan and ventilating system helped distribute the greenhouse's hot air through the house when it is needed.

As discussed in the UO PWCH report on Eco-Industrial Development, Lane County contains the largest solar electric installation in Oregon. The Pacific Olive building in downtown Eugene had a 25 kW photovoltaic system installed on its roof in December 2002. The system's electricity is fed back into the Eugene Water and Electric Board (EWEB) grid. Through a special program, EWEB will buy the solar-generated power at a premium of 25 cents per kW hour for 10 years. The project also received support from the Oregon Office of Energy's Business Energy Tax Credit, which provided a tax credit equal to 35% of the installed project cost. Tom Bowerman, the building owner, said, "If everything goes as planned, the return on investment should exceed 10 percent. In this investment market, that's good, and to be involved in green power is certainly a bonus.[13]

Non-Profit Resources

A nonprofit organization, BRING Recycling,[14] has started a Reuse Warehouse program. According to their website, each month the Warehouse takes in nearly 40 tons of building materials and other reusable items donated by the public, contractors and businesses. Re-usable materials diverted from the transfer station or deconstruction sites are brought to the Warehouse and sold to the public at a huge cost savings over new materials. Most items require only a little elbow grease to be put back into a functional state. Homeowners, remodelers, contractors, and landlords find it much more cost-effective to replace a broken window, door, or flooring with a used one, rather than a new one. For instance, a woman from Eugene bought 40 sheets of maple flooring at $20 per sheet. In the end, she salvaged 1,000 square feet of flooring for $800. At Jerry's Home Improvement Center in Eugene, 1,000 square feet of unfinished maple costs $3,000. Unfinished maple sells for $3 per square foot, while finished maple costs $6 per square foot[15]. Most importantly, the reuse program has created a considerable number of jobs for low-skilled workers in the community[16]. The U.S. Community Development Loan Fund, which has assets of $31.4 million, has shown that successful regional low-cost housing construction programs actively generate jobs.

IX. Green Building in Rural Communities

Our research could not find examples of green building programs specifically focused on small rural communities. Public incentive programs and grants often do not extend to rural areas, making green building more difficult to finance. However, a partnership approach linking larger and smaller communities in Lane County could prove to be an effective way to expand green building to rural areas. Our research found that green building programs often take off at the regional level, spring boarding from efforts by multiple public agencies and municipalities, nonprofit organizations, consumers, and builders.

Partnership and Regionalism

Green building is traditionally thought of as a "bioregional" activity because it applies to any area, and is not restricted to a government's administrative boundary. Building suppliers, contractors, and designers usually work within a region, not one specific community. The supply chain for green building products encompasses the whole Southern Willamette Valley and Northwest. The holistic nature of green building connects metropolitan areas (such as Eugene/Springfield) with rural small-sized communities. Therefore, it is likely that partnerships between rural and urban communities in Lane County could help grow the green building industry in rural areas.

The development of county-wide or regional partnerships would benefit both rural and urban areas. A report from the Council for Agricultural Science and Technology[17] shows how replicating rural

green spaces could be key to building a better urban environment. In addition to food and forestry production, agriculture includes major green building components that range from fiber and natural fuel to ornamental plants. Since most green building materials are agricultural products or agricultural waste, expanding the green building industry would help revitalize economic vitality and public health in both rural and urban areas of Lane County. While rural farmers provide food and forest operations provide lumber and other products to urban markets, city residents enjoy the amenities provided by rural areas and provide financial and other services to rural areas.

Partnerships Are Already Occurring In Lane County

In Lane County, for example, an informal partnership has already been developed by a collaborative effort among the City of Eugene, the Home Builder's Association of Lane County and the UO Program for Watershed and Community Health. These organizations worked together to hold a meeting in June 2003 at the Home Builders Association to begin a dialogue among local builders, building supply companies, and government about how to expand Green Building. At the meeting, many builders showed interest in green building techniques. This partnership and dialogue could form the basis for a broader effort that could include builders, suppliers, and government agencies from rural and urban communities throughout Lane County.

X. Green Building and Affordable Housing

Green building has been found to be an effective match with affordable housing projects. Affordable housing refers to housing units operated by government or nonprofit organizations that are provided to lower income households. Many studies have found that green building technologies can be competitively priced compared to conventional technologies and practices while reducing the overall life-cycle costs of a construction project.

Why Affordable Housing Should Utilize Green Building Practices

Affordable housing projects face many obstacles. Public funding is increasingly harder to obtain, many aging housing units are in need of repair or replacement, and new affordable housing projects often face local opposition. Due to such constraints, designers and nonprofit organizations must find creative ways to build high-quality housing that is affordable to build and to live in and that will last a long time. Applying green building principles can help achieve these aims.

Green Affordable Housing Can Benefit Housing Providers

Green building can expand, diversify, and stabilize the financial tools available to fund affordable housing projects. Tax credits for energy efficiency, loans and grants from public and philanthropic organizations, and other financial tools may be available to support green building projects. These options can broaden the range of funding sources available for affordable housing projects.

In addition, many green building practices can lead to cost savings during construction. For example, steel framing is often cost competitive, conserves trees, and is recyclable. Good management of construction sites reduces waste and saves tipping fees. In some cases, salvage material can be reused, saving money compared to virgin feedstocks. In addition to the cost savings during construction, green affordable housing allows the public or non-profit agencies that own the buildings to enjoy lower maintenance costs. For example, water efficiency should reduce water bills for a complex. Improved bathroom ventilation can reduce the need for continued painting and dry

rot repairs because air circulation reduces mold. Also, in the long run, decreased electricity and water use will result in reduced need for infrastructure maintenance.

Green Affordable Housing Will Benefit Low-Income Households

Lower-income populations have a great deal to gain from the use of green building techniques. Energy efficient systems lower utility bills, making them an important feature of green affordable housing. In reducing utility bills by as much as 35 percent, these techniques can make a real difference in family budgets.

The positive health effects of green building can greatly improve the quality of life—and the economic circumstances--of local residents. Poor indoor quality contributes to higher health costs and productive time lost to illness. The use of low or non-toxic paints, solvents, stains and glues improves indoor air quality and thus occupants' health. It can also reduce sick leave. This is important for low-income households because low-income workers tend to work hourly. At a time when a clear link has been established between poverty and poor health, and when asthma has reached epidemic proportions in some neighborhoods, the improvements in indoor air quality that green buildings offer become critically important.

Green Affordable Housing Success Stories

City of Portland

The City of Portland has established guidelines to increase the environmental performance and durability of all City-funded affordable housing projects managed through the Portland Development Commission (PDC). Johnson Creek Commons, a Portland affordable housing rehabilitation project, found positive economic savings for both occupants and builders as a result of increased energy efficiency[18]. The project was financed by a PDC low-interest loan, grants, and loans from Shorebank Pacific[19]. The main focus of the project was to add energy efficiency techniques that include:

- Upgrading ceiling insulation
- Upgrading floor insulation
- Adding rigid wall insulation in conjunction with new siding
- Upgrading single-pane aluminum frame windows and sliding glass doors to vinyl-framed, double-pane, low-emission, argon-filled glazing, and
- Installing energy-efficient appliances and equipment (i.e. refrigerators)

Due to the energy efficiency systems, each apartment unit has saved approximately $33 per month—a significant sum for low-income individuals. The report concluded that in 5 years, savings would exceed the costs, assuming no increase in real electricity prices. Over a 25-year horizon, the electricity savings were estimated to exceed the costs of financing the efficiency improvements by $83,000. Over a 60-year horizon[20], the savings were estimated to be nearly $145,000. If energy rates rise, the savings will be greater. In addition to the energy efficient elements, a number of other enhancements were added to the apartment complex including:

- Installation of linoleum flooring, which is biodegradable and more durable, in place of standard vinyl
- Installation of high flow rate bathroom fans to reduce mold problems
- Repainting with solvent-free paints

- Use of recycled exterior paint, and
- Implementation of a water-efficiency program in conjunction with the Portland Water Bureau

The report concluded that the electric utility bill savings would provide substantial economic benefits to the occupants over the lifetime of the buildings. They also noted that the efficiency improvements and several other green improvements to the building would benefit the occupants through improved living conditions, improved air quality, better comfort, and improved health.

Emeryville, California

The Emeryville Resourceful Building Project in Emeryville, California, showed the positive monetary impact of green affordable housing by using a quantitative impact measurement. This project was funded by the Alameda County Waste Management Authority, which had been awarding grants to fund green demonstration projects. The project looked for simple, cost-effective ways to reduce environmental impacts, using mostly conventional means of construction, while maximizing benefits to the future occupants. With the exception of energy efficiency, green building principles have not been widely applied to affordable housing. The reasons for this include perceived higher construction costs and a reluctance to use new materials and practices for publicly funded projects. However, this project illustrates that careful selection and installation of mainstream materials, along with judicious use of recycled materials and alternate construction methods, can create cost-effective, environmentally sound affordable housing.

An assessment of the project looked at the economic impacts of the flooring and found that, despite the fact that it was about twice as expensive as standard vinyl flooring, over a 25-year period it will reduce ownership and maintenance costs to the property owners by nearly $5,000 and over 60 years it will reduce costs by nearly $9,000. The report found that the project's accomplishments included:

- Total operating energy reduced by approximately 38%
- Emissions from energy production and use that contribute to global warming reduced by 23%
- Emissions from operating energy that contributes to acid rain reduced by 16%
- Amount of fuel used for materials production reduced by 50%
- Wood framing reduced by 19%
- The project cost no more than conventional affordable housing

Santa Monica, California

Santa Monica, California, became involved with green affordable housing in 2001. California's energy crisis in 1999 motivated the City of Santa Monica Housing Division to pursue the potential for energy-efficient residential projects. This project was financed by a combination of tax-credit allocations, state funds, city funds, and other grants and subsidies for energy-efficient initiatives. Solar panels, natural lighting, recycled materials, energy-saving refrigerators, and natural cooling were featured in the affordable homes. As a result, the building produces 92 percent of its own power, and saves more than $6,000 annually in energy costs. The savings turned out to be very important, because the California Public Utility Commission announced higher rates for electric power in that year, with progressive increases of as much as 37 percent for residential customers that were tiered to consumption.

New York

Green affordable housing can also be found on the east coast. The first green affordable housing project in New York State was developed in the South Bronx in 2002. This project was a joint initiative of the New York City Housing Partnership (HPD) and New York City Department of Housing Preservation and Development, supported financially by Deutsche Bank. In addition to Deutsche Bank, financing was provided by the U.S. Department of Energy's "Building America" program. There was also support from nonprofit organizations. HPD Commissioner Jerilyn Perine said, "It demonstrates that the public sector can incorporate the latest innovations in housing construction into its developments without sacrificing its most important mission: providing affordable and quality homeownership opportunities…" The homes include a variety of energy efficient features as well as other green building elements. According to the City's web site, the project was awarded to homes that were at least 30 percent more energy efficient than the building code requires.

Green Building and Affordable Housing in Seattle, Washington

The first LEED-certified affordable housing project recently opened in Seattle. Traugott Terrace is a $4 million, 39,000-square-foot housing project that offers 50 units for people in the 30 percent or less medium income category for that region.[21]

Green Affordable Housing in Lane County

The Neighborhood Economic Development Corporation (NEDCO), a nonprofit organization, completed an affordable housing project called "Field of Dreams" in 1996. The project achieves affordability through the economy of building design and the efficiencies of site design. Quality is achieved through intelligent design strategies, low-maintenance material selection, and appealing architectural features. The housing units were built with simple proportions and standard modular dimensions and layouts to make them less expensive to build. Keeping it simple and maximizing the use of utility and municipal rebate programs, this project offers real affordability to the low and moderate-income local housing market. The houses were covered with recycled wood fiber siding, a cost-effective material that needs less maintenance than conventional siding materials in this region. Apparently, low-maintenance vinyl siding was ruled out primarily due to aesthetic reasons. This wood-fiber material is made from wood-bi-products and adhesives. The affordable housing project offered homes to low-income buyers at prices ranging from $54,000 to $71,000[22].

St. Vincent de Paul Society of Lane County, Inc. (SVdP) provides social service programs including emergency services that provide food, shelter, clothing, affordable housing, job placement, and economic development. SVdP includes high standards of waste reduction in its business practices and implements green building in many of its affordable housing projects. The housing projects often include energy efficiency and the use of recycled materials. Fund-raising efforts are also often based around creative ways of reusing materials. SVdP has a partnership with Lane County's curbside recycling program to turn post-consumer steel, glass, and box springs into usable products. Recycled materials are used to produce appliances, beds and other furniture, art products, fire retardant, computers, and other goods. They also use the post-consumer and recycled waste in their housing projects.[23] Through these processes, SVdP has created a substantial number of jobs for the low income/unskilled population.

XI. Obstacles to Green Building

A number of national and regional studies have identified specific barriers to green building. Telephone interviews and a meeting with representatives from the Lane County Home Builder's Association[24] found that local concerns about barriers are similar to the barriers identified elsewhere.

Barriers Identified in Other Municipalities

City of Portland

The City of Portland identified three key barriers to the expansion of Green Building:

1. Lack of Information

Consumers, lenders, real estate agents, appraisers, developers, architects, builders, and permit reviewers are rarely well informed about the health, productivity, and environmental issues associated with building and sites. Even when individuals are aware of the differences between green and conventional buildings, the technical expertise to undertake green building projects is not readily available.

2. Regulatory Hurdles

Securing approval for buildings designed with innovative features typically takes longer than acquiring permits for conventional buildings. Emerging technologies, materials, and practices are often not recognized as meeting building code requirements. Also, the present structure of certain development-related fees and design requirements does not encourage resource-efficient practices.

3. Financing Obstacles

Increasingly, the initial costs of a green building are comparable to those of a conventional building. However, green building can incur initial costs that are higher than those of conventional buildings. Although gains from lower utility costs and increased worker productivity may easily recover the higher initial investment, these savings rarely accrue to the same organization that designed and constructed the building, and most building tenants are poorly informed about the financial advantage of high-performance buildings.

City of Seattle[25]

The City of Seattle identified the following barriers:

1. Information Barriers

- There is no consensus as to what "sustainable building" means, what the minimum performance standards are, what activities are environmentally stressful, what the economics are, and how to evaluate or measure them.
- There is no public policy defining why sustainable building benefits the City of Seattle and promotes the public good; there is a lack of success in effectively communicating the benefits of sustainable building to the building industry.
- The vast amount of information currently available has not been successfully integrated and effectively disseminated or promoted.
- Bad experiences and poor product performance in the past deter builders from incorporating sustainable building practices today.

2. Regulatory and Process Barriers

- There is a perceived and real inconsistency between sustainable building and existing building codes and regulations.
- It is unclear from the various codes and regulations whether sustainable building is a priority for the City, and if it is, there is a lack of information as to how to achieve sustainable buildings and landscapes.
- There are few if any benchmark standards or minimum performance standards for certain sustainable building issues.

3. Incentive Barriers

- There is a lack of information about the inherent long-term economic benefits of sustainable building.
- The reality is that initial costs are the overriding concern among financial institutions, investors, etc.
- There is a lack of integration among various incentive programs (rebates, loans, technical assistance, and recognition programs), and a lack of understanding about how to apply and receive incentives.
- Most current incentive programs are aimed at the developer, not at the people designing and constructing the building.
- The building industry faces a tremendous amount of risk (regulations, finances, public opinion) and is constantly managing that risk. Sustainable building is often perceived as an additional risk.
- Utility rates in Seattle are low and can be a disincentive to any sustainable building practices that increase initial costs.

Summary of Barriers Identified in Other Studies[26]

1. Industry Perception – Fear of Unknown

The Center for Sustainable Construction reported that: "each of the players involved in the procurement of a building will have preconceptions that they bring to the table."[27] This can often pose a significant barrier to the adoption of innovative solutions. The skepticism usually comes from uncertainties about the quality of the products and about profitability.

2. Investment Risk

Investors with little knowledge about the field often "brand" green buildings in certain ways. They are seen as a potentially short-term fashion trend with a narrow marketplace appeal that runs counter to longer-term investment strategies. To date, the investment market is relatively unaware of the less radical options and the benefits they may bring. Financial analyses also ignore the substantial costs of conventional building practices that are borne by the community as a whole, including impacts on stormwater, road congestion, air pollution, and water quality.

3. High Initial Cost

It is a commonly held belief that green buildings cost significantly more in terms of their initial capital costs. This belief is not well founded in reality and is based on experience with "bolt-on" sustainable design solutions. It also reflects a wariness of the unknown among construction professionals.

4. Lack of Networking in the Sector

Even though supply and demand may exist, local design, production, distribution, and consumption patterns are often not integrated. Since integration of all processes is necessary to practice green building, the lack of a sound network in the design and building sector is critical.

5. Regulatory Barriers

Builders may have to obtain special permission from officials to use green building practices and technologies. For example, builders may need to obtain special permission to install solar panels on roofs or exterior aspects of buildings because the panels do not comply with the safety code and local residents may object to seeing them. It is common to use a net-metering system for a solar energy system. However, use of the net-metering system may be prohibited by utility regulations.

Barriers Identified in Lane County

Barriers listed below were identified by members of the Home Builders Association of Lane County.

- Lack of information: Although green building is understood on a surface level, local builders and product suppliers are not clear about specific techniques, products, and advantages.
- Builders are concerned about the reliability of new products. They have been burned in the past by water and energy efficiency products that did not live up to their billing.
- Some builders want to get the work done in the quickest and easiest way possible. Green building may require new training and education that take time away from existing work.
- Concerns that the higher costs of some green building products have led to substantially higher production costs. A recent phone survey, conducted by graduate students working with the UO Program of Watershed and Community Health, found that 27% of green building materials in Lane County cost the same amount as conventional materials, 5% cost less, and 67% cost more. Of the products that cost more, 24% had higher durability than traditional products, 35% were products that increased efficiency and had a reasonable payback period, and 5% were non-toxic products.
- Builders say their local suppliers must advertise, promote and carry more green products if they are to use more of them.
- Local suppliers say that they will carry more products if builders ask for them.
- Builders say Lane County currently has weak market demand for green building. Many green builders indicate a weakness in customer knowledge about the importance of green consumerism.
- Large local green building projects found it difficult to find a local green builder. The UO's new business complex project, for example, has contracts with eight major construction and design companies, but only three of the eight companies were Lane County companies.
- Local governments have not clarified the definition and criteria for green building. As a result, builders have a hard time promoting the practices or gaining accountability from consumers.

XII. Potential Solutions

As other local governments have demonstrated, the barriers to Green Building can be overcome**.** In most cases, local government plays an important role in removing obstacles.

City of Portland Strategies
The City of Portland Office of Sustainable Development's Green Building Program has been providing the framework and tools to initiate, encourage, and promote green building practices in the region. The City of Portland strongly believes that "by promoting and applying green building practice, the City can stimulate economic growth and build demand for innovative and efficient building materials, energy systems, and green building services provided by local firms."[28] The Initiative has two fundamental objectives:

- **To expand market demand** by educating building industry professionals and the public about the benefits of green building
- **To make green building practices easier to implement** by reducing regulatory and financial barriers and developing technical services and resources for building industry professionals.

To implement the objectives, the Office of Sustainable Development's Green Building Division focused on increasing the application of green building practices by:

- Offering technical assistance and incentives
- Having clear criteria for green building, which is based on the LEED rating system[29]
- Removing regulatory disincentives
- Providing training and resources[30] to developers, contractors, and design professionals.

To accomplish these goals and objectives, the Green Building Division established a detailed strategic action plan in 1999. The plan focuses on four strategic areas: organization and policy development, demonstration project, technical outreach, and offering resources and incentives.

City of Seattle Strategies

The strategies used by Seattle to promote and expand green building include:

- Support local efforts to put sustainable building concepts into practice
- Recognize and reward successful projects
- Lead the effort by setting an example with public buildings

The ultimate goal is that once Green Building is more widely accepted and practiced, the City can step aside and allow market forces to work on their own.

XIII. Recommendations

The following recommendations and action items have been identified through our research and through interviews with local builders and government representatives. It is very important to note that growing the Green Building sector in Lane County will require a diversified county-wide partnership between nonprofit organizations, public utilities, designers, architects, builders, energy providers and other members of the building community.

A. Educate the Local Building Community, Government, and Consumers

Education and training have been key elements of every successful local effort to expand Green Building. Every successful program uses a continuous stream of workshops, educational events, Home Shows, speaker series, technical workshops, written information, and other instruments. Local architects and design firms, builders, suppliers, and government staff, as well as consumers, must be apprised of the purpose, practices, and benefits of green building. This will require a consistent effort over many years.

Action 1: Upgrade and Expand Educational Outreach

The City of Eugene, EWEB, the University of Oregon, and others have offered workshops and hosted speakers in the past and will continue to do so in the future. As previously noted, the Home Builders Association of Lane County recently partnered with the UO Program for Watershed and Community Health, the City of Eugene, and the City of Springfield, to host a dialogue among local builders and suppliers about how to expand green building. These are positive steps that should be continued and expanded. As demonstrated by the dialogue with local builders at the Home Builders Association, local building trade unions, professional associations, and others must educate and train their members about green building. Local governments must partner with the building industry to expand knowledge and understanding. Many of the meeting and interview participants indicated that local governments should take a leadership role in stimulating market shifts by facilitating dialogue and initiating workshops.

Action 2: Establish A County-Wide Green Building Steering Committee

One way to advance green building could be for local governments throughout Lane County to organize an informal steering committee with builders, trade associations, Lane Community College and the University of Oregon, the local EcoBuilding Guild, and others county-wide. This could be coordinated through Lane County government, the Lane Council of Governments (LCOG), or other venues. The purpose would be to identify the actions needed to educate builders and consumers, share expertise, remove barriers, provide incentives, and in other ways expand green building. Every successful green building program we reviewed has included some type of diverse steering committee to coordinate activities. Smaller rural communities may need help in taking the steps described above. Involving rural communities in a county-wide effort could leverage expertise and resources.

Action 3: Establish A “Green Building Kiosk” or Information Center

Central locations should be established where homeowners, developers, designers, contractors, customers and others can get information about green building. It can be extremely time consuming to research applicable codes, available products, design specifications, and incentive programs,

because most of the information is widely dispersed throughout the County. A central kiosk could store information such as:

- LEED building standards
- Governmental incentive programs
- Private sector resources
- Local case studies, project information
- Code pertaining to green building
- Computer database of green building materials
- Product samples, literature
- Guideline booklets

Lane County or the LCOG could take the lead in establishing a regional resource center or kiosk system that serves all cities in the county. Support could be solicited from trade associations, non-profit organizations, and others. The resource centers should be located in areas builders and customers frequent, such as next to building permit offices. A virtual resource center on the Internet may be more feasible due to financial constraints. The U.S. Green Building Council has developed a national virtual resource center that may provide some of the information needed.

B. Government Should Lead by Example

As demonstrated in Portland and Seattle, one of the best ways to advance green building is for local governments to lead the way by constructing new buildings and remodeling existing ones using Green Building standards. This will not only reduce taxpayer costs in the long run, it will also provide a model for local builders and consumers. Educational tours can be held. In addition, the buildings can be used as economic development promotional tools. The City of Florence recently decided to design a new Visitors Center planned for Highway 101 as a green building to provide a showcase for local builders and the public. This is just the type of action that will help expand green building.

<u>Action 1: Adopt Green Building Standards for Public Buildings</u>
Government agencies throughout Lane County should adopt policies that require all publicly funded new construction and major renovation projects to be designed and built to meet Green Building standards. Requiring that all new and renovated public buildings be sustainably designed sends a clear message that government supports the approach. It can also increase the cost-effectiveness of the industry.

<u>Action 2: Organize Green Building Tours</u>
Looking at actual green buildings in the community is a wonderful educational tool for the general public, builders, and community leaders. Since green homes and buildings exist in Lane County, it is feasible to coordinate tours. EWEB, the Eco Design Center at the University of Oregon, and the Northwest EcoBuilding Guild Eugene Chapter have hosted tours in the past. These events can be expanded.

<u>Action 3: Recognize and Reward Outstanding Green Projects</u>
Research shows that another excellent way to grow the industry is to reward and recognize outstanding green building projects through quarterly, annual or biennial conferences and awards events. An awards program for green building projects could be a part of an annual conference,

workshop, or other event. Design competition may be incorporated into these events. Public recognition provides designers, developers, contractors, and others with a way to feel good about the work they have done as well as a marketing tool.

C. Establish Green Building Standards and Criteria for Non-Public Buildings

Our research found that green building expanded in other communities only after local municipalities and public agencies adopted or tailored the U.S. Green Building Council's LEED standards for local use. Each local jurisdiction in Lane County could adopt a clear set of green building guidelines and criteria. Incentives and rewards can then be provided for buildings that meet the criteria (e.g. speedier permitting, public recognition). Clarification of local criteria will provide a baseline for local builders and consumers and help builders promote green buildings to their customers. Although building codes are unique to each community, the most efficient way to adopt local criteria may be through the countywide consortium previously discussed. Working through Lane County or LCOG, model green building criteria based on the LEED standards could be developed that each community could tailor to its local circumstances and needs.

Action 1: Develop Local Standards

Public agencies throughout Lane County, and/or LCOG serving as an umbrella group, should adopt Green Building policies and standards. A local advisory committee composed of architects, building permit officials, policy makers, builders, and suppliers could be formed to assist in the process. Entities that should consider adopting policies and standards include:

- Local governments
- County government
- LCOG
- School districts
- Local utility boards

Action 2: Publish and Disseminate Policies and Standards

Local builders, suppliers, and consumers will need simple and easy-to-use information describing the policies and standards. Our research found that the successful Green Building programs produce and widely distribute a simple, easy to understand document that describes the new policies and standards. The document should be hard copy and web-based. It will not only inform the public about the new criteria, it will demonstrate to citizens a serious commitment and intention to adopt Green Building practices. The document could include the following:

- Definitions of green building applicable to each community or agency
- Benefits to government, industry, and the community
- Principles of green building
- Performance guidelines and standards
- Information about resources and incentive programs
- Summaries of case studies

D. Help Builders Overcome Regulatory Barriers

Our research found that the most successful local green building programs place a major emphasis

on working cooperatively with builders to remove regulatory barriers. Local building regulations may not reflect innovations in technology, design and building materials. Regulatory hurdles can arise unexpectedly, delay projects and drive up building costs. Local governments should develop processes that lead to quick resolution of these obstacles. LCOG could be asked to provide assistance in reviewing building codes to resolve barriers within smaller rural communities.

Action 1: Review Existing Codes

Review existing codes, regulations, and other requirements that pertain to the building industry and identify those which conflict with green building to determine which can be modified to facilitate green building. The building industry must comply with a tremendous amount of codes, regulations, and other requirements, some of which may be inconsistent with green building practices. For example, through our interviews we learned that some people believe that the City of Eugene's low bid process is an impediment to hiring quality firms to design and build more resource-efficient buildings. The code reviews will need to include numerous dialogues with large members of the building industry to identify the main regulatory barriers to green building.

Action 2: Provide Technical Assistance

All officials in building permit departments throughout Lane County should be trained so that they are well informed about green building in order to assist designers, builders, and consumers in overcoming regulatory barriers. Every building permit office should have staff available to deal with specific questions regarding green building.

E. Help Builders Overcome Cost Barriers

When initial construction costs are higher than costs for conventional construction, low-interest loans, grants, and other assistance should be provided whenever feasible. A number of loan and grant programs exist for these purposes. Also, local steering committees should review existing incentives and technical assistance programs regarding energy efficiency, water conservation, material use, reuse and recycling to determine if any can be streamlined or if others should be added.

Action 1: Organize Monetary Incentive Programs

A list of incentive programs should be developed and made available through permit offices, kiosks or resource centers, and in other convenient locations to allow building professionals and consumers to have ready access to the information.

Action 2: Integrate Current Incentive Programs

In order for incentive programs to be effective they need to be easily accessible and user-friendly. Currently, many incentive programs are dispersed among various departments or levels of government, so it takes dedication and time to identify them. Some incentive programs also require a significant amount of paperwork and time. Local governments, with the possible assistance of Lane County or LCOG, could help to provide one-stop-shopping for existing incentive programs.

Action 3: Target Information about Green Building Life Cycle Costs to Appraisers

Whether or not a specific green building has higher initial construction costs than a conventionally constructed building, the use of green building design and materials can result in lower utility costs, lower maintenance costs, and higher long-term value. Because financing is usually based on appraised values, an educational effort should be developed to provide information to real-estate

appraisers about the long-term monetary value of green building.

Action 4: Consider New Incentive Programs

In addition to integrating current programs, local governments throughout Lane County may want to examine new incentive programs for developers as well as for designers and contractors. The following are examples of possible incentives:

- Develop performance-based grant programs (i.e. energy savings)
- Provide reduced utility rates to building owners that conserve energy, water, and materials resources
- Provide designers with a portion of the savings accrued from decreased utility bills
- Ensure that green building projects will not take any longer to be approved in the permitting process
- Work with the Oregon Office of Energy to create Lane County's Green Building-based Energy Tax Credit

Resource Information

Green Building Related Organizations

U.S. Green Building Council (USGBC): http://www.usgbc.org/

LEED Certification Program, Technical Assistance, Networking in National Level
Cascadia (Northwest) chapter <http://www.usgbc.org/chapters/cascadia/>
info@usgbc.org
(202) 828-7422
1015 18th NW Suite 805, Washington, DC 20036

American Society for Testing and Materials: http://www.astm.org/

Building Permit, Alternative Materials
(610) 832-9585
100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, 19428

Development Center for Appropriate Technology: http://www.dcat.net/

Building Code, Technical Assistance,
info@usgbc.org
(520) 624-6628
PO Box 27513, Tucson, Arizona, 85726

Other Municipal Green Building Programs

City of Portland: http://www.green-rated.org/g_rated/grated.html

G-rated Green Building Service, Office of Sustainable Development
greenrated@ci.Portland.or.us
(503) 823-7725
The Jean Vollum Natural Capital Center, 721 NW 9th Suite 350, Portland, Oregon 97209

City of Seattle: http://www.cityofseattle.net/sustainablebuilding/

Sustainable Building Program, Seattle Public Utilities
lucia.athens@seattle.gov

City of Austin (TX): http://www.ci.austin.tx.us/greenbuilder/

Green Building Program, Austin Energy
Lisa.Nutt@austinenergy.com
(512) 505-3700
PO Box 1088, Austin, Texas 78767

City of Santa Monica (CA): http://www.green-rated.org/g_rated/grated.html

Green Building Program, Energy and Green Building Office
(310) 458-8229
1918 Main Street, Santa Monica, California 90401

Energy Efficiency

Oregon Office of Energy: http://www.energy.state.or.us/

Business Energy Tax Credit: <http://www.energy.state.or.us/bus/tax/taxcdt.htm>
Residential Energy Tax Credit: <http://www.energy.state.or.us/res/tax/taxcdt.htm>
1-800-221-8035, (503) 378-4040
625 Marion St. NE, Salem, Oregon 97301

Portland, General Electric (P&GE): http://www.portlandgeneral.com/

Earth Advantage Program (Energy Rebate Program), Local Networking
http://earthadvantage.com/
888-EARTH33 (888-327-8433)
16280 SW Upper Boones Ferry Rd. Portland, OR 97224

Eugene Water and Electricity Board (EWEB): http://www.eweb.org

Energy Management Services: < http://www.eweb.org/energy/index_ems.html>
Energy Saving Rebate Program: < http://www.eweb.org/energy/energysharp/index.html>
ask.us@eweb.Eugene.or.us
(541) 484-1125
PO Box 10148, Eugene, Oregon 97440

Local Nonprofit Organizations

St. Vincent de Paul Society of Lane County, Inc: http://www.svdplanecounty.org/index.html

Green Affordable Housing, Recycling, Manufacturing
(541) 687-5820
PO Box 24608, Eugene, Oregon 97420

BRING Recycling: http://www.bringrecycling.org

Reuse Warehouse, Recycling, Education
info@bringrecycling.org
(541) 484-112
BRING Reuse Warehouse 86641 Franklin Blvd. Eugene, Oregon 97405

Neighborhood Economic Development Corporation (NEDCO): <http://www.nedcocdc.org/>

Green Affordable Housing,
nedco@efn.org
(541) 345-7106
769 Monroe St. Eugene, Oregon 97402

Local Trade Associations

Home Builders Association of Lane County: < http://www.hbalanecounty.org/home.asp>

Local Builders Networking, Workshop, Lecture Series
ed@hbalanecounty.org
(541) 484-5352
2053 Laura St. Springfield, Oregon 97477

Northwest EcoBuilding Guild: < http://www.ecobuilding.org/>

Workshop, Technical Assistance, Local Networking
Southwest Oregon (Eugene) Chapter: < http://www.ecobuilding.org/chap/eug/index.php>
sullivan@oikos.com
(541) 767-0355
PO Box 1104 Eugene, Oregon 97440

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[1] National Science and Technology Council. Civilian Industrial Technology Committee. Subcommittee on Construction and Building. *Rationale and Preliminary Plan for Federal Research for Construction and Building*. Washington, D.C. National Science and Technology Council. September 1994.
[2] This figure includes "General Construction" and "Building and Garden Supply" industry of SIC code. Oregon Employment Department. 2000.
[3] This figure includes "Architecture/ Engineering" and "Construction." U.S. Department of Labor. 2000.
[4] U.S. Green Building Council. Official Web Site. *Why Build Green?* http://www.usgbc.org/AboutUs/
[5] Life Cycle Cost Analysis is an inclusive approach to costing a program, facility or group that encompasses planning, design, construction, operation ad maintenance over the useful life of the facilities and finally any decommissioning or disassembly costs.
[6] Public Technology Inc. *Sustainable Building Technical Manual*. Information based on telephone conversation with DPIC Insurance.
7 For more information on U.S. Green Building Council and LEED programs, visit www.usgbc.org
[8] For more detailed information, please refer to the appendix X, the list of the local municipalities that have green building code
[9] Center for Maximum Potential Building Systems.
[10] City of Eugene. Sustainable Building Policy (draft).
[11] University of Oregon Charles H. Lundquist School of Business Web site, http://lcb.uoregon.edu/complex/sustain.html.
[12] University of Oregon. Ecological Design Center. *Ecological Design Review.* Vol. 12, no. 3, Fall 2002
[13] Oregon Office of Energy, "New Grid-Connected Solar System Largest in State", http://www.energy.state.or.us/renew/Solar/Eugene.htm
[14] Bring Recycling. < http://www.bringrecycling.org/index.html>
[15] The Register Guard. April 11, 2002. "Rinky– dink no more: young teacher salvages old roller – rink floor for gorgeous maple hardwood."
[16] Personal interview with General Manger of Bring Recycling, Julie Daniel at University of Oregon.
[17] Diane Relf. (2002). *Urban and Agricultural Communities: Opportunities for Common Ground*. The Council for Agricultural Science and Technology.
[18] Low-Income Housing Rehabilitation for Sustainability and Affordability. (2000). Portland Energy Office. Prepared by Xenergy Inc and Sera Architects.
[19] ShoreBank Pacific is a community development bank with an environmental focus. The bank supports individual and community efforts to bring together conservation and economic development. < http://www.eco-bank.com/>
[20] The 60-year time horizon was used because the property owners guaranteed to the PDC that the housing project would be maintained as affordable housing over that time period.
[21] Sustainable Industries Journal, Issue #9, October 2003, page 8.
[22] The median home price for this region was $160,000 at that time.
[23] Sustainable Lane County. <http://www.sustainablelanecounty.org/>
[24] A meeting was held on June 10, 2003 in Springfield.
[25] Summarized by the City of Seattle. April 15, 1998. *Sustainable Building Action Plan*.
[26] Summarized by Center for Sustainable Construction, *Quantifying the Business Benefits of Sustainable Building*, February 2001
[27] Center for Sustainable Construction, BRE. *Quantifying the Business Benefits of Sustainable Building*. February 2001.
[28] City of Portland. Green Building Initiative – A Two-Year Action Plan for Promoting Resource-Efficient and Healthy Building Practices. Sustainable Portland Commission. December 1999.
[29] The City of Portland Supplement to Leadership in Energy and Environmental Design (LEED) 2.0 Green Building Rating System was developed by the City of Portland in 2002 to identify both local and state codes that go beyond LEED requirements and additional green building strategies that are regionally significant.

[30] City of Portland developed the Green Investment Fund to support a wide range of commercial and residential green building projects