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## **Eco-Friendly Building from the Ground Up: Environmental Initiatives and the Case of Portland, Oregon**

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## I

### INTRODUCTION

The City of Portland, Oregon, and its environs have consistently been rated the “greenest” major urban area in the United States.<sup>1</sup> Contributing to this distinction is a history of farsighted political leadership that helped set in place public planning initiatives in such vital areas as transportation,<sup>2</sup> multiple-use land development,<sup>3</sup> resource

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<sup>1</sup> *SustainLane Presents: The 2008 US City Rankings*, SUSTAINLANE, <http://www.sustainlane.com/us-city-rankings> (last visited Apr. 4, 2012) (Portland leads the nation in SustainLane’s urban sustainability rankings—a distinction the city has held since 2006. SustainLane is one of the largest online communities dedicated to sustainable living and ranks U.S. cities based on sixteen categories, including healthy air, quality of drinking water, parks, public transportation, and green building.); *Green Cities*, BUS. COURIER (Mar. 11, 2010), [http://cincinnati.bizjournals.com/cincinnati/datacenter/green\\_cities.html](http://cincinnati.bizjournals.com/cincinnati/datacenter/green_cities.html) (the Business Courier of Cincinnati’s “Green Cities Index” places Portland as number one based on factors including per capita green jobs, use of public transit, renewable energy use, and LEED-certified projects. The index was compiled using data obtained from government and other research agencies); *but see* THE ECONOMIST INTELLIGENCE UNIT US AND CANADA GREEN CITY INDEX (2011), *available at* <http://www.siemens.com/press/pool/de/events/2011/corporate/2011-06-northamerican/northamerican-gci-report-e.pdf> (The most recent indexes do not list Portland as the greenest city; however, Portland was not selected to be ranked in these indexes).

<sup>2</sup> *See* Zack O’Malley Greenburg, *In Depth: America’s Cleanest Commutes*, FORBES.COM (Sept. 21, 2009), [http://www.forbes.com/2009/09/21/clean-commutes-cities-lifestyle-america-public-transportation\\_slide\\_4.html](http://www.forbes.com/2009/09/21/clean-commutes-cities-lifestyle-america-public-transportation_slide_4.html) (A Forbes ranking of “America’s Cleanest Commutes” exults that “Portland proper boasts one of the most progressive mass transit systems in the country, including free fares in the city center.”); Sayeeda Warsi, *Where the Car is Not King*, BBC NEWS (Aug. 15, 2006), <http://news.bbc.co.uk/2/hi/programmes/newsnight/4794361.stm> (The BBC boasts that Portland has “what is undoubtedly one of the most integrated and dynamic public transport provisions anywhere in the world.”); *Portland Named 2<sup>nd</sup>-Most Bicycle Friendly City in the World*, TRAVEL OR. INDUSTRY BLOG (Dec. 5, 2007), [http://industryblog.travealoregon.com/international/portland\\_named\\_2nd.45most\\_bicyc.php](http://industryblog.travealoregon.com/international/portland_named_2nd.45most_bicyc.php).

<sup>3</sup> *Urban Growth Boundary*, OREGON METRO, <http://www.oregonmetro.gov/ugb> (last visited Apr. 4, 2012) (Portland has an urban growth boundary that encourages efficient land use within the urban area.); *Urban Development and Revitalization*, OREGON METRO, <http://www.oregonmetro.gov/index.cfm/go/by.web/id=26> (last visited Apr. 4, 2012) (The 2040 Growth Concept is a management policy that defines development in the metropolitan region through the year 2040. It encourages efficient land use, directing most development to existing urban centers and along existing major transportation corridors promotes a balanced transportation system within the region that accommodates a variety of transportation options such as bicycling, walking, driving and public transit, supports the

conservation,<sup>4</sup> and green construction.<sup>5</sup> In an era punctuated by the challenges of global climate change,<sup>6</sup> increasing energy demand,<sup>7</sup> and worldwide economic recession,<sup>8</sup> Portland has been a leader in the green building movement. Both the city of Portland and the state of Oregon have together instituted a number of innovative policy and market incentives for new green building construction and energy-efficient renovation of existing infrastructure. However, with the stagnant economy and some of these initiatives stopped,<sup>9</sup> stalled,<sup>10</sup> or reconsidered,<sup>11</sup> it is time to reflect on what has worked and propose some changes for the future.

Part II of this Article presents an overview of the green building movement and describes the features of green building, culminating in the development of various certification standards. Part III of this Article focuses on Portland's major legal, tax, and economic incentives that were so successful in promoting green construction in the past. The City of Portland program mandates that all public buildings comply with the Leadership in Energy and Environmental Design (LEED) standards. Portland also established a grant, loan, and technical assistance program to support green building, and has a proposal for a system of "carbon fees" and rebates designed to

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region's goal of building complete communities by providing jobs and shopping close to where people live).

<sup>4</sup> CITY OF PORTLAND OFFICE OF SUSTAINABLE DEVELOPMENT, PORTLAND RECYCLES! PLAN 4 (2008), available at <http://www.portlandonline.com/bps/index.cfm?c=46646&a=230043>.

<sup>5</sup> See discussion *infra* in Part III.B.

<sup>6</sup> Mara Baum, U.S. GREEN BLDG. COUNCIL, GREEN BUILDING RESEARCH FUNDING: AN ASSESSMENT OF CURRENT ACTIVITY IN THE UNITED STATES 1 (2007), available at <http://www.usgbc.org/ShowFile.aspx?DocumentID=2465> (building operations alone contribute over 38% of the U.S.'s carbon dioxide emissions).

<sup>7</sup> *Id.* (Green building is of vital importance to the environment since permanent buildings consume 40% of U.S. energy resources.); Eric Corey Freed, *Reduce Construction Waste in Your Home Remodel*, ECOMII, <http://www.ecomii.com/building/construction-waste> (last visited Mar. 1, 2012) (Waste from demolition construction and remodeling makes up at least 35% of all nonindustrial waste.).

<sup>8</sup> Banks and investment firms overleveraged in the subprime mortgage market helping to fuel job losses and reduced consumer spending. Joe Nocera & Edmund L. Andrews, *Struggling to Keep Up as the Crisis Raced On*, N.Y. TIMES, Oct. 22, 2008, available at <http://www.nytimes.com/2008/10/23/business/economy/23paulson.html>.

<sup>9</sup> See H.B. 3672 (OR. 2011), *infra* note 347.

<sup>10</sup> See TECHNICAL ADVISORY GROUP, *infra* note 226.

<sup>11</sup> See OREGON DEP'T OF ENERGY, *infra* note 340.

encourage maximum use of energy-efficient materials and design. Part III concludes with an assessment of the local initiatives and suggestions for the future. Part IV of the Article focuses on state initiatives that encourage green building, including the Business Energy Tax Credit (BETC), which has recently been sunsetted but was very successful in promoting energy efficient construction throughout the state. Central to this tax vehicle was its pass-through provision, which allowed property or project owners (even nonprofit organizations and public agencies) to transfer their tax credits to a pass-through partner or company in exchange for a lump-sum cash payment. Part IV concludes with an assessment of these state initiatives and suggestions for the future. Part V of this Article highlights the environmental, social, economic, and national security benefits of green building, as well as the economic and other challenges. Part VI of this Article concludes that while the Portland and Oregon green building initiatives have proved to be powerful forces for change in the green building movement in the past, new mandates and initiatives are needed if Portland wants to regain its leadership position and continue to foster green development in the future. The appendices feature various comparison charts and two Portland building case studies: River Campus One, a newly constructed LEED Platinum building, and the Jean Vollum Natural Capital Center, a LEED Gold retrofit of a historic building.

## II

### THE GREEN BUILDING MOVEMENT

#### A. Introduction

The term green building encompasses the design, construction, operation, and deconstruction phases of a building's life.<sup>12</sup> In general, green buildings conserve resources by using energy, water, and materials more efficiently during the entire life of the building, including the initial construction phase.<sup>13</sup> Green buildings utilize

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<sup>12</sup> According to the Environmental Protection Agency, "Green building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from siting to design, construction, operation, maintenance, renovation, and deconstruction." See DEFINITION OF GREEN BUILDING, ENVTL. PROT. AGENCY, <http://www.epa.gov/greenbuilding/pubs/about.htm> (last visited Apr. 4, 2012). Green buildings use water, energy, and resources efficiently; protect occupant health; and reduce waste, pollution, and environmental degradation. *Id.*

<sup>13</sup> See *LOHAS Dictionary*, Lifestyles for Health and Sustainability, <http://www.lohas.com/glossary.html#g> (last accessed Sept. 12, 2010) ("A green building is designed to

techniques, materials, and methods aimed at reducing the building's impact on the environment, while increasing the level of comfort, health, and productivity of its occupants.<sup>14</sup> The term green building may also refer to a sustainable or high performance building; these terms are often used interchangeably although differences do exist.<sup>15</sup> Currently, the green building and sustainable building philosophies are merging in what may best be described as a movement based upon "creating a healthy built environment based on ecologically sound principles" while considering the "entire life cycle of the built environment: planning, design, construction, operation, renovation, and retrofit."<sup>16</sup> Though such holistic thinking may appear revolutionary, in many ways it represents a return to the roots of building construction.

### ***B. Historical Perspective***

Buildings in the early twentieth century were often designed and built by the same person—the builder architect.<sup>17</sup> This generalist had the ability to understand the entire building from design through

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conserve resources and reduce negative impacts on the environment—whether it is energy, water, building materials or land. Compared to conventional construction, green buildings may use one or more renewable energy systems for heating and cooling, such as solar electric, solar hot water, geothermal, biomass or any combination of these.”)

<sup>14</sup> See Edna Sussman, *Reshaping Municipal and County Laws to Foster Green Building, Energy Efficiency, and Renewable Energy*, 16 N.Y.U. ENVTL. L.J. 1, 8 (2008).

<sup>15</sup> Green building is an attempt to develop, design, construct and operate buildings in a manner that reduces the use of natural resources and energy from fossil fuels, encourages recycling of construction materials and waste and ultimately develops land in a manner imagined to be less injurious to the natural landscape and community resources.

UJJVAL K. VYAS, GREEN, SUSTAINABLE OR HIGH PERFORMANCE? KNOWING THE DIFFERENCE AND MANAGING THE RISKS, 1 (Alberti Group, LLC 2007). Sustainable building considers the economic, environmental, and social aspects of building without concentrating on measurable and verifiable performance improvement. *Id.* High performance building focuses on measurable and verifiable benchmarked improvements in building performance. *Id.*

<sup>16</sup> Christopher D. Montez & Darren Olsen, *Legislative Update: The Leed™ Green Building Rating System and Related Legislation and Governmental Standards Concerning Sustainable Construction*, 25 CONSTR. L. 38, 38 (2005) (quoting Charles J. Kilbert, Proceedings of the 8th annual Public Interest Environmental Conference: Policy Instruments for a Sustainable Built Environment, 17 J. LAND USE & ENVTL. L. 379, 383 (Spring 2002).

<sup>17</sup> See GREENBUILDING.COM, <http://www.greenbuilding.com/greenHistory.html> (last visited Apr. 4, 2012) [hereinafter GREENBUILDING.COM].

construction, including lifetime operations. Many of these early buildings incorporated simple mechanical systems to heat, cool, and light buildings and passive technologies to control conditions such as ventilation and indoor air temperatures.<sup>18</sup> Beginning in the 1930s, however, new building technologies and materials began to transform city landscapes.<sup>19</sup> Structural steel, reflective glass, air conditioning, and low-wattage fluorescent lighting emerged as primary components, marking the beginning of a sad, regressive movement in architecture. Architects began to ignore environmental, health, and social effects of buildings and their occupants, and the increasing complexity of building technologies brought about specialization in professionals who, unlike the generalists, were not inclined to whole systems thinking.<sup>20</sup> These developments set the stage for the modern green building movement.

Some experts believe that the OPEC oil embargo in the 1970s accelerated the modern green building movement.<sup>21</sup> Suddenly, many Americans were concerned about finding more renewable sources of energy as they waited in long lines at the gas station. Others cite the start of the modern green building movement as a reaction to the prevalence of sick building syndrome in the 1960s and 1970s.<sup>22</sup> Regardless of the impetus, during the 1970s, a small group of forward-thinking architects, engineers, environmentalists, and ecologists, influenced by work in the field,<sup>23</sup> began to challenge traditional perspectives on building systems.<sup>24</sup> As this group discovered new technologies and building practices, the country's skyscrapers and

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<sup>18</sup> BUILDING DESIGN AND CONSTRUCTION: WHITE PAPER ON SUSTAINABILITY 4 (Nov. 2003), available at [www.usgbc.org/Docs/Resources/BDCWhitePaperR2.pdf](http://www.usgbc.org/Docs/Resources/BDCWhitePaperR2.pdf) [hereinafter WHITE PAPER] (Buildings such as the Rockefeller Center and the New York Times Building used the advantage of natural shade to control the temperatures and lighting inside their facilities.)

<sup>19</sup> *Id.*

<sup>20</sup> *Id.*

<sup>21</sup> GREENBUILDING.COM, *Welcome to Green Building.com* (2010), <http://www.greenbuilding.com/content/welcome-greenbuilding.com>.

<sup>22</sup> Stephen T. Del Percio, *The Skyscraper, Green Design, & the LEED Green Building Rating System: The Creation of Uniform Sustainable Standards for the 21<sup>st</sup> Century or the Perpetuation of an Architectural Fiction?* 28 ENVIRONS ENVTL. L. & POL'Y J. 117, 151 (2004).

<sup>23</sup> See generally JANE JACOBS, *THE DEATH AND LIFE OF GREAT AMERICAN CITIES* (1961); VICTOR OLGAY, *DESIGN WITH CLIMATE* (1963); RALPH KNOWLES, *FORM AND STABILITY* (1968); and RACHEL CARSON, *SILENT SPRING* (1962).

<sup>24</sup> See Del Percio, *supra* note 22, at 128.



buildings began to take on new shapes.<sup>25</sup> For example, in the late 1970s, California commissioned eight state buildings that were to be energy sensitive.<sup>26</sup> In 1973, the American Institute of Architects (AIA) formed the energy task force that later became known as the AIA Committee on the Environment. The AIA was credited with producing the AIA Environmental Resource Guide—the first assessment of building practices based on life cycle analysis.<sup>27</sup> In 1977, the federal government entered the arena and tasked the newly created Department of Energy to promote renewable energy to increase the country's energy security.<sup>28</sup>

In 1980, major building trade associations founded the Sustainable Buildings Industry Council (SBIC).<sup>29</sup> The 1980s also saw the development of new solar, water, and construction technologies internationally.<sup>30</sup> Near the end of the decade, the term sustainable development was first defined during the UN World Commission on Environment and Development.<sup>31</sup> Out of the Commission came the Brundtland Report,<sup>32</sup> which discussed the challenges associated with creating a sustainable environment on the international level.<sup>33</sup> The ideas of green building and sustainability soon trickled down to the local level. A few years later in 1991, Austin, Texas, was home to the first green building program in the United States with a local focus.<sup>34</sup>

The first major federal government project involving sustainable development was likely the Greening of the White House during the

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<sup>25</sup> *Id.*

<sup>26</sup> WHITE PAPER, *supra* note 18, at 4.

<sup>27</sup> Kira Gould, *AIA/COTE: A History Within a Movement*, AMERICAN INST. OF ARCHITECTS, <http://www.aia.org/practicing/groups/KC/AIAS077347> (last visited Mar. 1, 2012).

<sup>28</sup> *See Energy Efficiency*, DEP'T OF ENERGY, <http://energy.gov/science-innovation/energy-efficiency> (last visited Apr. 5, 2012) (The Department focuses on energy efficient technologies for buildings, transportation options, and power systems.).

<sup>29</sup> *About SBIC*, SUSTAINABLE INDUSTRIES BUS. COUNCIL, <http://www.sbicouncil.org/about> (last visited Apr. 5, 2012).

<sup>30</sup> *See GREENBUILDING.COM*, *supra* note 17.

<sup>31</sup> *See UNITED NATIONS, Report of the World Commission on Environment and Development: Our Common Future*, UN Doc A/42/427 (1987), available at <http://www.un-documents.net/wced-ocf.htm>.

<sup>32</sup> *See id.*

<sup>33</sup> *See id.*

<sup>34</sup> *See Del Percio, supra* note 22, at 130.

Clinton administration, which was announced on Earth Day 1993.<sup>35</sup> Soon thereafter President Clinton signed Executive Order 12852 to create the President's Council on Sustainable Development.<sup>36</sup> The Energy Star program was created in 1992 by the Environmental Protection Agency and the Department of Energy, initially as a voluntary labeling program.<sup>37</sup> The Energy Star Label is used on dozens of products (appliances, office equipment, lighting, electronics, etc.) to signify energy efficiency to individuals and companies shopping for new products. Today this program is probably one of the most well-known programs related to green building, especially among residential consumers.<sup>38</sup>

A turning point in the green building movement occurred in June 1993 at the World Congress of Architects in Chicago.<sup>39</sup> Six thousand architects signed the Declaration of Independence for a Sustainable Future, committing the signers to focus not only on sustainability when performing their responsibilities, but educating people about sustainable building practices. That same year the U.S. Green Building Council (USGBC) was founded.<sup>40</sup> Comprised initially of professionals from the construction industry and representatives from various federal agencies, the USGBC was established to promote green building technologies.<sup>41</sup> USGBC established a common language and measurable standards for the imprecise concept of green building.<sup>42</sup> In late 1998, the USGBC initiated a pilot project called LEED 1.0.<sup>43</sup> Thus began the adoption of uniform standards with a third-party certification process that was to transform the green building movement in the United States and abroad. To understand green

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<sup>35</sup> See Nicole Kilbert & Charles Kilbert, *Sustainable Development and the U.S. Green Building Movement: Profitable Development Projects Can Be Good for the Planet, Too*, 22 ADR PROBATE & PROP. 21, 23 (2008) (This initiative ultimately resulted in estimated savings of \$300,000 annually.).

<sup>36</sup> Exec. Order No. 12,852, 58 Fed. Reg. 35841 (1993).

<sup>37</sup> *History of Energy Star*, ENERGY STAR [http://www.energystar.gov/index.cfm?c=about.ab\\_history](http://www.energystar.gov/index.cfm?c=about.ab_history) (last visited Apr. 4, 2012).

<sup>38</sup> See WHITE PAPER, *supra* note 18, at 26.

<sup>39</sup> See *id.* at 7.

<sup>40</sup> See U.S. GREEN BLDG. COUNCIL, <http://www.usgbc.org> (last visited Apr. 4, 2012) [hereinafter USGBC].

<sup>41</sup> It was later expanded to include owners, designers, contractors and others included in the construction industry.

<sup>42</sup> See WHITE PAPER, *supra* note 18, at 6–7.

<sup>43</sup> *Id.* at 7.

building standards, both under LEED and other rating systems, it is necessary to understand the underlying principles of green building.

### ***C. Tenets of Green Building***

In general, green building incorporates the following features: site selection, design, use of environmentally friendly and sustainable materials, energy efficiency (including renewable energy and the use of passive elements), water conservation, indoor air quality, pollution and waste reduction, landscaping, and management and operations.<sup>44</sup> This section briefly discusses the main issues underlying each of these features and provides examples of these features in Portland buildings.

#### *1. Site Selection*

Site selection considerations center around minimizing the disruptive effects of construction and development on the natural environment. Minimizing such effects preserves land, open space, and natural habitat for future generations; and reduces the impact of development on biodiversity.<sup>45</sup> Selecting sites where disruptive effects are minimal also leads to decreased consumption of energy in the building process.

To minimize disruption of the natural environment, green building favors smart growth<sup>46</sup> over green-space-consuming urban sprawl. Smart growth encourages preservation, rehabilitation, and retrofitting of existing and historic buildings and the reuse of already developed land, including the redevelopment of blighted areas and brownfields.<sup>47</sup>

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<sup>44</sup> See generally Jason R. Busch, Rosemary A. Colliver & Janet F. Jacobs, *Tax and Financial Incentives for Green Building*, 30 L.A. LAW 15 (Jan. 2008).

<sup>45</sup> See Jordan Vana, *The First Precaution of Intelligent Tinkering: Biodiversity and the Case for a Conservation Tax Credit in Wisconsin*, 8 WIS. ENVTL. L.J. 73, 74 (2002) (Biodiversity (biological diversity) describes the variety and variability of genes, species, populations, and natural ecosystems.).

<sup>46</sup> See Chris J. Williams, *Do Smart Growth Policies Invite Regulatory Takings Challenges? A Survey of Smart Growth and Regulatory Takings in the Southeastern United States*, 55 ALA. L. REV. 895, 896 (2004) (Smart growth generally focuses on growth management, planned development, economic development, existing transportation, and facilities infrastructure, conservation of natural resources, and protection of the environment and open space.).

<sup>47</sup> Brownfields are property that may be contaminated with pollutants and other hazardous substances. See generally *Brownfields and Land Revitalization*, ENVTL. PROT. AGENCY, <http://epa.gov/brownfields/> (last visited Apr. 5, 2012); JOEL B. EISEN, *BROWNFIELDS DEVELOPMENT: FROM INDIVIDUAL SITES TO SMART GROWTH*, CHAPTER FIVE IN AGENDA FOR A SUSTAINABLE AMERICA (ELI Press 2009).

Increasing urban density by limiting lot sizes, encouraging vertical development and mixed-use buildings, and discouraging dedication of land to parking areas further curbs urban sprawl.

Selecting sites in close proximity to existing services and infrastructure also minimizes disruption of the natural environment. Because a major principle of green building is the reduction of energy consumption, selecting sites with access to adequate mass transportation and bike lanes is preferable. However, societal dependence on roads and highway systems must be considered; and, centering development where these systems already exist or can be built with minimal impact to the environment is preferred. In addition, close proximity to other services such as utilities, shopping, health care, educational institutions, and workplaces is important.

Site selection also involves evaluating the contours and quality of the land. Contours may impact building in several ways. For example, building into hillsides is more disruptive to the environment and requires additional resource consumption for excavation and foundational structures.<sup>48</sup> However, earth sheltering<sup>49</sup> is a green building alternative that reduces disruption of natural habitat, uses less material, and takes advantage of natural temperature control. Quality of the land for building involves drainage and irrigation issues and quality of the habitat. Diverse ecosystems and land that is habitat for threatened species must be protected.<sup>50</sup> Other considerations related to quality of the land as a building site include solar exposure, rainfall, and wind patterns.<sup>51</sup>

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<sup>48</sup> See EXPONENT, *Deep Excavation and Urban Construction*, [http://www.exponent.com/deep\\_excavation\\_urban\\_construction/](http://www.exponent.com/deep_excavation_urban_construction/) (last visited May 1, 2012).

<sup>49</sup> See *Keep Your Cool*, GREENHOMEBUILDING.COM, <http://www.greenhomebuilding.com/keepcool.htm> (last visited Apr. 5, 2012). Earth-sheltering (building into the earth) is a green building method that allows development of hillsides without excess site disruption while taking advantage of the earth's natural insulating quality. The earth heats and cools at a very slow rate compared to air. Building into the earth creates a thermal flywheel effect, protecting the building interior from large temperature fluctuations throughout the day. See *Keep Your Cool*, GREENHOMEBUILDING.COM, <http://www.greenhomebuilding.com/keepcool.htm> (last visited Mar. 1, 2012).

<sup>50</sup> See, e.g., Endangered Species Act, 16 U.S.C. § 1536(a)(2).

<sup>51</sup> See ELIZABETH WILHIDE, *ECO: THE ESSENTIAL SOURCEBOOK FOR ENVIRONMENTALLY FRIENDLY DESIGN AND DECORATION* 21 (Quadrille Publishing Ltd. 2002) (Maximizing solar exposure allows for maximum solar energy collection as well as passive solar benefits such as natural day lighting and passive heating and cooling; rainfall can be collected and used for irrigation, laundry and toilets; wind patterns provide natural cooling effects which reduce energy consumption.).



The Casey Condominiums<sup>52</sup> are the first high-rise condominiums in the United States to receive LEED Platinum certification. The condominiums exemplify several important site selection principles. The Casey is located in a renovated industrial area of downtown.<sup>53</sup> The condominiums are within walking distance of the city center, shops, restaurants and other services. Also, like most of Portland's LEED

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<sup>52</sup> Photo courtesy of Reid Haataja.

<sup>53</sup> See Kristin Dispenza *The Casey: A High-Rise Condominium Earns LEED-Platinum*, GREEN BLDG. ELEMENTS (May 20, 2008), <http://greenbuildingelements.com/2008/05/20/the-casey-a-high-rise-condominium-earns-leed-platinum/>. (The Casey is part of a development project that renovated five blocks of a formerly industrial area housing historic brewery buildings in Portland's Pearl District. The project has been recognized by the Sierra Club as one of the best neighborhood redevelopment projects in the United States.).

certified buildings, the condominiums are near public transportation lines.

## 2. Design

The design phase should be fully integrated to ensure that the interests of all stakeholders are aligned from the outset. This includes the incorporation of nearly all aspects of green building such as: siting, landscaping, materials, resource consumption, and pollution prevention. Integrated design is a multidisciplinary approach to building construction; owners, architects, engineers, and contractors work together on the project from the project's inception to create efficiency by identifying the needs and goals of the occupants and designing the building to meet those needs.<sup>54</sup> Integrated design brings together site, climate, structure, landscaping, and water and energy systems to create design synergies. For example, passive use of solar exposure reduces consumption of energy for lighting, improves indoor environmental quality, and reduces the need for cooling systems in warmer months.<sup>55</sup> Assembling a multidisciplinary team is essential; each team member has a particular area of knowledge and expertise and the collaborative process between team members results in the construction of the most efficient and sustainable building possible that meets the needs of its occupants.

The design process should ensure that resource consumption during the construction phase is minimized.<sup>56</sup> Reducing consumption of resources throughout the life of the building is also critical.<sup>57</sup> Green buildings aim for longevity through the use of durable materials and construction methods. Other design issues include ease of maintenance and repair, flexibility for retrofitting as green technologies change and improve, and ease of salvaging materials during the deconstruction phase.<sup>58</sup> Minimizing square footage per occupant may be the simplest

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<sup>54</sup> *The High Performance Portfolio: Integrated Design*, BETTER BRICKS, available at [http://betterbricks.com/track.aspx?link=graphics/assets/documents/BB\\_WinTactics\\_IntegratedDesign\\_v6.Pdf](http://betterbricks.com/track.aspx?link=graphics/assets/documents/BB_WinTactics_IntegratedDesign_v6.Pdf) (last visited Apr. 4, 2012).

<sup>55</sup> *See id.*

<sup>56</sup> "The construction industry consumes and incorporates nearly 40 percent of all raw material extracted from the earth." Theresa Laughlin Silver and Melissa A. Orien, *Climate Change is Heating Up the Construction Industry*, 28 CONSTR. LAW. 1, 2 (2008).

<sup>57</sup> Reduction of energy consumption throughout the life of the building can be achieved through building design, use of passive solar and natural ventilation, insulation and energy-efficient appliances and systems, all discussed *infra*.

<sup>58</sup> *See* WILHIDE, *supra* note 51, at 11.

way to reduce resource consumption both during the construction phase and throughout the life of the building.<sup>59</sup> Reduction of resource consumption during the construction phase is also achieved by considering industry-standard sizes of materials (such as lumber, drywall, and flooring) when determining room dimensions and layouts and placement of doors and windows. Designing buildings based upon standard sizes of materials further reduces construction waste caused by customizing cuts and scraps.<sup>60</sup>

Many design elements can reduce consumption of resources throughout the life of the building. Designing buildings to minimize open space (large open rooms with unused space and high ceilings) conserves energy and materials.<sup>61</sup> Thoughtful site orientation of a building can maximize passive solar heating, cross-ventilation, and rainwater collection, thereby ensuring reduced consumption of resources throughout the life of the building and minimizing the disruptive environmental impacts of building. Large roof overhangs in hot climates provide shade for cooling,<sup>62</sup> while in wet climates an overhang keeps rain off the building, reducing the risk of rot and the need for frequent repainting. Green landscape design incorporates vegetation to keep the building cool; for example, in moderate climates, use of deciduous trees allows for shading in the summer and allows light in during winter months.<sup>63</sup> Installing green roofs can cut down on land lost in construction, providing habitat for local species, absorption of carbon dioxide, and insulation.<sup>64</sup> Green roofs also provide space for urban agriculture and prevent stormwater runoff.<sup>65</sup>

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<sup>59</sup> Lower total square footage results in decreased energy demands for lighting, heating and cooling. See GREEN HOME BLDG., *Think Small*, <http://greenhomebuilding.com/small.htm> (last visited Mar. 1, 2012).

<sup>60</sup> It is estimated that approximately one-third of all landfill material comes from the construction industry. See Silver & Orien, *supra* note 56, at 1.

<sup>61</sup> See GREEN HOME BLDG., *supra* note 59.

<sup>62</sup> WILHIDE, *supra* note 51, at 27.

<sup>63</sup> See *Benefits of Green Landscaping in the Mid-Atlantic*, ENVTL. PROT. AGENCY, <http://www.epa.gov/reg3esd1/garden/benefits.htm> (go to last heading under "save energy" and they mention shade and deciduous trees) (last visited Apr. 16, 2012).

<sup>64</sup> See *Green Roofs*, CONSERVATION TECH., <http://www.conservationtechnology.com/greenroof.html> (last visited Mar. 1, 2012).

<sup>65</sup> *Ecoroof Portland*, PORTLAND BUREAU OF ENVTL. SERVS., [www.portlandonline.com/bes/index/cfm?c=44422](http://www.portlandonline.com/bes/index/cfm?c=44422). (Green roofs require additional structural support and waterproofing, therefore consume additional resources, but are still environmentally beneficial.)

All of these features and related benefits should be considered during the design phase.

Additional considerations in the design phase include providing storage, shower and locker facilities for bicycle commuters, efficient recycling systems, and rainwater collection systems. Design issues are extensive and the preceding discussion is not exhaustive. Goals of the owners and occupants should be clearly identified to guide the integrated design team and to ensure the green building goals are met.





The White Stag Block<sup>66</sup> is one of just a few renovations to be both listed on the National Register of Historic Places and LEED certified.<sup>67</sup> The integrated design team, including the developer, the architect and the future tenant (the University of Oregon) worked together to adhere to historic renovation and LEED standards while creating a space that would suit the University's needs.<sup>68</sup>

### 3. Materials

During the materials selection phase of the green building process, issues to consider include life cycle assessment (LCA)<sup>69</sup> and embodied energy, availability of local and sustainable materials, use of salvage and recycled-content materials, durability, and toxicity. Trade-offs are often involved when selecting building and finishing materials; for example, the most durable material may not be available locally. The goals of the occupants should be used as criteria when selecting among alternatives.<sup>70</sup>

LCA and embodied energy are tools often employed in green building when choosing among building material alternatives. LCA identifies and quantifies the environmental impact of a product from cradle-to-grave (if the product cannot be recycled or reused) or cradle-to-cradle (if recycling or reusing is possible).<sup>71</sup> In other words, it

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<sup>66</sup> Photo courtesy of Reid Haataja. The White Stag Block is comprised of three previously separate historic buildings. The renovation, completed in 2008, has received Gold certification. *The White Stag Block*, THE UNIV. OF OR., <http://pdx.uoregon.edu/leed/index.html> (last visited Mar. 1, 2012).

<sup>67</sup> See *University of Oregon White Stag Building*, INTERIORS AND SOURCES (Oct. 2008), <http://www.interiorsandsources.com/ArticleDetails/tabid/3339/ArticleID/6618/Default.aspx>.

<sup>68</sup> The building has a 10,000 gallon stormwater retention tank which collects storewater, treats it on site, and uses it to flush the buildings' toilets. See *id.*

<sup>69</sup> Life cycle assessment is defined by the EPA as

[a] technique to assess the environmental aspects and potential impacts associated with a product, process, or service, by: compiling an inventory of relevant energy and material inputs and environmental releases; evaluating the potential environmental impacts associated with identified inputs and releases; [and] interpreting the results to help you make a more informed decision.

See *Life Cycle Assessment*, ENVTL. PROT. AGENCY, <http://www.epa.gov/nrmrl/std/lca/lca.html> (last visited Apr. 4, 2012).

<sup>70</sup> See C.F. Reinhart, *Energy Efficient Solar Buildings* in THE FUTURE FOR RENEWABLE ENERGY 2: PROSPECTS AND DIRECTIONS, 82, 82 (James & Jones 2002).

<sup>71</sup> *Defining Life Cycle Assessment*, THE GLOBAL DEV. RESEARCH CTR., <http://www.gdrc.org/uem/lca/lca-define.html> (last visited Apr. 16, 2012).

identifies all of the environmental impacts from extraction and production, energy consumption, and environmental impacts during the life of the product through the final disposition at the end of its useful life.<sup>72</sup> Another cradle-to-grave analysis method is known as embodied energy, but it only considers the energy usage of the product and disregards its other environmental impacts. Embodied energy quantifies the energy used to produce and install building materials; the amount of energy consumed by the materials while in use; and the energy needed to disassemble, remove, and dispose of the materials.<sup>73</sup>

Salvage<sup>74</sup> and recycled materials should be selected whenever possible; salvaged materials are preferred because they require less energy to convert for reuse than recycled materials.<sup>75</sup> Further, use of salvage materials in new construction diverts demolition waste from landfills. Salvaging materials requires additional labor during construction and deconstruction phases; however, in the current economic climate, labor is plentiful while the earth's natural resources are inherently limited.

Recycled materials reduce the need to harvest virgin material from the earth. For example, recycled plastic lumber and wood-composite materials for decks, patios, and fences reduce demand for virgin lumber. Cellulose insulation, made from recycled cellulose fibers, is a green alternative to insulation made from synthetic materials.<sup>76</sup> Straw bale construction is yet another example of a green building material; straw is an agricultural waste product that can be recycled into a durable and structurally sound building material.<sup>77</sup>

When salvage and recycled materials are not an option, sustainable<sup>78</sup> building materials should be used whenever possible. The Forest Stewardship Council is an example of a nonprofit organization that certifies businesses that practice sustainable

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<sup>72</sup> See Silver & Orien, *supra* note 56, at 1.

<sup>73</sup> *Embodied Energy*, THE ARCHITECTURAL LEAGUE OF N.Y., <http://www.tenshadesofgreen.org/shade4.html> (last visited Mar. 1, 2012).

<sup>74</sup> Salvage materials are building materials that have been extracted from demolition and remodeling projects for reuse in construction.

<sup>75</sup> While recycled materials do not consume virgin raw materials, significant transportation and energy are often required to convert post-consumer waste into new products.

<sup>76</sup> See WILHIDE, *supra* note 51, at 28.

<sup>77</sup> *Id.* at 24.

<sup>78</sup> Sustainable building materials are materials that are capable of being consumed without compromising the needs of future generations.

forestry.<sup>79</sup> Procuring sustainable materials from local sources is best. Locally sourced materials benefit local economies, reduce energy consumption through decreased transportation, and allow consumers to verify sustainable methods used in the extraction of natural resources.

The durability of materials and components is another key factor to be considered during the materials selection phase. A building material or component that is more durable and can be refinished may be less environmentally harmful than a sustainable or local material that will need to be frequently replaced. Selecting durable products reduces the consumption of energy and raw materials and reduces the amount of waste sent to landfills. LCA can be employed to weigh the benefits and costs when selecting materials and components.

Green building promotes the use of nontoxic building and finishing materials, including low volatile organic compound (VOC)<sup>80</sup> paints, finishes, and carpets. The durability of these materials may be problematic, but the growth of the green building movement is leading to a growing number of producers of higher-quality, longer lasting low VOC materials, and environmentally-friendly finishing products.<sup>81</sup>

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<sup>79</sup> See *About Us*, FOREST STEWARDSHIP COUNCIL, [http://fscus.org/about\\_us](http://fscus.org/about_us) (last visited Apr. 4, 2012).

<sup>80</sup> V.O.C. (Volatile Organic Compounds) “are emitted as gasses from certain solids or liquids.” VOCs are emitted through many building materials, paints, finishes, strippers, etc., and may have long-term adverse health effects. See *An Introduction to Indoor Air Quality*, ENVTL. PROT. AGENCY, <http://epa.gov/iaq/voc.html> (last visited Mar. 2, 2012).

<sup>81</sup> *Id.*



The Jean Vollum Natural Capital Center (Ecotrust Building)<sup>82</sup> was the first historic restoration in the nation to receive LEED Gold certification.<sup>83</sup> The renovation featured extensive use of salvage and recycled materials, including rubber flooring made of recycled tires, support beams made of reclaimed wood, and salvaged doors. In

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<sup>82</sup> Photo courtesy of Ecotrust.

<sup>83</sup> *Jean Vollum Natural Capital Center Awarded LEED Gold Rating*, ECOTRUST, <http://www.ecotrust.org/ncc/leed.html> (last visited Mar. 2, 2012).

addition, all the structural steel in the building contains 97.5% recycled steel scraps.

#### 4. Energy Efficiency

Green buildings conserve energy throughout the life of the building as well as during the construction of the building.<sup>84</sup> In the construction phase, methods employing human energy are preferred to those requiring consumption of fossil fuels. Energy consumption for construction may be further reduced through modular design and construction methods<sup>85</sup> and the use of prefabricated components such as prehung doors and windows. Energy efficiency is primarily addressed in the design, materials selection, and operation phases of the building.

In the design phase, energy demands may be reduced by maximizing passive solar design techniques to provide for heating and cooling.<sup>86</sup> Buildings can be oriented and designed so as to obtain maximum daylight.<sup>87</sup> And shades, roller blinds, and roof overhangs can be installed to keep solar heat out during the hotter months. Designing for natural ventilation also moderates indoor temperatures without consuming energy as naturally occurring processes can be used to control indoor air temperatures.<sup>88</sup> Because heat rises, vents can shift air from ground floor kitchens to upstairs areas with indoor vents, and opening skylights and high windows can then be used to let the hot air out.<sup>89</sup> This process is known as the stack effect.<sup>90</sup> Energy consumption can also be reduced by designing heating and cooling systems with individual digitalized thermostats for each room or zone

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<sup>84</sup> See *Green Building: Basic Information*, ENVTL. PROT. AGENCY, <http://www.epa.gov/greenbuilding/pubs/about.htm> (last visited Apr. 4, 2012).

<sup>85</sup> Building modular units at a central location for installation on-site can provide economies of scale and reduce transportation costs and waste.

<sup>86</sup> Artificial lighting accounts for approximately one-third of electrical energy consumption in a building, but the use of an efficient lighting system may reduce this consumption by up to 70%. Reinhart, *supra* note 70, at 98.

<sup>87</sup> *Id.*

<sup>88</sup> Design buildings so that doors and windows allow cross-breeze to cool rooms in the hotter months; buildings can also be designed to benefit from the rising heat in cooler months. See WILHIDE, *supra* note 51, at 26–27.

<sup>89</sup> See *id.*

<sup>90</sup> See *The Stack Effect: When Buildings Act as Chimneys*, GREEN BUILDING ADVISOR.COM, <http://www.greenbuildingadvisor.com/stack-effect-when-buildings-act-chimneys> (last visited Apr. 4, 2012).

of a building. Additionally, utilizing a motion sensitive lighting system<sup>91</sup> further reduces energy consumption throughout the life of the building.<sup>92</sup> Finally, building designs should include high levels of tight-fitting insulation<sup>93</sup> and draft-proofing of doors and windows to minimize energy loss.

In the materials selection phase, materials, components, and systems that consume less energy, reduce energy demand, or produce energy should be selected. On-demand water heaters and low-energy appliances are two examples of components that conserve energy. To reduce energy demand, installation of double-glazed windows made of low-E glass is best.<sup>94</sup> Additionally, reflexive or white coatings on rooftops and building exteriors can reduce energy demand in hot climates by keeping heat out. And heavy floors and walls made of concrete, stone, or brick can further reduce energy demand since the heavy mass can absorb and retain heat for long periods of time and act as a storage radiator.<sup>95</sup> Furthermore, pipes should be wrapped to minimize heat loss and components that produce their own energy, such as solar water heaters and photovoltaics,<sup>96</sup> can be installed.

In the operations phase, all systems and components should be regularly monitored and maintained for maximum efficiency to reduce energy consumption.<sup>97</sup> Thermostats should be programmed for minimum and maximum temperature levels and timers can be installed so that heating and cooling systems are not in use when the building is unoccupied. Also designing a house that is conducive to work (when

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<sup>91</sup> Motion-sensitive lighting systems turn lights off if there is no activity in the room for a set period of time.

<sup>92</sup> See Reinhart, *supra* note 70, at 98.

<sup>93</sup> Green roofs may be installed to provide additional insulation.

<sup>94</sup> Double-glazed windows have two panes of glass; low-E glass is a low emissivity glass that has an insulating coating. Double-glazed windows made of low-E glass serve as a form of thermal insulation. See WILHIDE, *supra* note 51, at 31.

<sup>95</sup> Use of heavy material for walls and floors for temperature control is known as thermal mass. The same concept applies to cooling so the technique can be used in both hot and cold climates to control interior temperatures resulting in reduced energy consumption. Combining thermal mass with passive solar heating and cooling systems maximizes the beneficial effects of both energy reduction methods. See *Passive Solar Design—Thermal Mass*, CAL. ENERGY COMM'N, CONSUMER ENERGY CTR., <http://consumerenergycenter.org/home/construction/solardesign/thermal.html> (last visited Apr. 4, 2012).

<sup>96</sup> Photovoltaics are solar panels, which produce an electrical current when exposed to light. *Photovoltaic Definition*, CLEAN ENERGY IDEAS, [http://www.clean-energy-ideas.com/articles/photovoltaic\\_definition.html](http://www.clean-energy-ideas.com/articles/photovoltaic_definition.html) (last visited Mar. 2, 2012).

<sup>97</sup> R.S. MEANS COMPANY, GREEN BUILDING: PROJECT PLANNING AND COST ESTIMATING 11 (2011).

working at home is feasible) is important for energy efficiency because it reduces the need for commuting.<sup>98</sup>



The Casey Condominiums,<sup>99</sup> a LEED Platinum building, employs passive solar lighting, integrated lighting and shading control systems, and solar cells and collectors to make it 50% more energy efficient than required by the building code. In a typical commercial building, as much as half the electricity consumed is dedicated to lighting.<sup>100</sup>

##### 5. Water Conservation

Water consumption, like energy consumption, should be addressed during the design, materials selection, and operations phases.<sup>101</sup> In the

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<sup>98</sup> Alex Frangos, *The Green House of the Future*, WALL ST. J. R5 (Apr. 27, 2009), available at <http://online.wsj.com/article/SB124050414436548553.html> (advocating that toilets and washrooms be separate and that walls and furniture be on rollers to better utilize an otherwise small space).

<sup>99</sup> Photo courtesy of Reid Haataja.

<sup>100</sup> See DAVID OWEN, *GREEN METROPOLIS: WHY LIVING SMALLER, LIVING CLOSER, AND DRIVING LESS ARE THE KEYS TO SUSTAINABILITY* 249 (Penguin 2009) [hereinafter *METROPOLIS*].

<sup>101</sup> See Ethan Goffman, *Green Buildings: Conserving the Human Habitat* (2006), available at <http://www.csa.com/discoveryguides/green/review7.php>.

design phase, rainwater and greywater<sup>102</sup> collection systems should be incorporated into the building design. Additionally, native landscaping should also be incorporated into the design to further reduce water consumption.<sup>103</sup> In the materials selection phase, low-flow water fixtures and dual-flush toilets help reduce water consumption. Composting toilets may also be installed to reduce water consumption. And further water reduction may be accomplished by installing water efficient appliances such as washing machines and dishwashers. In the operations phase, plumbing systems should be regularly monitored to ensure efficiency and prevent water loss due to plumbing leaks. Timers can be installed on faucets and landscaping irrigation systems to avoid excess water consumption. And when possible, stored rainwater and greywater may be used for irrigation, toilets, and laundry.

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<sup>102</sup> Greywater refers to washwater from dishes, sinks, showers, and laundry. Carl Lindstrom, GREYWATER, <http://greywater.com> (last visited Mar. 2, 2012).

<sup>103</sup> Native landscaping requires less watering than landscaping utilizing nonnative plants and provides habitat for native species. See *Landscaping With Native Plants*, ENVTL. PROT. AGENCY, [http://www.epa.gov/greenacres/awards.html#Why\\_Native\\_Landscaping](http://www.epa.gov/greenacres/awards.html#Why_Native_Landscaping) (last visited Mar. 2, 2012).





A rainwater harvesting and treatment system at the White Stag Building<sup>104</sup> collects and treats stormwater, which is used for flushing toilets. This system reduces water usage by 86%.<sup>105</sup>

#### 6. Air Quality

Air quality issues address overall environmental concerns as well as the health and well-being of building occupants. Reducing or eliminating the use of toxic materials and products can improve indoor air quality. The use of natural lighting also increases indoor air quality and benefits building occupants<sup>106</sup> while reducing energy consumption. Additionally, regulating indoor temperatures with the use of natural ventilation rather than mechanical heating and cooling systems further improves indoor air quality.<sup>107</sup> Finally, increased use

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<sup>104</sup> Photo courtesy of Reid Haataja.

<sup>105</sup> See *Converging Histories: Restoring Portland's White Stag Block*, SUNDAY OREGONIAN, Supplement 5, Mar. 30, 2008.

<sup>106</sup> Natural lighting stimulates production of vitamin D, regulates hormones, and increases balance with the natural rhythm of the day. See WILHIDE, *supra* note 51, at 36.

<sup>107</sup> See *An Introduction to Indoor Air Quality (IAQ): Volatile Organic Compounds*, ENVTL. PROT. AGENCY, <http://www.epa.gov/iaq/voc2.html>.

of indoor vegetation provides cleaner air and beautifies the work and living environment.

### 7. *Pollution and Waste Management*

Many of the features already discussed inevitably lead to reduced pollution from the construction and operation phases of a building's lifetime. For example, reducing energy consumption through design and installation of efficient heating and cooling systems and the use of passive solar energy reduces air pollution. Similarly, the use of low VOC and nontoxic materials reduces pollution.<sup>108</sup> Construction waste is perhaps the most critical area in which pollution can be reduced without significant increased costs or technological development.<sup>109</sup> As construction waste accounts for nearly one-third of annual landfill material,<sup>110</sup> green building practices should require that all waste be sorted for reuse, recycling, and disposal. Green building rating systems and methods can mandate reduction of construction waste by limiting the amount of allowable waste to specific percentages of overall building materials used in the construction phase.<sup>111</sup>

Stormwater runoff is another significant source of pollution caused by development.<sup>112</sup> Installing native landscaping, green roofs, and permeable semi-paved surfaces can reduce stormwater runoff.<sup>113</sup> Contamination of stormwater runoff and groundwater can also be reduced by implementing organic pest management and landscaping techniques. Eliminating the use of toxic materials for building maintenance further protects water resources.

Waste reduction can be achieved by establishing strict recycling policies and creating recycling systems within the buildings themselves. Additionally, composting systems should be installed on-

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<sup>108</sup> See *Module 6: Air Pollutants and Control Techniques- Volatile Organic Compounds*, ENVTL. PROT. AGENCY, <http://www.epa.gov/apti/bces/module6/voc/control/control.htm> (last visited Mar. 26, 2012).

<sup>109</sup> Tom Napier, *Construction Waste Management*, WHOLE BLDG. DESIGN GUIDE, <http://wbdg.org/resources/cwmgmt.php> (last visited Apr. 4, 2012).

<sup>110</sup> See Silver & Orien, *supra* note 56, at 37.

<sup>111</sup> See discussion *infra* in Part II.D. and Appendix A, Chart 2.

<sup>112</sup> Stormwater runoff occurs when rain or snowmelt passes over impervious surfaces, picking up debris, chemicals, and other pollutants. Stormwater flows, untreated, directly into water bodies, contaminating water supplies. See *After the Storm*, ENVTL. PROT. AGENCY, <http://water.epa.gov/action/weatherchannel/stormwater.cfm> (last updated Jan. 2003).

<sup>113</sup> See R.S. MEANS COMPANY, *supra* note 97, at 10.

site. Composting food scraps and biodegradable materials diverts waste from landfills while providing organic fertilizer for landscaping.<sup>114</sup>



Green roofs serve a practical function by producing oxygen, reducing stormwater runoff, providing habitat for different bird and insect species, and can be aesthetically pleasing. The eco-roof at the

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<sup>114</sup> See *Compost System*, SUSTAINABLE RES., <http://compost.sustainablesources.com/> (last visited Apr. 4, 2012).

Burnside Rocket Building<sup>115</sup> produces organic vegetables that are eaten at the downstairs restaurant. When properly constructed, green roofs are more durable than conventional roofs because the vegetation reflects nearly all ultra-violet radiation back into space before it can deteriorate the roofing materials.<sup>116</sup>

### 8. Landscaping

In green building, landscaping issues provide both challenges and opportunities. Water consumption,<sup>117</sup> pollution from gas-powered lawn mowers, gardening tools, and the use of chemical gardening inputs<sup>118</sup> are the main environmental harms of conventional landscaping. A well-planned landscape design can provide many benefits, including beautification of the building, energy savings, cooling and cleaning of the air, and even food production.<sup>119</sup>

The harmful effects of conventional landscaping can be drastically reduced by adopting xeriscaping.<sup>120</sup> Xeriscaping principles—such as the use of native plants, efficient irrigation systems, and maintenance of nutrient-rich soil—reduce landscaping water consumption,<sup>121</sup> utilize compost created as part of the waste reduction system, improve the quality of the land, and eliminate the need for chemical fertilizers and pesticides. Xeriscaping also reduces pollution by discouraging the planting of turf, which is generally maintained with chemical inputs and gas-powered tools.

In the construction phase, preserving existing trees and vegetation can provide natural shading as well as protect the building from wind. When selecting new trees in the landscaping phase, deciduous trees can be used to provide shading in the summer while allowing light

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<sup>115</sup> Photo courtesy of Reid Haataja.

<sup>116</sup> MATT TUETH, FUNDAMENTALS OF SUSTAINABLE BUSINESS: A GUIDE FOR THE NEXT 10 YEARS 46 (2009).

<sup>117</sup> Over fifty percent of residential water consumption is attributed to watering of lawns and landscaping. *Xeriscape*, EARTHEASY, [http://www.eartheasy.com/grow\\_xeriscape.htm](http://www.eartheasy.com/grow_xeriscape.htm) (last visited Apr. 4, 2012) [hereinafter EARTHEASY].

<sup>118</sup> These include fertilizers as well as pesticides.

<sup>119</sup> See EARTHEASY, *supra* note 117.

<sup>120</sup> Xeriscaping benefits the environment by conserving water through improvement of soil quality (achieved through aeration of soil, composting, and mulching), use of native, drought-resistant plants, reducing amount of land planted with turf, and employing efficient irrigation systems. *See id.*

<sup>121</sup> Xeriscaping can reduce landscaping water consumption by fifty to seventy percent. Landscaping water consumption can also be reduced by using stormwater and greywater for irrigation. *See* EARTHEASY, *supra* note 117.

into the building in winter months. Paved surfaces should be minimized because they can contribute to stormwater runoff and create a negative heating effect.<sup>122</sup> When possible, paths made of hardy steppable or carpet plants, such as Elfin Thyme and Miniature Rush, should be installed in lieu of pavement. Urban gardens can be established on rooftops and open space; urban gardens provide all of the benefits of xeriscaping while also providing fresh, local food for building occupants.



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<sup>122</sup> See R.S. MEANS COMPANY, *supra* note 97, at 10.

The Portland Convention Center,<sup>123</sup> a LEED Silver building, demonstrates green building landscaping on a grand scale. The Convention Center employs a rain garden to divert contaminated stormwater from the city's sewer system.<sup>124</sup> The rain garden collects water from the Center's nine-acre rooftop and funnels it through a constructed waterfall into a garden of native grasses and vegetation.

### 9. *Management and Operations*

The management and operations phases extend throughout the life of the building.

Management issues generally involve monitoring, accountability, education, and promotion of green building principles.<sup>125</sup> Effective management includes monitoring and maintenance of green building systems and components to ensure maximum performance as well as accountability when systems fail to achieve target levels of performance. Building management plans should set clear goals for resource consumption, waste management, use of alternative transportation, and green building ideals in building operations. The management plan should also provide education to occupants on how to best utilize energy saving systems and methods, for example, how to maximize passive solar features. Management should be aware of developments in the green building field and be prepared to install new technologies when practical. Issuance of green leases to tenants is a significant concern for management. When leasing green building space to tenants, managers need to consider a variety of issues that conventional leases do not address. The majority of these issues pertain to tenant compliance with green building standards throughout the operations phase, such as ensuring that tenants do not remove the energy saving appliances in the building.<sup>126</sup>

Operations issues involve the day-to-day workings of the building. Operations policies should require performance of regularly scheduled

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<sup>123</sup> Photo courtesy of Reid Haataja.

<sup>124</sup> *Oregon Convention Center Rainwater Garden*, PORTLAND BUREAU OF ENVTL. SERVS., <http://www.portlandonline.com/bes/index.cfm?a=68703&c=36848> (last visited Mar. 2, 2012).

<sup>125</sup> For a thorough discussion of green lease issues, see Stuart D. Kaplow, *Does a Building Need a Green Lease?* 38 U. BALT. L. REV. 375, 2009.

<sup>126</sup> For example, the landlord could restrict water and energy consumption, could prevent certain property uses, not allow improvements or repairs without consent, restrict parking, monitor solid waste production, and even make the tenant purchase sustainable furniture. *See id.*

maintenance of building systems, energy-efficient temperature control methods, water conservation for routine building maintenance, use of nontoxic cleaning products and methods, sustainable landscaping practices, and water-conserving irrigation techniques. This list is not exhaustive and the goals of the building owners should serve as a guide for establishing operations policies.

#### ***D. Green Building Standards***

Green building evaluation standards now exist at the local, national, and international levels and incorporate many of the features discussed earlier.<sup>127</sup> These green building evaluation standards are generally similar in that they are all intended to: (1) guide the design, construction, and renovation of the building; (2) provide a uniform standard that assures that the building will have certain environmental benefits; and (3) utilize a holistic approach to promote integration of the total building systems.<sup>128</sup> The standards are also similar in the general types of building projects covered, the general assessment criteria, the type of point rating system, and the process for third-party evaluation that leads to certification.<sup>129</sup>

The standards differ in the category prerequisites, the specifics of the criteria, the emphasis or weight placed on the different factors,<sup>130</sup> and the specific implementation or certification process. These differences can be quite significant when examining different building types (schools, office buildings, homes, etc.), different stages in the building's life cycle (construction, renovation, operation, or demolition),<sup>131</sup> and different regions of the world.<sup>132</sup>

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<sup>127</sup> Kate Galbraith, *International Interest Grows in Green-Building Certification*, N.Y. TIMES, Mar. 7, 2012, available at [http://www.nytimes.com/2012/03/08/business/global/international-interest-grows-in-green-building-certification.html?\\_r=1&scp=1&sq=LEED%20building&st=cse](http://www.nytimes.com/2012/03/08/business/global/international-interest-grows-in-green-building-certification.html?_r=1&scp=1&sq=LEED%20building&st=cse); Peter White Lumpkin & Deborah Bovarnick Mastin, *Latest in Green Development: Advising Your Client on the New Standard for Real Estate Projects*, 85 FLA. B. J. 32 (2011).

<sup>128</sup> Galbraith *supra* note 127; Lumpkin & Mastin, *supra* note 127.

<sup>129</sup> See Appendix A, Chart 1.

<sup>130</sup> Environmental weighting occurs in all the standards. Certain subcategories may be considered more important from an environmental point of view. For example, energy performance of the building or use of on-site renewable energy would generally be weighted more than enhanced refrigerant management.

<sup>131</sup> For example, energy consumption may not be tracked on new buildings but are considered in retrofits. See Mireya Navarro, *Some Buildings Not Living Up to Green Label*, N.Y. TIMES, Aug. 30, 2009, at A8.

LEED (Leadership in Energy and Environmental Design) is the most popular rating system used in the United States.<sup>133</sup> The Green Globes system is also popular for smaller projects because it provides online guidance with an affordable third-party verification process.<sup>134</sup> Another standard less commonly used in the United States is the Building Research Establishment Energy and Environmental Assessment Model (BREEAM).<sup>135</sup> Some cities, such as Seattle,<sup>136</sup> and many countries, such as Canada, Australia, and Japan, have

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<sup>132</sup> See discussion of Japan, *infra* note 140, Australia *infra* note 139. Also note that cities, such as Boston, emphasize historical preservation as a criterion in their standards. BOSTON, MASS., ZONING CODE, art. 37, app. A (2007).

<sup>133</sup> See Benjamin Cryer, et al, *Evaluating the Diffusion of Green Building Projects*, (Mar. 2006), available at [http://personal.anderson.ucla.edu/charles.corbett/papers/diffusion\\_green\\_building.pdf](http://personal.anderson.ucla.edu/charles.corbett/papers/diffusion_green_building.pdf).

<sup>134</sup> See Peter Bardaglio, *To LEED or Not to LEED? TODAY'S CAMPUS* (last visited Apr. 4, 2012), available at <http://www.todayscampus.com/articles/load.aspx?art=1823>. [http://www.unepfi.org/fileadmin/documents/metrics\\_report\\_01.pdf](http://www.unepfi.org/fileadmin/documents/metrics_report_01.pdf); Nicole C. Kibert & Charles J. Kibert, *Sustainable Development and the U.S. Green Building Movement Profitable Development Projects Can Be Good for the Planet, Too*, in 22 A.B.A. Probate & Prop. 20 (March/April 2008). For a critique of Green Globes, see <http://forestethics.org/downloads/Green%20Globes%20Factsheet%201%2006.pdf>.

<sup>135</sup> Sarah Morrison, *Unstoppable! The Rise and Rise of Britain's Green Buildings*, INDEPENDENT, Mar. 18, 2012, available at <http://www.independent.co.uk/environment/green-living/unstoppable-the-rise-and-rise-of-britains-green-buildings-7576440.html>.

<sup>136</sup> Seattle has developed the Evergreen Sustainable Development Standard Criteria (ESDSC), which is required of all retrofits and new-building construction projects (typically low-income housing) that receive housing trust funding in the Washington State budget. WASH. REV. CODE § 39.35D.080 (2009). Any new construction project must then earn at least 50 points from the standard's Optional Criteria, while a retrofit must earn 40 points. *Evergreen Sustainable Development Criteria*, STATE OF WASH. DEP'T OF COMMERCE, <http://www.commerce.wa.gov/site/1027/default.aspx> (last updated Feb. 21, 2012). ESDSC features eight categories of criteria: (1) integrated design; (2) site location; (3) site improvements; (4) water conservation; (5) energy efficiency; (6) materials; (7) healthy living environment; and (8) operations and maintenance. Some criteria may apply only to one type of construction. See WASH STATE DEPT. OF CMTY. TRADE AND ECON. DEV., EVERGREEN STANDARD, VOL. 3 USER'S MANUAL, 4–56, available at <http://www.commerce.wa.gov/DesktopModules/CTEDPublications/CTEDPublicationsView.aspx?tabID=0&ItemID=9665&Mid=870&wversion=staging> (last visited Apr. 4, 2012). In addition to these mandated standards, Seattle has developed the SeaGreen Affordable Housing Guide to promote green building and sustainability. This very detailed guide has six chapters that run through various green building topics and provide an extensive checklist for builders who want to implement sustainable building practices. SEAGREEN: GREENING SEATTLE'S AFFORDABLE HOUSING, SEATTLE OFFICE OF HOUSING, CITY OF SEATTLE (2002), available at <http://www.seattle.gov/housing/SeaGreen/SeaGreen.pdf>. Other examples of cities that have their own standards include Boulder, Colorado; Livermore, California; Epping, New Hampshire; and Austin, Texas.



established their own standards.<sup>137</sup> Canada has a modified LEED.<sup>138</sup> Australia uses the Green Star program,<sup>139</sup> and Japan has the Comprehensive Assessment System for Building Environmental Efficiency (CASBEE) system.<sup>140</sup> All of these systems are similar to

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<sup>137</sup> These countries with standards include Brazil, China, Finland, France, Germany, Hong Kong, India, Italy, Malaysia, Mexico, Netherlands, New Zealand, Portugal, Russia, Singapore, South Africa, Spain, Switzerland, and the United Kingdom. Some countries do not follow any green standards. *See generally* Raymond J. Cole, *Shared Markets: Coexisting Building Environmental Assessment Methods*, 34 BLDG. RES. & INFO. (Special Issue) 357 (2006). *See also* Xue Gang & Yan Li, *An Overview of Green Building Rating Systems in the World*, Reports of the City Planning Institute of Japan, No.10 (Feb. 2012), available at [http://www.cpij.or.jp/com/ac/reports/10-4\\_205.pdf](http://www.cpij.or.jp/com/ac/reports/10-4_205.pdf).

<sup>138</sup> Canada initially developed BREEAM in 1996 and a Web-based version of Green Globes in 2004. *See* THOMAS E. GLAVINICH, *CONTRACTORS' GUIDE TO GREEN BLDG. CONSTR.* 25 (John Wiley & Sons, Inc. 2008) [hereinafter GREEN BUILDING BOOK]. The Canada Green Building Council (CGBC) also has its own LEED standard based on the one used in the United States. *Introduction to LEED*, CANADA GREEN BLDG. COUNCIL, <http://www.cagbc.orgAM/Template.cfm?Section=LEED> (last visited Apr. 4, 2012). Project categories are similar, but the points allocated to each differ from the U.S. version. *Green Building Rating System*, CANADA GREEN BLDG. COUNCIL, 8–10, available at [www.cagbc.org/.../LEED%20Canada\\_CI%20Rating%20System\\_English.pdf](http://www.cagbc.org/.../LEED%20Canada_CI%20Rating%20System_English.pdf) (last visited Apr. 4, 2012).

<sup>139</sup> *See Green Star Overview*, GREEN BLDG. COUNCIL AUSTRALIA, <http://www.gbca.org.au/green-star/green-star-overview/> (last visited Apr. 4, 2012). Projects can receive up to six stars under the Green Star rating system, but only buildings that achieve at least four stars will be certified. *Id.* Green Star uses a point system with 100 possible points. *Id.* A one star rating is 10 to 19 points; a two star is 20 to 29 points; a three star is 30 to 44 points. A four star is 45 to 59 points; a five star is 60 to 74; and a six star is 75 or more points. *Id.* To be eligible for certification a project must meet four provisions: space use, spatial differentiation, conditional requirements, and timing of certification. *See generally Green Star Eligibility Criteria*, GREEN BLDG. COUNCIL AUSTRALIA (May 21, 2010), <http://www.gbca.org.au/green-star/certification/green-star-eligibility-criteria/2982.htm>. The space use provision ensures that at least 80% of the project's area is able to be assessed by the rating tool. *Id.* Spatial differentiation focuses on making sure that the project is distinct from other projects so that it sends a notice to those around that this is a sustainable building. *Id.* The conditional requirement focuses on the fact that each rating tool has conditions that must be met for its use. *Id.* The nine criteria include management, indoor environmental quality, energy, transport, water, materials, land use and ecology, pollution, and innovation. An environmental weighting is applied to each category (except innovation), and weighting can vary by geographic location.

<sup>140</sup> *The Assessment Method Employed by CASBEE*, JAPAN GREENBUILD COUNCIL, <http://www.ibec.or.jp/CASBEE/english/methodE.htm> (last visited Apr. 4, 2012); Clare Lowe & Alfonso Ponce, *UNEP-FI/SBCI's Financial & Sustainability Metrics Report: An International Review of Sustainable Building Performance Indicators & Benchmarks*, [http://www.unepfi.org/fileadmin/documents/metrics\\_report\\_01.pdf](http://www.unepfi.org/fileadmin/documents/metrics_report_01.pdf). *See* Thomas Saunders, *BREAM, A Discussion Document Comparing International Environmental Assessment Methods for Buildings* (2008), available at [http://www.dgbc.nl/images/uploads/rapport\\_vergelijking.pdf](http://www.dgbc.nl/images/uploads/rapport_vergelijking.pdf) (last visited Apr. 4, 2012). Although the criteria include categories such as indoor and outdoor environments, energy, and materials, each of these categories has

the U.S. LEED and BREEAM ratings in that they have a certified point system for rating various sustainable features, as well as a mechanism for certifying the building. See Appendix A, Chart 1 for a comparison of the features of the various green building standards.

### *1. Leadership in Energy and Environmental Design (LEED)*

LEED has established standards for nine building project types: (1) New construction and major renovations; (2) core and shell renovation; (3) commercial interiors; (4) existing buildings upgrades, operations, and maintenance; (5) homes; (6) neighborhood development; (7) retail; (8) schools; and (9) healthcare.<sup>141</sup> Each project earns up to 100 total points towards one of four certification levels.<sup>142</sup> 40–49 points results in LEED certification; 50–59 points earns LEED Silver certification; 60–79 points earns LEED Gold certification; and 80 or more points earns LEED Platinum certification (based on the LEED rating system for New Construction).<sup>143</sup>

Points are earned for five environmental or basic design categories: (1) Sustainable Site (SS) (26 points); (2) Water Efficiency (WE) (10 points); (3) Energy and Atmosphere (EA) (35 points); (4) Materials and Resources (MR) (13 points); and (5) Indoor Environmental Quality (EQ) (15 points).<sup>144</sup> In addition, there is the Innovation

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layers of subcategories that are also weighted. *Id.* Credits are based upon quality and load reduction. *Id.* The quality credits are eventually divided by the load reduction credits, so the value of each credit cannot be determined until there is a final score. *Id.* This makes it impossible to determine the costs of attaining a certain level until an assessment is actually done. CASBEE has a few credits available that would rarely be used, except for buildings that are in areas that suffer from earthquakes and other natural disasters. A comparison study found that it was harder to compare CASBEE to LEED, Green Star, or BREEAM because it had more credits that do not have an equivalent in the other rating systems.

<sup>141</sup> USGBC, *USGBC: Rating Systems*, available at <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222>.

<sup>142</sup> *See id.* There are currently over twenty thousand LEED registered or certified projects in all 50 states and 91 countries around the world. Under the Existing Building and New Construction rating systems, there were 29 Silver in Portland, 79 Gold, and 30 Platinum. *See LEED Projects & Case Studies Directory*, USGBC, <http://www.usgbc.org/LEED/Project/CertifiedProjectList.aspx?CMSPageID=247> (last visited Apr. 4, 2012).

<sup>143</sup> *See LEED 2009 for New Construction and Major Renovations*, USGBC, <http://www.usgbc.org/ShowFile.aspx?DocumentID=5546> (last visited Mar. 3, 2012).

<sup>144</sup> *See* GLAVINICH, *supra* note 138, at 19. *See also* Benjamin S. Kingsley, *Making it Easy to be Green: Using Impact Fees to Encourage Green Building*, 83 N.Y.U. L. REV. 532, 535 (2008). The Architecture 2030 Challenge has asked the global architecture and building community to adopt a set of energy efficiency targets that include the goal of making all new buildings, developments and major renovations carbon neutral by the year 2030. *See* ARCHITECTURE 2030, *The 2030 Challenge*, <http://www.architecture2030.org>

category (6 points) and also the Regional Priority category (1–4 points), giving the builder and owner room to have interesting design or other features that can promote green technologies and practices.<sup>145</sup> Each category has specific subcategories. There are also some category prerequisites,<sup>146</sup> requiring the owner to meet minimum standards before points can be earned. For a list of the subcategories under the six criteria, see Appendix A, Chart 2.

## 2. *Green Globes Rating System*

Green Globes is an interactive web-based system that is used in both the United States and Canada.<sup>147</sup> Green Globes can either be used as a self-assessment tool independent of the costly verification and certification structures of LEED and BREEAM, or owners can pursue certification using the Green Globes rating system.<sup>148</sup> The self-assessment system provides the project team with feedback on how the project is meeting, or can better meet, the Green Globe standards.

The projects covered are similar to LEED and BREEAM and include updates to existing commercial and residential buildings, management and operation of existing buildings, building emergency management, and new construction.<sup>149</sup> The Green Globes system allows for a total of 1000 possible points, and each project earns points that are then converted to a percentage of the total points possible.<sup>150</sup> In total percentages the ratings are: 1 Globe (35–54%), 2 Globes (55–69%), 3 Globes (70–84%), and 4 Globes (85–100%). In addition to the numerical ratings, Green Globes also provides a

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/2030\_challenge/index.html (last visited Mar. 3, 2009). The American Institute of Architects, the USGBC, and the American Conference of Mayors, among many other organizations and municipalities have adopted the 2030 Challenge.

<sup>145</sup> See GLAVINICH, *supra* note 138, at 21.

<sup>146</sup> For example, SS requires Construction Activity Pollution Prevention; EA requires Fundamental Commissioning Of the Building & Energy Systems, and Fundamental Refrigerant Management; MR requires Storage & Collection Of Recyclables; and EQ requires both Minimum IAG Performance and Environmental Tobacco Smoke Control. See GLAVINICH, *supra* note 138, at 20–21.

<sup>147</sup> GREEN GLOBES INITIATIVE, *Green Globes FAQ*, <http://www.thegbi.org/commercial/green-globes/faq.asp> (last visited Apr. 16, 2012).

<sup>148</sup> *Id.*

<sup>149</sup> See GREEN BLDG. INITIATIVE, *Green Globes*, <http://www.thegbi.org/green-globes/> (last visited Apr. 4, 2012).

<sup>150</sup> GREEN GLOBES, *Green Globes Ratings*, <http://www.greenglobes.com/about-faq.asp> (last visited Apr. 17, 2012).

qualitative description of the significance of the rating earned by the building.<sup>151</sup>

Points are earned for seven criteria: (1) Project Management (50 points or 5%); (2) Site (115 points or 11.5%); (3) Energy (360 points or 36%); (4) Water (100 points or 10%); (5) Resources, Building Materials, and Solid Waste (100 points or 10%); (6) Emissions and Other Impacts (75 points or 7.5%); and (7) Indoor Environment (200 points or 20%).<sup>152</sup> These criteria are very similar to LEED and BREEAM, covering the entire life cycle of the building from site selection to demolition. However, there is no category for Innovation. Also, the weighting of the criteria and the subcategories are slightly different. See Appendix A, Chart 3.

### *3. Building Research Establishment Energy and Environmental Assessment Model (BREEAM)*

The other standard commonly used in the U.S. building industry is BREEAM. BREEAM was initially developed in the United Kingdom as a voluntary green building rating system.<sup>153</sup> Like LEED, there are different BREEAM criteria depending on the type and use of building project: courts, education, industrial, health care, offices, retail, prisons, and multi-residential.<sup>154</sup> BREEAM uses five rating certification categories—pass, good, very good, excellent, and outstanding—with each level having some minimum requirements.<sup>155</sup> Also like LEED, BREEAM uses a point system, with 100 total possible points. BREEAM requires 30 to 44 points to pass; 45 to 54

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<sup>151</sup> In the order of least significance to most significance: “Demonstrates movement beyond awareness and commitment to sound energy and environmental design practices by demonstrating good progress in reducing environmental impacts,” “Demonstrates excellent progress in achieving ecoefficiency results through current best practices in energy and environmental design.” “Demonstrates leadership in energy and environmental design practices and a commitment to continuous improvement and industry leadership,” and “[r]eserved for select building designs that serve as national or world leaders.” GLAVINICH, *supra* note 138, at 28. See also <http://www.thegbi.org/commercial/about-green-globes/green-globes-ratings.asp> (last visited Apr. 4, 2012).

<sup>152</sup> ECD ENERGY & ENVIRONMENT CANADA LTD., GREEN GLOBES DESIGN FOR NEW BUILDINGS AND RETROFITS 4 (2004), available at <http://www.greenglobes.com/design/Green-Globes-Design-Summary.pdf>.

<sup>153</sup> Karim Elgendy, *Comparing Estidma's Pearls Rating System to LEED and BREEAM*, CARBOUN (Apr. 17, 2010), <http://www.carboun.com/sustainable-development/sustainable-design/comparing-estidama%E2%80%99s-pearls-rating-method-to-leed-and-breeam/>.

<sup>154</sup> *BRE Environmental Assessment Method*, BREEAM ASSESSOR MANUALS, <http://www.breeam.org/page.jsp?id=109> (last visited Apr. 4, 2012).

<sup>155</sup> *Id.* at 31.

for a good certification; 55 to 69 for a very good certification; 70 to 84 for an excellent certification; and 85 or more for an outstanding rating.<sup>156</sup>

Points are earned for the following categories: (1) Management (12 points); (2) Materials (12.5 points); (3) Energy (19 points); (4) Water (6 points); (5) Pollution (10 points); (6) Waste (7.5 points); (7) Health and Well-being (15 points); (8) Land Use and Ecology (10 points); and (9) Transportation (8 points).<sup>157</sup> On top of these 100 points, an additional ten points can be earned under the Innovation category.<sup>158</sup> There are three possible ways to earn innovation points, including (1) meeting the exemplary criteria for certain BREEAM issues; (2) having a project with specific targets and objectives that involved a BREEAM professional; or (3) applying to have a certain building feature certified as exemplary.<sup>159</sup> See Appendix A, Chart 4 for various subcategories under each of the criteria.

#### 4. Assessing Green Building Standards

Green building standards are valuable in that they provide minimum standards for sustainable building practices as well as a mechanism for evaluation and certification. In the United States, LEED has raised awareness of the benefits of green building to the building industry, the public, and policy makers. Awarding points for innovation has encouraged technological change and new design features within the industry.<sup>160</sup> LEED has “prompted the upgrading of building codes in parts of the country, has increased awareness of the possibility of recycling many kinds of demolition and construction waste, and has helped raise manufacturing standards for building components.”<sup>161</sup> Lastly, these standards are constantly being revised to include important new features, to change the weights of the

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<sup>156</sup> *Bream Assessments*, FAITHFUL GOULD, [www.fgould.com/uk/construction-consulting-services/sustainability\\_services/breem-assessment](http://www.fgould.com/uk/construction-consulting-services/sustainability_services/breem-assessment) (last visited Apr. 16, 2012); see Thomas Saunders, *A Discussion Document Comparing International Environmental Assessment Methods for Buildings*, BREAM, 35 (2008), available at [http://www.dgbc.nl/images/uploads/rapport\\_vergelijking.pdf](http://www.dgbc.nl/images/uploads/rapport_vergelijking.pdf).

<sup>157</sup> Saunders, *supra* note 156, at 11.

<sup>158</sup> *Id.* at 36.

<sup>159</sup> *Id.*

<sup>160</sup> See U.S. Green Building Council’s Innovation in Design Credit Catalog (Mar. 2008), <http://www.usgbc.org/ShowFile.aspx?DocumentID=3569> (last visited May 1, 2012).

<sup>161</sup> See METROPOLIS, *supra* note 100, at 22.

subcategories, and to help ensure that the buildings are efficient and nonpolluting.<sup>162</sup>

Nevertheless, criticisms have been voiced about these green building standards.<sup>163</sup> Perhaps the biggest complaint is that LEED can be costly.<sup>164</sup> In addition to the certification fee, there are fees for the administration of the process and documentation of LEED credits. Another serious criticism is that building performance is not tracked and the models used in the energy assessments are inexact.<sup>165</sup> Others have said that LEED favors “complex solutions over common sense.”<sup>166</sup> Also, green building standards have been criticized for potentially increasing liability “for emerging technologies and performance promises.”<sup>167</sup> Lastly, these standards are voluntary. Except for Seattle, which provides for mandates, none of the national or international standards provide any financial incentives for incorporating green elements into a building. Yet, for the long-term sustainability of green construction, these standards should be mandated, used as a guide for the imposition of environmental taxes, or subsidized in grant or loan programs or tax initiatives. The case of Portland, Oregon, illustrates how local and state governments can use LEED standards in their mandates, grants, subsidized loans, environmental taxes, and tax incentives to encourage green building.

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<sup>162</sup> *Id.*

<sup>163</sup> See Del Percio, *supra* note 22, at 148 (stating that LEED guidelines merely serve as a “laundry list of green elements which do not refer to each other or provide substantial guidance as to how the proven empirical benefits are to be achieved”).

<sup>164</sup> See *discussion infra* Part VI.B.1.

<sup>165</sup> See Navarro, *supra* note 131, at 26 (asserting that building performance is not tracked and that energy assessments models are inexact). Citing a 2008 study last year of 121 new buildings certified through 2006 where more than half—53%—did not qualify for the EPA’s Energy Star label. In addition, many used more energy per square foot than at least 70% of comparable buildings. *Id.*

<sup>166</sup> See METROPOLIS, *supra* note 100, at 231. See also Peter White Lumpkin & Deborah Bovarnick Mastin, *Latest in Green Development: Advising Your Client on the New Standard for Real Estate Projects*, 85 FLA. B. J. 32 (2011), <http://www.economist.com/node/15819127> (public housing LEED in NYC and other U.S. cities).

<sup>167</sup> See Kibert and Kibert, *supra* note 134.

### III THE GREEN BUILDING MOVEMENT IN PORTLAND

#### A. Introduction

Portland is a national leader in the green building movement,<sup>168</sup> a distinction stemming from the confluence of initiatives implemented on the local, state, and federal levels. Portland is currently at a crossroads. With the economic downturn the grants have stopped, the feebate proposal has stalled, and the mandates have not been implemented because of exceptions.<sup>169</sup> This part of the Article describes the features of the policies that have spurred past sustainable development in Portland. It concludes with a critical analysis including suggestions for future directions for new mandates and market incentives.

#### B. Local Initiatives

The City of Portland has been active in the sustainability and green building movements for more than twenty years.<sup>170</sup> These movements have helped further the city's long-term land planning goals, which have been in place since the State of Oregon enacted its statewide land use planning legislation.<sup>171</sup> It was not by happenstance that Portland became a leader in the green building movement; city leaders and volunteer city residents, prompted by the threat of global warming, worked together to create a green building initiative.<sup>172</sup> Mandates and grants have been instrumental in Portland's green building accomplishments.<sup>173</sup> The local building code has been amended to promote several green building practices.<sup>174</sup> Portland continues to set stricter green building standards for construction and is currently developing new economic incentives to expand green building

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<sup>168</sup> See SUSTAINLANE *supra* note 1.

<sup>169</sup> See discussion of feebate *infra* Part III.B.5. All private buildings are exempted from the mandates. See discussion *infra* Part III.B.2.

<sup>170</sup> See discussion *infra* Part III.B.1. (history section).

<sup>171</sup> See Terry D. Morgan, *Statewide Land Use Planning in Oregon with Special Emphasis on Housing Issues*, 11 URB. LAW 1 (1979). Oregon's Land Use Planning Program, enacted in 1973, created a comprehensive state system, which requires that local governments' land use ordinances comply with statewide goals.

<sup>172</sup> See discussion *infra* Part III.B.5.

<sup>173</sup> See discussion *infra* Part III.B.2. for mandates and Part III.B.4. for grants.

<sup>174</sup> See discussion *infra* Part III.B.2.b.

throughout the city.<sup>175</sup> The following section examines the historical implementation of Portland's green building policies and discusses the future of green building policies in Portland, including the city's proposal for an innovative feebate system.

### 1. History

Portland took its first step toward becoming the greenest major urban area in the United States when it adopted its 1979 energy policy; its two main goals were to collect data regarding the city's energy consumption and to establish a residential weatherization program aimed at reducing that energy consumption.<sup>176</sup> In 1990, Portland expanded its energy policy, emphasizing sustainable practices and setting a goal to increase energy efficiency by ten percent.<sup>177</sup> In 1993, the city took another step on its path to green leadership when it passed its carbon dioxide reduction strategy, becoming the first U.S. city to adopt a local policy to reduce carbon dioxide emissions.<sup>178</sup> The following year, the Sustainable Portland Commission, a multi-disciplinary volunteer citizen group, was created to inform the City Council on sustainable development.<sup>179</sup> The Sustainable Portland

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<sup>175</sup> See generally PROPOSED HPGBP, *infra* note 188 at 2. See also *Green Building Policy Program Guidelines*, PORTLAND DEV. COMM'N, 2, available at <http://www.portlandonline.com/shared/cfm/image.cfm?id=112680>.

<sup>176</sup> See CITY OF PORTLAND BUREAU OF PLANNING AND SUSTAINABILITY, LEADERSHIP FOR ENERGY EFFICIENCY AND RENEWABLE POWER, <http://www.portlandonline.com/bps/index.cfm?a=116779&c=41462> (last visited Apr. 4, 2012). The 1990 Energy Policy included 89 objectives in areas such as City operations, energy efficiency in residential, commercial and industrial facilities, transportation and energy supply. *Id.* The 1990 Energy Policy also established the City Energy Challenge, a challenge that involved drastically cutting energy bills for the city's internal buildings and facilities. *Id.* As of 2000, over 90% of the city's 1990 objectives had been achieved. *Id.*

<sup>177</sup> See *id.*

<sup>178</sup> See CITY OF PORTLAND, CARBON DIOXIDE REDUCTION STRATEGY UPDATE, 1 (1997), available at <http://www.portlandonline.com/bps/index.cfm?a=112112&c=41917>. Portland's 1993 Carbon Dioxide Reduction Strategy set a goal to reduce the City's carbon dioxide emissions to twenty percent below 1990 levels by 2010. The Strategy included objectives in the areas of energy efficiency, recycling, renewable resources, transportation, tree planting, and influencing federal policy. As of 2007, despite rapid population growth, the City had reduced its carbon dioxide emissions by one percent. While this reduction may seem insignificant, when compared to the national average change in emissions levels during this same time period (increased by seventeen percent), Portland is making progress. See CITY OF PORTLAND, CLIMATE ACTION PLAN 2009, available at <http://www.portlandonline.com/bps/index.cfm?c=49989&a=268612> (last visited Feb. 15, 2012).

<sup>179</sup> See *Green Building Program History*, CITY OF PORTLAND BUREAU OF PLANNING AND SUSTAINABILITY, <http://www.portlandonline.com/bps/index.cfm?c=42133&> (last visited Apr. 4, 2012) [hereinafter *BPS Green Building*].



Commission subsequently commissioned the Green Building Steering Committee to explore opportunities to expand green building in the city.<sup>180</sup>

In 2000, Portland Commissioner Dan Saltzman created a Green Building Division within the city's Office of Sustainable Development (OSD),<sup>181</sup> wrote the city's first Green Building Policy,<sup>182</sup> and established a Green Investment Fund;<sup>183</sup> and thus, Portland's Green Building Program was born.<sup>184</sup> In addition to establishing green building policies in the form of mandates and providing access to financial resources in the form of grants and subsidized loans, the Green Building Program acts as a resource for Portland residents by providing technical assistance, educational outreach, and demonstration projects.<sup>185</sup>

Since the creation of the Green Building Program, Portland has been successful in adopting policies that mandate specified levels of performance for city-owned buildings and buildings constructed with Portland Development Commission funding.<sup>186</sup> However, Portland continues to seek new ways to increase green building within its community. In March 2007, the City Council directed OSD to identify options for improving environmental performance in all buildings—commercial and residential, new construction and existing.<sup>187</sup> That same spring, the Portland Developmental Review Advisory Committee (DRAC) formed a subcommittee to explore options for

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<sup>180</sup> Two documents were produced by the Green Building Steering Committee: the *Green Building Options Study* (exploring “strategies to standardize green building”), and the *Green Building Initiative* (creating “a two-year action plan to expand market demand and make green building practices easier to implement in Portland.”). CITY OF PORTLAND ENERGY OFFICE, *Green Building Options Study* (Aug. 1999), available at <http://www.portlandonline.com/shared/cfm/image.cfm?id=121163>; SUSTAINABLE PORTLAND COMM'N, *Green Building Initiative* (Dec. 2009), available at <http://portlandonline.com/shared/cfm/image/cfm?id=121164>.

<sup>181</sup> In 2009, the Office of Sustainable Development merged with the Bureau of Planning to create the Office of Planning and Sustainability. *BPS Green Building*, *supra* note 179.

<sup>182</sup> *Id.*

<sup>183</sup> *Id.*

<sup>184</sup> *Id.*

<sup>185</sup> *Id.*

<sup>186</sup> See discussion *infra* Part III.B.2.

<sup>187</sup> Portland City Council Res. 36488 directs OSD to develop policy options to reduce oil and natural gas use and carbon dioxide emissions from buildings. Portland, Or., Res. No. 36488 (2007), available at <http://www.portlandonline.com/bps/index.cfm?a=150163&c=42894>.

expanding sustainable development practices, and the City Council passed a resolution directing the Portland Development Commission to increase green building standards in the affordable housing realm.<sup>188</sup> In 2008, the Technical Advisory Group was created to make recommendations for local amendments to the state building code that the Portland City Council could propose to the State Building Codes Division.<sup>189</sup> In January 2009, Portland announced the Portland Energy Efficient Home Pilot (PEEHP) grant program, intended to encourage building energy efficient one and two-family residences by providing information regarding costs and benefits of building above energy performance requirements.<sup>190</sup>

Portland's commitment to the development and expansion of green building is clear. In 2008, Portland had more LEED certified buildings than any other city in the United States.<sup>191</sup> Much of the success Portland has experienced can be attributed to mandates including growth boundary restrictions and local code regulations, technical assistance, and grants through the Green Investment Fund.<sup>192</sup>

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<sup>188</sup> CITY OF PORTLAND, OFFICE OF SUSTAINABLE DEV., CITY OF PORTLAND PROPOSES HIGH PERFORMANCE GREEN BUILDING POLICY 4 (2008), available at <http://www.portlandonline.com/bps/index.cfm?c=45879&a=220879> [hereinafter PROPOSED HPGBP].

<sup>189</sup> See *id.* In July 2009, the process to create a local code amendment was temporarily suspended. See *Green Building Local Code Amendment*, CITY OF PORTLAND, BUREAU OF DEV. SERVS., <http://www.portlandonline.com/bds/index.cfm?c=46751> (last visited Apr. 4, 2012).

<sup>190</sup> See *Portland Energy Efficient Home Pilot*, CITY OF PORTLAND, BUREAU OF DEV. SERVS., <http://www.portlandonline.com/bds/index.cfm?c=49556> (last visited Apr. 4, 2012).

<sup>191</sup> Portland has also been successful in reducing its carbon emissions. See *Green Building*, SUSTAINLANE, <http://www.sustainlane.com/us-city-rankings/categories/green-building> (last visited Apr. 4, 2012). This study compared the sustainability of the 50 most populous cities in the country, comparing them based on several criteria, including Green Building, which was measured by the number of LEED certified buildings. *Id.* The methodology used counted all LEED buildings in a city, weighted certified buildings more than registered buildings, and gave extra weight to buildings with higher LEED certification levels. Portland was ranked number one for both overall sustainability and Green Building. *Id.*

<sup>192</sup> See CITY OF PORTLAND, BUREAU OF PLANNING AND SUSTAINABILITY, *Green Investment Fund*, <http://www.portlandonline.com/bps/index.cfm?c=42134> (last visited Apr. 4, 2012). Unfortunately, the Green Investment Fund stopped its grant program. Portland's success is also attributable to state and federal initiatives. Oregon, like Portland, has had a long history of supporting sustainable development. See discussion *infra* Part III. The federal government also has a number of federal income tax benefits for green building. IRC Section 179D allows a deduction for the cost of certain energy-efficient commercial buildings placed in service by December 31, 2013. These include the cost of depreciable interior lighting systems; depreciable heating, cooling, ventilation, and hot water systems; and depreciable building envelope. The deduction is limited to \$1.60 per foot for buildings meeting a 50% certification standard and is aggregated from prior years. 26 U.S.C.

Education, assistance, and community involvement have all been critical to the success of the city's green building movement. The future of the city's Green Building Program currently lies largely with consensual incentives in the proposed High Performance Green Building Policy and the EcoDistricts Initiative.

## 2. Mandates

In 2001, following the creation of the OSD Green Building Program, Portland adopted a policy mandating that all new city-owned buildings achieve the U.S. Green Building Council's LEED Silver certification.<sup>193</sup> In 2005, the city raised the standard, requiring that all new city-owned buildings achieve LEED Gold certification.<sup>194</sup> This revision also added requirements concerning energy performance, stormwater management, water conservation, roof installation and construction, and demolition waste.<sup>195</sup> As a result of these mandates, Portland now has eleven public LEED-certified buildings.<sup>196</sup>

In addition to Portland's mandates for new city-owned buildings, the Portland Development Commission (PDC)<sup>197</sup> adopted a policy

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§179(D)(b). If the building fails to meet the standard, the maximum deduction is \$0.60 per square foot. *Id.* Section 48 of the Code allows for an income tax credit equal to 30% of the cost of any equipment to generate electricity from solar energy that is placed in service before December 31, 2016. 26 U.S.C. § 48. Pursuant to the American Recovery and Reinvestment Act of 2009, the owner of a qualifying renewable energy facility can elect to receive a cash grant in lieu of tax credits. The amount of the grant is generally 30% of the cost of equipment used to generate electricity from the renewable resources and is available even if the owner of the facility does not have sufficient tax liability to use the credit. Pub. L. No. § 111-5, Div. B, Title 1 § 1121. This provision applies to equipment placed in service in 2009 and 2010 and the amount of the grant is not included in the recipient's taxable income. *Id.* § 1104. First year 50% bonus depreciation under § 169 and accelerated depreciation for renewable energy property under § 168(e)(3)(B)(vi) may also be available.

<sup>193</sup> CITY OF PORTLAND, EXHIBIT A: CITY OF PORTLAND GREEN BUILDING POLICY 3 (2001), available at <http://www.portlandonline.com/bps/index.cfm?c=50447&a=211352>.

<sup>194</sup> Council of the City of Portland, *Green Building Resolution*, PORTLAND ONLINE (2005), <http://www.portlandonline.com/bps/index.cfm?c=50447&a=112681> (last visited May 1, 2012).

<sup>195</sup> *Id.*

<sup>196</sup> See *LEED Projects & Case Studies Directory*, U.S. GREEN BLDG. COUNCIL, <http://www.usgbc.org/LEED/Project/CertifiedProjectList.aspx> (last visited Apr. 4, 2012). Oregon has 73 LEED certified buildings, second only to Chicago with 88 green buildings. See Blair Kamin, *Chicago Ranks No. 1 in Green Buildings*, <http://featuresblogs.chicagotribune.com/theskyline/2009/09/-chicago-is-no-1-in-green.html> (last visited May 1, 2012).

<sup>197</sup> The Portland Development Commission is responsible for, among other things, providing loans to small businesses and providing affordable housing for Portland residents. See PORTLAND DEV. COMM'N, <http://www.pdc.us/> (last visited Apr. 4, 2012).

mandating that all new construction projects receiving PDC funding through development loans achieve LEED certification.<sup>198</sup> In 2005, the PDC raised the requirement to LEED Gold certification.<sup>199</sup> Additionally, the OSD directed the PDC to incorporate green building principles into urban renewal projects, affordable housing, and other development projects in 2001.<sup>200</sup>

Currently, Portland has no green building mandates in place for privately-owned, privately-funded construction projects. While other cities, such as Boston,<sup>201</sup> Los Angeles,<sup>202</sup> San Francisco,<sup>203</sup> and

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<sup>198</sup> See generally PROPOSED HPGBP, *supra* note 188, at 2. See also Portland Development Commission, *Green Building Policy Program Guidelines*, *supra* note 175.

<sup>199</sup> CITY OF PORTLAND, OFFICE OF SUSTAINABLE DEVELOPMENT, CITY OF PORTLAND PROPOSES HIGH PERFORMANCE GREEN BUILDING POLICY 2 (2008), <http://www.portlandonline.com/bps/index.cfm?a=220879&c=45879>. See *Green Building Policy Program Guidelines*, *supra* note 175, at 2. Projects that receive at least 10% of their total project costs and at least \$300,000 and are at least 10,000 square feet must comply with these standards. The guidelines state that a \$10,000 deposit is necessary to ensure good faith compliance but that the deposit will be returned to the developer unless there is bad faith, in which case the amount is forfeited to the PDC.

<sup>200</sup> See *Green Building Policy Program Guidelines*, *supra* note 175, at 2, 3.

<sup>201</sup> Boston's zoning code requires that all buildings over 50,000 square feet be certified as LEED. Press Release, Boston Redevelopment Authority, Mayor Menino Announces New Green Building Standards for Boston (Dec. 19, 2000), *available at* <http://www.bostonredevelopmentauthority.org/press/PressDisplay.asp?pressID=346>. A Massachusetts Executive Order signed in April of 2007 requires city buildings to meet a LEED Plus standard that has been established by the State. MA. Exec. Order No. 484 (2007), *available at* <http://www.mass.gov/governor/docs/executive-orders/leading-by-example-eo.pdf>. Further, the City of Boston has taken the step to require developers constructing affordable housing projects to meet the LEED Silver Standard under its Green Affordable Housing Program. See *Green Affordable Housing Program*, CITY OF BOSTON, [http://www.cityofboston.gov/dnd/D\\_green\\_housing.asp#Leed](http://www.cityofboston.gov/dnd/D_green_housing.asp#Leed) (last visited Apr. 4, 2012). A mandate makes additional sense for the affordable housing industry in a city like Boston, which is known for high construction costs.

<sup>202</sup> See *infra* Appendix A, Chart 5, notes 8 & 9.

<sup>203</sup> As of November 2008, San Francisco has placed mandates on the construction of commercial buildings over 5000 square feet, new residential buildings, and renovations in buildings that are going through significant upgrades and are over 25,000 square feet. Depending on the size of the building and the year of construction, LEED certification is required. See S.F., CAL., BLDG. INSPECTION COMM'N CODE ch. 13C, 5-6 (2008), *available at* [http://www.sfenvironment.org/downloads/library/sf\\_green\\_building\\_ordinance\\_2008.pdf](http://www.sfenvironment.org/downloads/library/sf_green_building_ordinance_2008.pdf). See also <http://www.sfdbi.org/Modules/ShowDocument.aspx?documentid=308>. All city building projects over 5000 square feet are required to meet LEED Silver standards while noting that projects under the square footage requirement should be designed in a way that maximizes LEED points. See S.F., CAL., ORDINANCE NO. 88-04: Resource Efficiency Requirements and Green Building Standards, 8 (2004), *available at* <http://www.sfenvironment.org/downloads/library/rebordinance.pdf>. This same ordinance requires specific agencies to focus on certain energy saving strategies. See *id.* In addition to current mandates, the Mayor's Task Force on Green Building issued a report that looks

Washington D.C.<sup>204</sup> have established mandates for developers to build according to specified green building standards, Portland has thus far elected to employ market-based incentives rather than mandates to spur green building in the private sector.<sup>205</sup> Nevertheless, Portland has forty-two privately built buildings that are LEED certified.<sup>206</sup>

*a. Portland's Urban Growth Boundary*

Portland, as well as all other cities in Oregon, is required under state law to have an urban growth boundary.<sup>207</sup> An urban growth boundary separates urban land from rural land within a jurisdiction; a requirement designed to prevent urban sprawl from intruding onto lands that are needed for rural purposes, such as farming.<sup>208</sup> Urban growth boundaries thus force most development and growth to occur within cities.<sup>209</sup> Though initially passed in 1973, legislation affecting the urban growth boundary continues to be a hot issue in the state.<sup>210</sup> These laws require cities to look at planning for a variety of housing types and income levels long into the future to consider how they will manage growth.<sup>211</sup> Some residents feel that Portland's urban growth boundary has been a greatly effective tool, while critics argue it is not meeting its original goals.<sup>212</sup> The states of Washington and Tennessee as well as cities like Boulder, Colorado, agree that urban growth

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ahead and recommends that large commercial projects be required to meet LEED Gold standards in 2012. See *Report and Recommendations*, MAYOR'S TASK FORCE ON GREEN BLDG., S.F. COUNTY, CAL., 2 (2007), available at <http://www.sfenvironment.org/downloads/library/gbtfrrreleasev1.3.pdf>.

<sup>204</sup> See *infra* Appendix A, Chart 5.

<sup>205</sup> See HPGBP, OSD, and PDC discussion, *supra* notes 145–200.

<sup>206</sup> See U.S. GREEN BLDG. COUNCIL, *supra* note 196. Also see *USGBC: Rating Systems* *supra* note 141. The numbers for LEED buildings in Portland vary depending on the source. See <http://content.usatoday.com/communities/greenhouse/post/2011/03/us-cities-states-leed-green-building/1#.T5kI65jT4UU>.

<sup>207</sup> *Urban Growth Boundary*, METRO, <http://www.oregonmetro.gov/index.cfm/go/by.web/id=277> (last visited Apr. 4, 2012).

<sup>208</sup> *Id.*

<sup>209</sup> *Id.*

<sup>210</sup> See *Hunnicut v. Myers*, 333 Or. 610 (2002) (challenging initiatives related to urban growth boundaries).

<sup>211</sup> Pendall, Marting, & Fulton, *Holding the Line: Urban Containment in the United States*, THE BROOKINGS INST. CTR. ON URBAN AND METRO. POLICY 27 (2002), available at <http://www.brookings.edu/reports/2002/08metropolitanpo;icy-pendall.aspx>.

<sup>212</sup> See *Time to Deal With Growth Is Now*, PORTLAND BUS. J., Dec. 11, 2005, available at <http://www.bizjournals.com/portland/stories/2005/12/12/editorial1.html>.

boundaries are an effective planning tool and have enacted their own urban growth boundary regulations.<sup>213</sup>

*b. Local Amendments to Building Code*

One of the most significant challenges facing the green building movement lies in inconsistencies between building codes and green building practices.<sup>214</sup> In Oregon, the structural and energy building codes are mandated by the state.<sup>215</sup> Therefore, uniform statewide building codes can potentially interfere with and reduce local flexibility and responsiveness.<sup>216</sup> For example: Oregon prohibits any city from enacting or enforcing “any ordinance, rule or regulation” that concerns “the same matters encompassed by the state building code but . . . provides different requirements.”<sup>217</sup> Fortunately, the state only provides minimum standards; local jurisdictions are permitted to provide additional requirements, as long as they are compatible with the state building code.<sup>218</sup> Furthermore, Oregon’s major sustainability effort directed at public buildings only mandates energy standards for state facilities (State Energy Efficient Design),<sup>219</sup> leaving cities, like Portland, to enact city building codes that go beyond the requirements for state buildings.

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<sup>213</sup> *Urban Growth Boundaries*, SPRAWL WATCH (2008), <http://www.sprawlwatch.org/ubg.html> (last visited May 1, 2012).

<sup>214</sup> See *infra* Part V.B.5. text accompanying notes 581–85.

<sup>215</sup> See OR. REV. STAT § 197.307 (2011).

<sup>216</sup> This is in contrast to Colorado, for example, which does not have a statewide building code but requires localities that do have a building code to use the 2003 International Environmental Conservation Code or a more recent edition for their commercial codes. See Colorado H.B. 07-1146, ONLINE CODE ENV’T & ADVOCACY NETWORK, <http://bcap-energy.org/node/57> (last visited Apr. 4, 2012). New York has an Energy code for commercial buildings based on the International Environmental Conservation Code, and all buildings not required to follow the U.S. Department of Housing and Development Code must abide by it. See N.Y. COMP. CODES R. & REGS. tit. 19 § 1240.1 (2009) *Status of State Energy Codes: New York*, U.S. DEP’T OF ENERGY (Dec. 30, 2010), [http://www.energycodes.gov/states/state\\_info.php?stateAB=NY](http://www.energycodes.gov/states/state_info.php?stateAB=NY).

<sup>217</sup> OR. REV. STAT § 455.040(1) (2007). This does not include different regulations that are approved “by the Director of the Department of Consumer and Business Services.” *Id.* The state intends that its structural, mechanical, heating, and ventilation codes to be uniform throughout the state. *Id.* at 2. In addition, the state intended to establish “uniform performance standards to provide maximum energy conservation and use of passive solar energy.” OR. REV. STAT § 455.525(1).

<sup>218</sup> State ex rel. Haley v. City of Troutdale, 281 Or. 203, 576 P.2d 1238, 1242–43 (1978).

<sup>219</sup> *State Energy Efficiency Design (SEED) Program*, OREGON.GOV, <http://www.oregon.gov/ENERGY/CONS/SEED/SEEDhome.shtml> (last visited Mar. 5, 2012).

In addition to jurisdictional conflicts, conflicts among different types of codes may also pose challenges to green building practices. For example, a single-family home with a goal of net-zero water consumption<sup>220</sup> may face impediments in the state and local residential building codes, the state and local plumbing codes, state and local wastewater or stormwater codes, and the state Department of Health.<sup>221</sup> Again, Portland's government officials have recognized some of these issues and have successfully eliminated several of the barriers to net-zero water use.<sup>222</sup> In general, Portland has taken the lead by initiating a process to identify a set of higher performing green building practices or standards that will be proposed as a local amendment to the state code.<sup>223</sup> In early 2008, Portland created the Technical Advisory Group whose mission was to develop a local building code that would augment the current state building code. Unfortunately, the economic climate and budgetary concerns forced the Bureau of Development Services to temporarily suspend the group in July 2009.<sup>224</sup> Before the suspension, the group was able to draft some amendments to the state code,<sup>225</sup> including provisions for water conservation, materials efficiency, and air quality.<sup>226</sup> Interestingly, under the general provisions section of this draft, the group included a

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<sup>220</sup> The home harvests water from the site, consumes only that amount, and returns the water back to the site. See *Net Zero Water*, 100K, <http://www.100khouse.com/2009/08/27/net-zero-water/> (last visited Apr. 16, 2012).

<sup>221</sup> See CASCADIA REGION GREEN BLDG. COUNCIL, CODE AND REGULATORY BARRIERS TO THE LIVING BUILDING CHALLENGES FOR SUSTAINABLE, AFFORDABLE, RESIDENTIAL DEVELOPMENT: REPORT #1: FINDINGS 15 (Nov. 18, 2008), available at [www.cityofvancouver.us/upload/images/Planning/sustainability/CTED\\_Grant/Report\\_1\\_only.pdf](http://www.cityofvancouver.us/upload/images/Planning/sustainability/CTED_Grant/Report_1_only.pdf).

<sup>222</sup> *Id.*

<sup>223</sup> The Bureau of Development Services convened the first meetings of a Technical Advisory Group in March 2008 and is in the early stages of determining what a local amendment might look like. (Suspended as of July 16, 2009). See *Green Building Local Code Amendment*, CITY OF PORTLAND BUREAU OF DEV. SERVS., <http://www.portlandonline.com/bds/index.cfm?c=46751> (last visited Apr. 4, 2012).

<sup>224</sup> Letter from Paul L. Scarlett, Director of Portland Bureau of Dev. Servs., to Technical Advisory Group Members (July 16, 2009), available at [www.portlandonline.com/bds/index.cfm?a=257455&c=46751](http://www.portlandonline.com/bds/index.cfm?a=257455&c=46751).

<sup>225</sup> See *Proposed Code Changes*, CITY OF PORTLAND BUREAU OF DEV. SERVS., <http://www.portlandonline.com/bds/index.cfm?c=48074> (last visited Apr. 4, 2012).

<sup>226</sup> See TECHNICAL ADVISORY GROUP, DRAFT COMMERCIAL CODE (June 6, 2009), available at <http://www.portlandonline.com/bds/index.cfm?c=48074&a=249766>.

statement that the state provision would preempt any local provision with which it conflicted.<sup>227</sup>

### 3. *Subsidized Loans and Technical Assistance*

In addition to the mandates-for-loans program discussed above, the PDC provides a number of other programs for technical assistance and subsidized loans.<sup>228</sup> Technical assistance takes the form of consultations, educational outreach, and demonstration projects.<sup>229</sup> The PDC also offers grants and subsidized low interest rate loans of up to several million dollars.<sup>230</sup> Two types of projects qualify: the tenant improvement program<sup>231</sup> and the property development and rehabilitation program.<sup>232</sup> The projects must be located within the city's various urban renewal areas.<sup>233</sup> For example, between 2001 and 2002 and 2007 and 2008, the downtown waterfront urban renewal area had \$6.7 million in grants and loans to 35 businesses; the airport way urban renewal area had \$7.9 million in grants and loans to 23 businesses.<sup>234</sup>

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<sup>227</sup> *Id.* The overlapping of state and local regulations has not become an actual issue in Oregon yet, but the issue has reached other state courts in a similar context. In *Air Conditioning, Heating and Refrigeration Institute et al. v. City of Albuquerque*, a New Mexico District Court dealt with whether the City of Albuquerque's Energy Conservation Code was preempted by federal legislation. In granting a preliminary injunction against the city, the court noted the hardship the plaintiffs would face in dealing with products that exceed federal regulations. Perhaps more importantly, the court stated that this was a case of express preemption. This result hints at what could happen if a local building code comes into conflict with a state building code. See Civ. No. 08-633 MV/RLP (D. N.M. Oct. 3, 2008). See also Harvard Law School, Environmental Law and Policy Clinic, *The Green Building Revolution: Addressing and Managing Legal Risks and Liabilities* (Harvard Law School, 2009) 5, available at <http://www.mgkflaw.com/GreenBuildingRevolution.pdf>.

<sup>228</sup> See PORTLAND DEV. COMM'N, [www.pdc.us/](http://www.pdc.us/) (last visited Apr. 4, 2012).

<sup>229</sup> *Id.*

<sup>230</sup> *Id.*

<sup>231</sup> See *Quick Guide: Portland Development Commission Financial Assistance Programs*, PORTLAND DEV. COMM'N, <http://vmw.pdc.us/pdf/future-of-urban-renewal/nstudy/cac/requestlog/Business-finance-programs.pdf> (last visited Apr. 4, 2012). The borrowers here can get up to \$1,000,000, at an interest rate of 3% and with terms of 1% loan fee, up to three years with no payments and up to twenty years amortization.

<sup>232</sup> See *id.* The borrowers can get up to \$2,000,000, at an interest rate of 3%, with zero loan fee and up to twenty years amortization.

<sup>233</sup> *Id.*

<sup>234</sup> See PORTLAND DEV. COMM'N, *Adopted Fiscal Budget 2010-2011*, [www.pdc.us/Libraries/Budget/PDC\\_-\\_Adopted\\_Budget\\_-\\_FY2010-11\\_pdf.sflb.ashx](http://www.pdc.us/Libraries/Budget/PDC_-_Adopted_Budget_-_FY2010-11_pdf.sflb.ashx) (last visited Feb. 15, 2012).



#### 4. *The Green Investment Fund*

In 2005, Portland's Office of Sustainable Development established the Green Investment Fund (GIF),<sup>235</sup> a competitive grant program that supported innovative green building projects within city limits. Unfortunately, with the present economic situation, this program has been suspended.<sup>236</sup> Industrial, multi-family residential, commercial, and mixed-use public and private organizations may apply.<sup>237</sup> GIF's primary purpose was to "support early building and site-related project activities that examine the potential and identify the means to realize an exemplary, comprehensive green building project."<sup>238</sup> GIF grants were also intended to help offset the hard costs of the green building measures or strategies that most strongly contribute to a building's ability to meet the GIF Core Goals and Targets, which included: "[1] whole building system integration; [2] energy efficiency and on-site renewable power generation; [3] material use reduction, recycling, salvage, and reuse; [4] efficiency; [5] rainwater and stormwater management and improving watershed health; and [6] community connectivity."<sup>239</sup>

GIF awards were given in three separate payments: the first payment went to pre-development activities, while the second and third payments split the remaining grant amount to apply to the costs of the green building identified in the design activities.<sup>240</sup> The grant award amounts were determined by the GIF partners after assessing project eligibility and scoring.<sup>241</sup> In order to be considered eligible,<sup>242</sup> a project must be located within city limits; must have a secured project site; must include funds and/or resources for sustainability from a source other than the City of Portland or Energy Trust of Oregon, Inc.;

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<sup>235</sup> See generally City of Portland Bureau of Planning & Sustainability, *Green Investment Fund*, PORTLAND ONLINE, [www.portlandonline.com/BPS/index.cfm?c=42134](http://www.portlandonline.com/BPS/index.cfm?c=42134) (last visited Mar. 5, 2012) [hereinafter *GIF*].

<sup>236</sup> City of Portland Office of Sustainable Development, *Green Investment Fund Request for Proposals OSD GIF 09*, PORTLAND ONLINE 3 (Dec. 1, 2008), <http://www.portlandonline.com/bps/index.cfm?c=49140&a=220343> [hereinafter *GIF 2009 Request*].

<sup>237</sup> See *GIF*, *supra* note 235.

<sup>238</sup> *Id.*

<sup>239</sup> *GIF 2009 Request*, *supra* note 236, at 9.

<sup>240</sup> *Id.* at 2.

<sup>241</sup> *Id.* at 12.

<sup>242</sup> *Id.* at 7 (complete list of GIF eligibility requirements).

and must address all six of the GIF's "Core Goals and Targets."<sup>243</sup> For residential proposals, only "multi-family developments that included three or more units and required a commercial permit were eligible."<sup>244</sup> "Applicants can be individuals, non-profit organizations, corporations, LLCs, partnerships, or public agencies; . . . [j]oint applications and partnerships are encouraged."<sup>245</sup> Grants were awarded on the basis of a scoring system of 100 points:<sup>246</sup>

Quality of proposal	5 points
Core goal and targets, innovation, and impact potential	35 points
Process, adequacy of resources, and development milestones	20 points
Transferability, visibility, accessibility, and educational opportunities	15 points
Team qualifications	10 points
Diversity in workforce and contracting	15 points

The GIF helped fund 80 projects from 2001 to 2005.<sup>247</sup> In 2005, the GIF formed a partnership with the Office of Sustainable Development ("OSD"), Portland Water Bureau, Bureau of Environmental Services (BES), and Energy Trust of Oregon, Inc.,<sup>248</sup> to create a five-year, \$2.5 million dollar grant program.<sup>249</sup> This partnership increased the amount of available grant funds and "expanded support for comprehensive approaches to green building and sustainable site development."<sup>250</sup> From 2005 through 2009, the GIF awarded annual grants of \$425,000.<sup>251</sup> The program funded its final three projects in 2009 and is no longer accepting applications for funding.<sup>252</sup>

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<sup>243</sup> *Id.*

<sup>244</sup> *Id.*

<sup>245</sup> *Id.*

<sup>246</sup> *Id.* at 6.

<sup>247</sup> *Id.* at 2.

<sup>248</sup> *Id.*

<sup>249</sup> *Id.*

<sup>250</sup> *Id.* at 2.

<sup>251</sup> *Id.*

<sup>252</sup> See Letter from City of Portland Bureau of Planning and Sustainability (Apr. 27, 2009), available at <http://www.portlandonline.com/bps/index.cfm?c=49140&a=244775>.

### 5. Portland's High Performance Green Building Policy

Portland's proposed High Performance Green Building Policy (HPGBP) is the outcome of City Council Resolution 36488 directing OSD to develop policy options to improve building performance.<sup>253</sup> In November 2007, Commissioner Saltzman and OSD first introduced the HPGBP as a preliminary framework outlining policy options to improve building performance.<sup>254</sup> The current version of the proposal is the product of a collaborative effort between OSD, the Development Review Advisory Committee, the Portland Development Commission, and stakeholders in the design, development, construction, and real estate sectors.<sup>255</sup>

As proposed, the HPGBP will employ market mechanisms to encourage green building; the HPGBP proposals will apply to new and existing commercial construction and new residential buildings.<sup>256</sup> The goals of the proposed HPGBP reflect environmental, economic, and social concerns. Those goals are:

- Reducing greenhouse gas emissions, maximizing energy efficiency, decreasing potable water consumption, increasing on-site stormwater management, and reducing waste during construction and operation phases.
- Increasing the number of living-wage local green building jobs while keeping housing and commercial buildings affordable over time.
- Improving indoor environmental quality, occupant health, and productivity.<sup>257</sup>

The proposed HPGBP focuses primarily on an innovative feebate system designed to incentivize new construction of high performance green buildings.<sup>258</sup> The feebate is a three-pronged incentive system consisting of rewards, waivers, and fees.<sup>259</sup> The policy sets thresholds for building performance that must be achieved to receive a reward or waiver; if the minimum threshold is not met, a fee will be assessed to

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<sup>253</sup> See generally PROPOSED HPGBP, *supra* note 188.

<sup>254</sup> *Id.* at 4.

<sup>255</sup> *Id.* Throughout 2008, OSD convened stakeholder meetings to evaluate the policy's proposals and revised the policy drafts to incorporate stakeholder input.

<sup>256</sup> See PROPOSED HPGBP, *supra* note 188, at 5.

<sup>257</sup> *Id.* at 5.

<sup>258</sup> *Id.* at 5–11.

<sup>259</sup> *Id.* at 5, 8.

mitigate greenhouse gas emissions and other environmental impacts caused by the building.<sup>260</sup> Essentially, the fee is an environmental tax (or more particularly a carbon tax) aimed at internalizing the external costs of traditional construction that are not accounted for by the market. The policy claims that the fees collected will offset rewards paid; excess fees collected will be dedicated to funding financial and technical assistance and green building education programs.<sup>261</sup> To ensure progressivity in green building, the policy thresholds, green building standards, and performance targets and requirements will be evaluated every three years.<sup>262</sup>

Under the current version of the proposal, the feebate system applies only to new commercial construction<sup>263</sup> and qualified major remodels of existing commercial buildings.<sup>264</sup> The feebate will not apply to new residential construction if green building certification targets are met.<sup>265</sup> Currently, the HPGBP has no requirements for existing residential buildings.<sup>266</sup> The proposal also provides for expansion of Portland's technical assistance and education programs, and expanded guidance for monitoring and evaluation systems aimed at ensuring the city achieves its green building goals.<sup>267</sup>

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<sup>260</sup> *Id.* at 8.

<sup>261</sup> *Id.*

<sup>262</sup> *Id.* at 19.

<sup>263</sup> Further, the feebate for new commercial construction only applies to multifamily buildings greater than or equal to 5000 gross square feet and commercial buildings equal to or greater than 20,000 gross square feet. Projects not meeting the minimum gross square footage requirements are currently exempt. Specific building types and permit occupancy classifications covered by the feebate can be found in the PROPOSED HPGBP. *Id.* at 6.

<sup>264</sup> The feebate applies to major remodels only if

the project Permit Valuation of the Work exceeds \$250,000 [and] at least one of the following is true: [1] at the time of the application the Permit Valuation of the Work is greater than or equal to the Real Market Value of the property as determined by the County Tax Assessor; [2] a Change of Occupancy affects more than one-third of the building gross square footage; [3] a conversion of more than 5,000 gross square feet from unheated to heated space; or [4] an addition of building gross square footage greater than or equal to the gross square footage of the existing building.

PROPOSED HPGBP, *supra* note 188, at 7.

<sup>265</sup> The PROPOSED HPGBP sets percentage targets for LEED or Earth Advantage certified homes for 2009, 2010, and 2011. If these targets are not achieved, the feebate will go into effect for new residential construction. *Id.* at 2.

<sup>266</sup> Disclosure requirements for single-family residential buildings regarding building performance were considered, but until adequate financing options exist for homeowners, no disclosure requirements for single-family residential buildings will be implemented. *Id.* at 6.

<sup>267</sup> *Id.* at 19.

*a. Commercial Construction*<sup>268</sup>

Under the proposed HPGBP, builders of qualifying new commercial buildings have three feebate options:

- (1) Reward. Build to a high performance green building standard that includes energy performance at least 35% better than current minimum Oregon building code and receive a feebate reward check from the city.
- (2) Waiver. Build to a high performance green building standard that includes energy performance at least 25% better than the current minimum Oregon building code and receive a fee waiver.
- (3) Fee. Build to the current minimum Oregon building code and pay a one-time fee.<sup>269</sup>

To receive a reward or waiver, the building must receive third-party certification<sup>270</sup> verifying that HPGBP-required building performance standards are met.<sup>271</sup> Reward amounts vary and are based on both the building's gross square footage and level of environmental performance. Fees are based on gross square footage of the building.<sup>272</sup>

For existing commercial buildings, the proposal establishes disclosure requirements regarding building performance and storm-water management.<sup>273</sup> These disclosure requirements would go into effect January 1, 2011, and be applied to all existing commercial buildings exceeding 100,000 gross square feet.<sup>274</sup> All building

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<sup>268</sup> See *id.* at 6–11, 15–17.

<sup>269</sup> *Id.*

<sup>270</sup> Third-party certification by USBGC LEED is generally required for multifamily residential new construction. Projects less than 50,000 square feet may be certified by Earth Advantage, an alternative path to LEED certification. Buildings meeting the Living Building Challenge (documented net-zero energy and water use for one year) are not required to obtain LEED certification. *Id.* at 8.

<sup>271</sup> Under the proposal, LEED certified projects must also achieve specific minimum point thresholds for water and energy efficiency credits. *Id.* at 9.

<sup>272</sup> *Id.* at 8.

<sup>273</sup> *Id.* at 15.

<sup>274</sup> The disclosure requirements would be phased in to apply to buildings greater than or equal to 50,000 square feet in 2012 and to buildings greater than or equal to 20,000 square feet in 2013. Additionally, new construction projects covered by the feebate would be required to make disclosures within three years after receiving a Certificate of Occupancy. *Id.* at 16–17.

performance disclosures must be updated at least once every three years and be third-party certified.<sup>275</sup>

Building performance requirements include participation in the “EPA Energy Star Portfolio Manager program, including reporting building characteristics, energy use during the previous 12 months, water consumption levels and indoor environmental quality.”<sup>276</sup> Buildings failing to meet a minimum EPA Energy Star rating of thirty will be targeted by OSD to reduce energy use within three years.<sup>277</sup> Fines will be imposed for failure to either achieve a rating of thirty or reduce energy consumption by at least fifteen percent within three years.<sup>278</sup> Fines will also be imposed for failure to make the required disclosures.<sup>279</sup> The city will use all fines collected to fund green building technical assistance and outreach programs for existing buildings.<sup>280</sup>

*b. Residential Construction*<sup>281</sup>

Rather than adopt a feebate for new residential construction, the proposal has set target levels<sup>282</sup> for new homes<sup>283</sup> to be Earth Advantage or LEED certified; Portland would partner with area builders to increase the level of green building to meet these targets.<sup>284</sup> The city will be responsible for monitoring the percentage of new homes obtaining certification.<sup>285</sup> If the certification target levels of any given year are not met, a feebate system<sup>286</sup> parallel to the one for new commercial construction will go into effect and be applied to new

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<sup>275</sup> *Id.* at 16.

<sup>276</sup> *Id.* at 15.

<sup>277</sup> *Id.* at 17.

<sup>278</sup> *Id.*

<sup>279</sup> *Id.*

<sup>280</sup> *Id.*

<sup>281</sup> *See generally id.* at 12–13, 18.

<sup>282</sup> Proposed targets for certification are: in 2009, 20% of new homes certified; in 2010, 30% of new homes certified; in 2011, 40% of new homes certified. *Id.* at 12.

<sup>283</sup> Homes must be greater than or equal to 1200 square feet to qualify. *Id.*

<sup>284</sup> *Id.*

<sup>285</sup> *Id.*

<sup>286</sup> To qualify for a waiver, energy performance must be at least 15% better than the current minimum Oregon building code; to qualify for a reward, at least 25% improvement is required. *Id.*

residential buildings of at least 1200 square feet.<sup>287</sup> Reward amounts would be based upon environmental performance without varying based on the size of the home; fees would be based on square footage of the home.<sup>288</sup> The proposal also specifies minimum energy performance requirements that must be met to receive a reward or waiver.<sup>289</sup>

However, existing residential buildings are perhaps the biggest challenge facing the green building movement.<sup>290</sup> OSD declined to include any disclosure or performance requirements for existing residential buildings in the current version of the proposal.<sup>291</sup> OSD is committed to developing financing options to aid homeowners in making energy and environmental upgrades to existing homes as well as developing an Energy Performance Score system to identify cost-effective upgrade strategies.<sup>292</sup>

### 6. *The EcoDistricts*

In 2009, the Portland Sustainability Institute, (a nonprofit entity of governmental officials, academics, developers, and builders) in conjunction with the City of Portland, launched the EcoDistricts Initiative.<sup>293</sup> This initiative is a comprehensive strategy to bring together community stakeholders in targeting neighborhood “buildings, streetscapes, landscaping, and infrastructure” to “work together to cut greenhouse gases, reduce waste, and improve energy and water efficiency. . . .”<sup>294</sup> The EcoDistricts will engage the community in developing and identifying sustainability projects that can be tracked and that can then serve as a guide for future innovation

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<sup>287</sup> Buildings less than 1200 square feet are exempt from the fee but may qualify for a reward. *Id.*

<sup>288</sup> *Id.* at 12–13.

<sup>289</sup> See Table 4, *id.* at 14.

<sup>290</sup> “Existing homes are the largest category of residential energy use and greenhouse gas emissions.” *Id.* at 18.

<sup>291</sup> *Id.*

<sup>292</sup> *Id.*

<sup>293</sup> *Eco Districts: Building Blocks of Sustainable Cities*, PORTLAND SUSTAINABILITY INST., <http://www.pdxinstitute.org/index.php/whatwedo/ecodistricts> (last visited Apr. 4 2012).

<sup>294</sup> Jenny Sullivan, *Portland, Ore., Establishes Eco Districts*, Builder Online (Sept 14, 2009), <http://www.builderonline.com/sustainability/portland-ore-establishes-eco-districts.aspx>.

and development.<sup>295</sup> Five pilot districts have been identified, each in a different urban environment.<sup>296</sup> In the Portland State University district, the university is partnering with General Electric to construct the Oregon Sustainability Center, which will meet the Living Building Challenge—a standard more rigorous than the LEED Platinum rating.<sup>297</sup>

The “EcoDistricts are one piece of Portland’s long range development plans.”<sup>298</sup> Instead of a top-down approach, this model engages the local community in creating its own innovative strategies.<sup>299</sup> There are other cities, like Freiberg, Germany and Malmo, Sweden, that have experimented with ecodistricts, as well as the Olympic Village in Vancouver, British Columbia; however, no such districts exist anywhere else in the United States.<sup>300</sup> Challenges to this new concept, of course, exist, such as different governing structures, different boundaries, and different approaches.<sup>301</sup> Nevertheless, this initiative has helped make Portland “unique in leading the world with a city-wide vision.”<sup>302</sup>

### *C. Assessing Portland’s Green Building Initiatives*

Portland may have been the first U.S. city to address carbon dioxide emissions<sup>303</sup> and to mandate green building practices by requiring

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<sup>295</sup> *Id.*

<sup>296</sup> Lloyd District, Portland State University, Gateway, Lents and SouthWaterfront, Macadam. *Id.*

<sup>297</sup> Michael Burnham, “*Bold Public-Private Venture Aims to Make Ore. City an ‘Icon of Sustainability’*” N.Y. TIMES, July 7, 2010, available at [www.nytimes.com/gwire/2010/07/07/gwire-bold-public-private-venture-aims-to-make-ore-c-32109.html](http://www.nytimes.com/gwire/2010/07/07/gwire-bold-public-private-venture-aims-to-make-ore-c-32109.html). For example, the standards require that the building be occupied twelve consecutive months prior to certification and avoid asbestos, formaldehyde and a dozen other materials and chemicals on a red list. *Id.* The center will cost about \$75 million to build—about 15–20% more than the capital cost of a conventionally designed office building of the same size. *Id.*

<sup>298</sup> *Portland Eco-Districts 101*, CLEAN OREGON, <http://cleanoregon.wordpress.com/2009/10/30/portland-eco-districts-101/> (last visited Feb. 15, 2012).

<sup>299</sup> *Id.*

<sup>300</sup> *Id.*

<sup>301</sup> *Id.*

<sup>302</sup> *Id.*

<sup>303</sup> Portland implemented a Carbon Dioxide Reduction Strategy in 1993. City of Portland Bureau of Planning and Sustainability, *Climate Action Plan 2009*, CITY OF PORTLAND, <http://www.portlandonline.com/bps/index.cfm?c=49989&a=268612> (last visited Apr. 4, 2012). The city’s 2008 carbon emissions levels were 1% lower than the 1990 levels, a remarkable rate given the city’s population growth. *Id.* at 7. During this same period, emissions on a national level increased by 13%. *Id.*



LEED certification for publicly-owned buildings.<sup>304</sup> Unfortunately, Portland has been slow to adopt other strong measures to encourage green building. While Portland was once the unchallenged leader in the green building movement, other cities such as Seattle, Boston, and San Francisco, have now far surpassed Portland in their sustainable building practices.<sup>305</sup> Seattle has its own green building standards.<sup>306</sup> Boston mandates LEED Silver certification for affordable housing.<sup>307</sup> San Francisco mandates LEED standards for most new construction, including commercial, residential, and even renovations.<sup>308</sup> For more information, see Appendix A, Chart 5.

Nevertheless, Portland's combination of mandates, grants, subsidized loans, and technical assistance have all resulted in an impressive amount of LEED certified public and private buildings in the Portland area.<sup>309</sup> Portland should also be applauded for its efforts to use market mechanisms, in particular a form of environmental tax, to make builders that use environmentally harmful construction

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<sup>304</sup> See *Pacific Northwest Leads in Green Building*, CLIMATE CHANGE BUS. J., 14 (Oct. 2008), available at [http://www.cascadiagbc.org/news/cascadia-in-the-news-articles/Oct08\\_ClimateChangeBizJournal\\_LBC.pdf](http://www.cascadiagbc.org/news/cascadia-in-the-news-articles/Oct08_ClimateChangeBizJournal_LBC.pdf) (Seattle was first to mandate LEED for all public buildings.).

<sup>305</sup> See *infra* Appendix A, Chart 5.

<sup>306</sup> The City of Seattle, in partnership with King and Snohomish Counties, created Built Green, a nonprofit environmental building program devoted to environmentally friendly building practices and sustainable community development. BUILT GREEN, <http://www.builtgreen.net/index> (last visited Apr. 4, 2012). Built Green certifies building projects based on its independent checklists which emphasize site and water, energy efficiency, indoor air quality, and material selection. *Id.*

<sup>307</sup> The City of Boston's Department of Neighborhood Development requires adherence to LEED Silver standards as well as Energy Star standards for all affordable housing projects. See generally *Green Affordable Housing at DND*, CITY OF BOSTON, [http://www.cityofboston.gov/dnd/D\\_green\\_housing.asp#Green](http://www.cityofboston.gov/dnd/D_green_housing.asp#Green) (last visited Apr. 4, 2012).

<sup>308</sup> In August, 2008 San Francisco Mayor Newsom signed San Francisco's green building ordinance, imposing strict green building standards upon all new commercial construction over 5000 square feet, all new residential construction over 75 feet tall, and all renovations of buildings over 25,000 square feet. See *Mayor Newsom Signs Groundbreaking Green Building Ordinance to Reduce Greenhouse Gas Emissions*, SAN FRANCISCO OFFICE OF THE MAYOR (Aug. 4, 2008), [sfmayor.org/ftp/archive/209.126.225.7/archives/PressRoom\\_NewsReleases\\_2008\\_85918/index.html](http://sfmayor.org/ftp/archive/209.126.225.7/archives/PressRoom_NewsReleases_2008_85918/index.html). At the time of its passing, this ordinance made San Francisco the city with the strictest green building mandates in the United States.

<sup>309</sup> See U.S. GREEN BLDG. COUNCIL, *supra* note 196, at 43.

practices pay a fee.<sup>310</sup> Portland's effort to obtain consensus among various stakeholders in this process<sup>311</sup> is also admirable.

However, the development process of the HPGBP has been lengthy and controversial.<sup>312</sup> As of this writing, nearly five years after the Portland City Council directed OSD to develop green building policy options, the HPGBP is still a mere proposal.<sup>313</sup> In the interim, Portland's green building policy has almost come to a standstill. The one exception is the EcoDistrict Initiative.

Portland's HPGBP efforts illustrate some of the challenges<sup>314</sup> faced when addressing green building expansion through market incentives. Perhaps the biggest criticisms of the HPGBP concerns are the delay in its implementation and how watered-down the final proposal became.<sup>315</sup> As with most environmental taxes, issues arise as to its overall effectiveness, particularly when the revenue from the tax or fee is tied to the rewards or incentives for building green.<sup>316</sup> Lastly, there is the bigger issue of whether market mechanisms are the best environmental instruments to use during an economic recession.

Delays in implementing the HPGBP policy can be attributed to community concern and opposition to proposed requirements established in the original HPGBP.<sup>317</sup> After Commissioner Saltzman introduced his first version of the proposal, community backlash led to

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<sup>310</sup> See generally LESTER R. BROWN, PLAN B 3.0: MOBILIZING TO SAVE CIVILIZATION 7, 7 (Earth Policy Inst., W.W. Norton and Co. 2008) (stating "The challenge facing governments is to restructure tax systems by systematically incorporating indirect costs as a tax to make sure the price of products reflects their full costs to society . . .").

<sup>311</sup> See PROPOSED HPGBP, *supra* note 188, at 5.

<sup>312</sup> Saltzman offers scaled-back green building policy, (Dec. 5, 2008) (last accessed Mar. 25, 2012), [www.oregonlive.com/environment/index.ssf/2008/12/portland\\_writes\\_milder\\_green\\_b.html](http://www.oregonlive.com/environment/index.ssf/2008/12/portland_writes_milder_green_b.html).

<sup>313</sup> WILL BAKER, ET AL., BENCHMARKING MUNICIPAL GREEN BUILDING PROGRAMS 10 (Columbia SIPA May 2010). The public had until early 2010 to make comments on the proposal.

<sup>314</sup> See discussion *infra* Part V.

<sup>315</sup> See *Community-wide Green Building Policy*, CITY OF PORTLAND BUREAU OF PLANNING AND SUSTAINABILITY, available at <http://www.portlandonline.com/bps/index.cfm?c=45879&>. Initially proposed in November of 2007, the HPGBP was intended to go before the City Council in Fall 2008 for review and approval. Nearly a year later, the proposal was still subject to community commentary and no official date was slated to review and approve the policy.

<sup>316</sup> Richard B. Stewart, *A New Generation of Environmental Regulations?*, 29 CAP. U. L. REV. 21, 100, 101 (2001).

<sup>317</sup> See CITY OF PORTLAND BUREAU OF PLANNING AND SUSTAINABILITY, *supra* note 315.

a series of stakeholder meetings intended to ensure that the HPGBP would have community support and spur increases in green building without creating negative impacts on homeowners and businesses.<sup>318</sup> While community support is beneficial to the success of a green building policy, significant stakeholder involvement has prompted a series of revisions and a delayed implementation of the new policy.<sup>319</sup> Stakeholder input should be considered, but if the underlying goal of a green building policy is to reduce energy dependence and environmental harm, it should be acknowledged that the interests of some stakeholders might not be aligned with green building practices.

Additionally, stakeholder involvement has led to the current proposal being a less effective version of Commissioner Saltzman's original proposal.<sup>320</sup> Initially, the feebate would have applied to all buildings—new and existing, commercial and residential. However, revisions to the proposal following stakeholder meetings resulted in a new version with for new residential and limited requirements for existing commercial buildings.<sup>321</sup> Portland's HPGBP may prove to be an example of a policy that attempted to please too many and in the end accomplished very little.<sup>322</sup>

Even if the proposal is passed, serious questions remain as to its overall effectiveness. A major flaw of HPGBP is that the fee option allows developers to completely disregard green building practices.<sup>323</sup> Unless the fees are set at a level high enough to incentivize most developers to obtain, at minimum, a fee waiver, a significant increase in green building is unlikely to occur. The use of a revenue-neutral or revenue-generating fee in conjunction with a reward system such as the HPGBP feebate, works at cross purposes: At what levels must fees and rewards be set to balance the city's sustainability goals? The goal of having an adequate base of market participants willing to incur fees to finance the rewards conflicts with the goal of having large numbers

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<sup>318</sup> *Id.*

<sup>319</sup> PROPOSED HPGBP, *supra* note 188.

<sup>320</sup> See CITY OF PORTLAND BUREAU OF PLANNING AND SUSTAINABILITY, *supra* note 315.

<sup>321</sup> *Id.*

<sup>322</sup> As it stands, the proposal does not address existing residential buildings, which are responsible for the largest category of both residential energy use and greenhouse gas emissions. The failure of the proposal to address existing residential buildings is perhaps the proposal's greatest weakness.

<sup>323</sup> See PROPOSED HPGBP, *supra* note 188, at 8.

of participants comply with the more stringent green building standards. If the fee is set to significantly increase the prevalence of green building, fee revenues may fall short of the level required to pay rewards and provide for education, technical assistance, and other green building expenses as outlined in the proposal. In the end, Portland's commitment to a community-based policy-making model is likely to limit the city's ability to set fees at proper levels to accomplish the purposes desired.

Lastly, there is the issue of whether market mechanisms are the best environmental instrument during an economic recession. Portland commissioned a study with ECONorthwest (ECO) to evaluate the economic impacts of the HPGBP.<sup>324</sup> Based on data from 2006, a year when the economy was growing, the results were mixed. Under the assumption of a high feebate, ECO's analysis showed the program would lead to only \$14 million in increased annual output, 119 Oregon construction jobs, and 8.8 new jobs per year from energy savings.<sup>325</sup> Under the low feebate assumption, ECO predicted only \$8 million of projected annual additional output and 66.8 additional annual jobs created.<sup>326</sup>

It is often difficult for the policy maker to determine whether regulations or market mechanisms are best and which market mechanisms—or combination of mechanisms—are most effective in different situations.<sup>327</sup> Thus, policy makers should keep in mind the following major principles:

- (1) Mandates might be preferable when the environmental damage from the unregulated activity is significant. Because conventional construction methods have a devastating impact on the environment,<sup>328</sup> mandates might be necessary since markets incentivize the disregard of this environmental harm.
- (2) Mandates may be more efficient when there is information failure<sup>329</sup> and uncertainty as to the marginal costs of the

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<sup>324</sup> See Jules Kopel-Baily & Alec Johnson, *Economic Impacts of Portland's High Performance Green Building Policy*, ECONORTHWEST, available at [www.portlandonline.com/bps/index.cfm?a=220900&c=45879](http://www.portlandonline.com/bps/index.cfm?a=220900&c=45879) (last visited Apr. 4, 2012).

<sup>325</sup> *Id.*

<sup>326</sup> *Id.* at 25.

<sup>327</sup> See Stewart, *supra* note 316.

<sup>328</sup> See Part V.A.1. regarding Environmental Benefits.

<sup>329</sup> See Part V.B.1.a., *infra* notes 539–42 and accompanying text.

abatement,<sup>330</sup> and when these costs are low relative to the benefits from curbing the environmental harm.

- (3) Although mandates (and regulations) have been criticized for curtailing innovation, when minimum quality standards can be set (under LEED and other building standards)<sup>331</sup> and when those standards have specific categories that encourage innovation (like LEED and BREEAM), mandates can actually help create and stimulate new technologies.
- (4) Mandates may work well when stakeholders have incompatible interests and it is difficult to reach consensus without excessive compromise.<sup>332</sup>
- (5) When market demand for the product is inelastic, such as the demand for green building, then regulations (or grants and subsidized loans) may be better suited to accomplish the desired purpose.
- (6) In an economic recession when companies are running losses and capital is tight, mandates (or mandates coupled with grants and subsidized loans) may be preferable to market mechanisms.
- (7) In an economic recession where states are making significant budget cuts<sup>333</sup> (essentially restricting loan, grant, and tax subsidies), the federal government should step in with the needed incentives.<sup>334</sup>

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<sup>330</sup> See Part V.B.1.b., *infra* notes 543–49 and accompanying text.

<sup>331</sup> See Green Building Standards Section, *infra* Part II.D.

<sup>332</sup> See PROPOSED HPGBP, *supra* note 188, at 5.

<sup>333</sup> Leslie Eaton, e al., *States Shut Down to Save Cash*, WALL ST. J., Sept. 4, 2009, available at <http://online.wsj.com/article/SB125202235182685075.html>.

<sup>334</sup> The federal government has recognized this by passing the Emergency Economic Stabilization Act of 2008, Pub. L. No. 110-343, 122 Stat. 3765 which emphasized funding environmentally friendly projects. The American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115 has added a number of tax provisions, including allowing grants in lieu of credits for certain energy incentives. This is much more beneficial to cash poor companies than tax credits.

The EPA received over a billion in funds from the American Recovery and Reinvestment Act. Over \$100 million is devoted to cleaning up Brownfield sites in order to prepare for new uses. ENVTL. PROT. AGENCY, EPA RECOVERY ACT PLAN: A STRONG ECONOMY AND A CLEAN ENVIRONMENT (May 15, 2009), available at <http://www.epa.gov/recovery/plans/EPA.pdf>. Other stimulus projects are dedicated to green energy. These projects include \$11 billion for improving the electrical grid and \$300 million to allow state governments to purchase hybrid and electric cars. Almost \$9 billion is devoted to energy research, including \$1.5 billion for industrial carbon capture. The federal government is to

My suggestions for Portland's future include more mandates for green building. First, all new construction or retrofits of schools and college buildings should be LEED Silver certified. Public and nonprofit construction, unlike private construction, is financed partly by taxpayer money. Thus, regulating the public and nonprofit sectors would have less of an adverse economic impact on the economy. Green education facilities would not only promote the health and welfare of our young citizens, but serve as an educational experience for them. Living in a LEED building every day will help ingrain in our next generation the importance of environmental concerns.

I would also suggest that Portland mandate all new private construction within the center city be LEED Silver certified. This mandate would follow in the footsteps of several other cities, such as Boston, Los Angeles, and San Francisco.<sup>335</sup> However, like Washington D.C., Portland should think about mandates for major residential remodels. *See* Appendix A, Chart 5. Alternatively, the feebate system could be set up to incentivize residential remodels.

Portland definitely needs to pass the feebate proposal and make it more stringent. Externalities, such as water runoff and air and water pollution, result from traditional construction, and are generally passed on to society as a whole. The feebate system is a good step forward to encourage the private sector to choose green building practices and make the polluter pay. In addition, any environmental tax will raise revenue, and in an economic downturn income generation may be better than lost revenue through a direct or tax subsidy. Because of the revenue drain; however, I would not recommend reinstating the Portland grant program until the economy recovers. Any nontax or nonrevenue measure, such as those involving permits, height and density requirements, etc. could also be adopted.

#### IV

#### OREGON'S GREEN BUILDING INITIATIVES

Some of the success of the green building movement in Portland can be attributed to the favorable tax structure and other benefits provided by the state of Oregon. Oregon, like Portland, has a long

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receive \$4.5 billion for green building renovations, nearly as much as the \$4 billion going to green public housing. Amanda Ruggeri, *What the Stimulus Package Does for Renewable Energy*, U.S. NEWS, Mar. 6, 2009, <http://www.usnews.com/articles/news/energy/2009/03/06/what-the-stimulus-package-does-for-renewable-energy.html>.

<sup>335</sup> *See* Appendix A, Chart 5.

history of supporting sustainable development.<sup>336</sup> In 2001, the Oregon Legislature passed the Oregon Sustainability Act (OSA),<sup>337</sup> which not only defined sustainability,<sup>338</sup> but committed the state to sustainability as a policy. One of the primary goals of the statute is to require the state to invest “in facilities, equipment and durable goods [that] should reflect the highest feasible efficiency and lowest life cycle costs.”<sup>339</sup>

In 1979, the Oregon legislature created the Business Energy Tax Credit Program (BETC) to incentivize energy projects<sup>340</sup> two years after it had created the Residential Energy Tax Credit Program (RETC) to encourage energy efficiency within the home.<sup>341</sup> The BETC was expanded in 2007,<sup>342</sup> again in 2008,<sup>343</sup> and the 2009 Oregon

<sup>336</sup> OREGON DEP’T OF ENERGY, 2011-2013 State of Oregon Energy Plan 14 (2011), available at [http://oregon.gov/ENERGY/docs/reports/legislature/2011/energy\\_plan\\_2011-13.pdf?ga=t](http://oregon.gov/ENERGY/docs/reports/legislature/2011/energy_plan_2011-13.pdf?ga=t).

<sup>337</sup> OR. REV. STAT. § 184.423 (2011). The OSA established a seven-member board to consider sustainability legislation and policy and report biennially to the legislature. In addition to the OSA, the Oregon governors have issued several executive orders relating to sustainability practices.

<sup>338</sup> OR. REV. STAT. § 184.421 (2011) (defining sustainability as “using, developing and protecting resources in a manner that enables people to meet current needs and provides that future generations can also meet future needs, from the joint perspective of environmental, economic and community objectives”).

<sup>339</sup> OR. REV. STAT. § 184.423(1)(b).

<sup>340</sup> See OREGON DEP’T OF ENERGY, OREGON BUSINESS ENERGY TAX CREDIT (2008), available at <http://www.oregon.gov/ENERGY/CONS/BUS/docs/betcbro.pdf>.

<sup>341</sup> OREGON DEP’T OF ENERGY, RESIDENTIAL ENERGY TAX CREDITS, [http://www.oregon.gov/ENERGY/RESIDENTIAL/residential\\_energy\\_tax\\_credits.shtml](http://www.oregon.gov/ENERGY/RESIDENTIAL/residential_energy_tax_credits.shtml) (last visited Apr. 16, 2012).

<sup>342</sup> H.B. 3201, 74th Assemb. Reg. Sess. (Or. 2007). Enacted in 2007, H.B. 3201 increased the cap on eligible project costs from \$10 million to \$20 million for facilities producing (or using) renewable energy resources and kept the cap at \$10 million for all other facilities. It increased the tax credit for renewable energy systems installed by businesses from 35% to 50% of eligible cost taken over five years while all other facilities remain at 35% of the certified costs. H.B. 3201 also repealed the offset of federal tax credits for projects that receive a federal and state credit. Only federal grants reduce the certified cost of the facility “on a dollar for dollar basis.” Consequently, a taxpayer could use the BETC *and* any federal energy tax credit for the same qualifying energy efficiency or renewable energy project. It provided a tax credit to homebuilders for installing renewable energy systems in homes and for designing and building high-performance low energy use homes. (See Section 14). It increased the size of hydro facilities eligible for BETC from one megawatt to ten megawatts and provided a tax credit for “high performance” homes using energy-efficiency and on-site renewable energy based on criteria established by the ODOE. (See Section 16).

<sup>343</sup> H.B. 3619, 74th Leg. Assemb., Spec. Sess. (Or. 2008). Enacted in 2008, H.B. 3619 resolved and clarified issues that arose while promulgating rules in response to H.B. 3201. The bill permits the ODOE to set minimum performance and efficiency standards for

Legislature proposed further modifications, though Governor Kulongoski did not sign them into law.<sup>344</sup> In 2010, the Legislature successfully modified the BETC program with H.B. 3680.<sup>345</sup> Though the modifications saw substantive changes to the program, many of the changes applied primarily to large, renewable generation projects<sup>346</sup> rather than the conservation and energy efficiency programs likely to be implemented by green builders. During the 2011 legislative session, House Bill 3672 essentially sunsetted or gutted BETC.<sup>347</sup> However, the section governing green manufacturing was left unaffected and was transferred to the Oregon Business Development Department to continue providing subsidies.<sup>348</sup> Like

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homebuilder-installed renewable energy systems and high-efficiency combined heat and power facility. It defines “renewable energy resource manufacturing facility” and further permits the ODOE to set standards determining what constitutes a facility. It increased the maximum total eligible costs for renewable energy equipment manufacturing facility projects from \$20 million to \$40 million but retained the existing 50% multiplier for eligible costs, resulting in a maximum credit of \$20 million. It authorizes ODOE to adopt limits on the costs that are eligible for the credit by taking into account the facility’s minimum level of increased employment, financial viability, likelihood of long-term success, and likelihood of locating in Oregon based upon the applicant’s receipt of the BETC. It holds a purchaser of the BETC harmless from repaying the BETC if the state revokes certification of the project. It prohibits the ODOE from recapturing tax against certain persons who are not considered successors in interest to the applicant developer, including persons who acquired an interest through bankruptcy or foreclosure of a security interest.

<sup>344</sup> H.B. 2472, 75th Leg. Assemb., Reg. Sess. (Or. 2009). In 2009, the state legislature passed H.B. 2472, which would have reduced the BETC cap from \$10 million to \$3.5 million. The Governor returned H.B. 2472 unsigned and disapproved to the Oregon Secretary of State, stating,

The BETC has aided the renewable energy industry, which in turn has provided much needed jobs while transitioning the state towards cleaner, renewable energy sources. Oregon now leads the nation in the percentage of jobs related to green energy. . . . I cannot support a bill that would scale back our support for one of the few growing sectors of our economy at a time when encouraging new economic opportunity is so critically important.

Letter from Theodore R. Kulongoski, Governor, State of Oregon, to Kate Brown, Sec’y of State, State of Oregon (Aug. 7, 2009), *available at* [http://archivedwebsites.sos.state.or.us/Governor\\_Kulongoski\\_2011/governor.oregon.gov/Gov/pdf/letters/brown\\_hb2472\\_unsigned.pdf](http://archivedwebsites.sos.state.or.us/Governor_Kulongoski_2011/governor.oregon.gov/Gov/pdf/letters/brown_hb2472_unsigned.pdf).

<sup>345</sup> H.B. 3680, 75th Leg. Assemb., Spec. Sess. (Or. 2010).

<sup>346</sup> *See id.* § 6.

<sup>347</sup> Bill Text H.B. 3672 (Or. 2011).

<sup>348</sup> *Business Energy Tax Credits for Manufacturing*, OREGON DEP’T OF ENERGY, <http://www.oregon.gov/ENERGY/CONS/BUS/tax/BETC-Manufacturing.shtml> (last visited Apr 14, 2012). *Also see Business Energy Tax Credit*, BUS. OR., <http://www.oregon4biz.com/The-Oregon-Advantage/Incentives/Business-Energy-Tax-Credit> (last visited Apr 14, 2012).



Portland, the state of Oregon has mandates and provides grants, loans, and technical assistance to encourage green building practices. As a result of these initiatives, Oregon has been considered by many to be the leading state in successful sustainable building development.<sup>349</sup>

#### **A. Oregon Business Energy Tax Credit (BETC)**

The Oregon Business Energy Tax Credit (BETC) was offered to both individuals and businesses<sup>350</sup> to encourage green building, energy and resource conservation, and investment in renewable energy resources. BETC provided a tax credit based on the square footage of the building for sustainable buildings.<sup>351</sup> In addition, a credit varying between 35% and 50% of eligible energy project costs was available for qualified green energy projects.<sup>352</sup> Since its implementation, the Oregon Department of Energy (ODOE) has issued over 12,000 BETC tax credits for projects totaling over \$983 million.<sup>353</sup> The BETC provisions had two noteworthy features. First, the credits could be passed from the owner to other taxpayers.<sup>354</sup> Second, the taxpayer could double dip—i.e., the same person could receive the BETC *as well as* the federal tax credits.<sup>355</sup>

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<sup>349</sup> Elizabeth Brown, ET AL., TAX CREDITS FOR ENERGY EFFICIENCY AND GREEN BUILDING: OPPORTUNITIES FOR STATE ACTION (2002), available at [www.eceee.org/conference\\_proceedings/ACEEE\\_buildings/2002/panel\\_9/p9\\_2/paper](http://www.eceee.org/conference_proceedings/ACEEE_buildings/2002/panel_9/p9_2/paper). See also King & King, *infra* note App. B n.13, at 413. (“Oregon stands out as the only U.S. state with a sustainability statute that both defines sustainability and broadly commits the state to pursue sustainability policies.”).

<sup>350</sup> See OREGON DEP’T OF ENERGY, *Business Energy Tax Credits*, <http://www.oregon.gov/ENERGY/CONS/BUS/BETC.shtml> (last visited Apr. 4, 2012). BETC was not limited to businesses. Individuals as well as corporations, associations, firms, partnerships, limited liability companies, and joint stock companies were eligible. Furthermore, any nonprofit company or cooperative was eligible as was federal, state and local governments. Thus, school districts, water districts, or any other special district could qualify, which was a great opportunity for municipalities to implement green policies while helping their stretched budgets.

<sup>351</sup> OREGON DEP’T OF ENERGY, *BETC-Sustainable Buildings*, <http://www.oregon.gov/ENERGY/CONS/BUS/tax/sustain.shtml> (last visited Apr. 4, 2012).

<sup>352</sup> OREGON DEP’T OF ENERGY, *infra* note 378.

<sup>353</sup> OREGON DEP’T OF ENERGY, WHAT YOU NEED TO KNOW ABOUT BEING A BUSINESS ENERGY TAX CREDIT PASS-THROUGH PARTNER 1 (2007), available at <http://library/state.or.us/repository/2007/200701191123085/index.pdf>.

<sup>354</sup> OR. REV. STAT. § 469.206(1) (2011).

<sup>355</sup> As originally enacted, BETC had an overall cap on the subsidy of \$10 million, did not allow for the pass-through option, and did not allow double dipping. For a discussion of the federal credits, see *supra* note 192.

### 1. Sustainable Buildings

From 2001 to 2011, the BETC provided a tax credit for commercial buildings, based on the square footage of the entire building, if they were “Sustainable Buildings.” Sustainable Buildings were defined as those that meet LEED standards.<sup>356</sup> To be eligible for this tax credit, the sustainable building facilities had to achieve a minimum rating of Silver.<sup>357</sup> Projects receiving a Gold or Platinum rating could be awarded proportionally larger tax credits.<sup>358</sup> The credit was \$10 per square foot for the first 10,000 square feet if the building was Silver LEED and went up to \$13.57 per square foot if the building met either Gold or Platinum LEED.<sup>359</sup> The maximum BETC that could be claimed for a sustainable building was \$3.5 million, which was 35% of the certified cost,<sup>360</sup> up to a maximum certified cost of \$10 million.<sup>361</sup> In either case, a facility had to be rated and certified by a state approved program and earn a certain number of LEED points in specific LEED categories.<sup>362</sup>

### 2. Qualified Green Energy Projects<sup>363</sup>

The types of qualifying projects under BETC were numerous and included energy efficient conservation, lighting, and weatherization projects for both new construction and retrofits.<sup>364</sup> Homebuilders had two types of project options that could earn BETC credits—the

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<sup>356</sup> OR. ADMIN. R. 330-090-0135(1) (2011).

<sup>357</sup> *Id.*

<sup>358</sup> *Id.*

<sup>359</sup> Angelo Michael Capuzzi, Strategic Planning for LEED Certification (June 8, 2010) (thesis, MIT) (on file with the MIT Library System).

<sup>360</sup> OR. REV. STAT. §§ 315.354(4)(d), 469.200(1)(c) (2011).

<sup>361</sup> *Id.* at 469.200(1)(c).

<sup>362</sup> The project had to earn at least two points under Energy & Atmosphere Credit 1, one point under Energy & Atmosphere Credit 3, and calculate and report the building’s annual solar income in Btu. OR. ADMIN. R. 330-090-0110 (2011). Energy & Atmosphere 1 was “Optimize Energy Performance” and Energy & Atmosphere Credit 3 (Additional Commissioning). See OREGON DEP’T OF ENERGY, *Business Energy Tax Credits Technical Requirements*, available at <http://library.state.or.us/repository/2008/200804251534145/>.

<sup>363</sup> OR. ADMIN. R. 330-090-0120 (2010). See also *Oregon Business Energy Tax Credit*, OREGON DEP’T OF ENERGY, 2, (2008), <http://www.oregon.gov/ENERGY/CONS/BUS/docs/betcbro.pdf> (last visited Apr. 4, 2012).

<sup>364</sup> OR. ADMIN. R. 330-090-0120 (2011); see also *Oregon Business Energy Tax Credit*, OREGON DEP’T OF ENERGY (2008), <http://www.oregon.gov/ENERGY/CONS/BUS/docs/betcbro.pdf> (last visited Apr. 4, 2012).

Homebuilder Installed Renewable Energy Facility<sup>365</sup> and the High Performance Home.<sup>366</sup> Renewable energy projects were also subsidized and included renewable resource and energy projects.<sup>367</sup> Each type of project had to meet specific requirements and the tax benefit could vary.<sup>368</sup> After 2011, the green building programs have been suspended; however, the renewable energy projects for certain manufacturers were not repealed.<sup>369</sup>

The tax credit for energy efficiency projects was 35% of the incremental or additional costs.<sup>370</sup> Energy efficiency projects that relate to green building practices could be conservation or lighting

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<sup>365</sup> Renewable energy resource facility in a single-family dwelling had to meet specified BETC technical requirements. See OREGON DEP'T OF ENERGY, *BETC-Renewable Energy Projects* (2011), <http://www.oregon.gov/ENERGY/CONS/BUS/tax/BETC-Renewables.shtml> (last visited Apr. 4, 2012).

<sup>366</sup> *Id.*

<sup>367</sup> The BETC was 50% for High Efficiency Combined Heat and Power Projects, Renewable Energy Resource Generation Projects and Renewable Energy Resource Equipment Manufacturing Facilities. OREGON DEP'T OF ENERGY, *Energy Information for Businesses, Business Energy Tax Cuts*, (2011), <http://www.oregon.gov/ENERGY/CONS/BUS/BETC.shtml> (last visited Apr. 4, 2012). The High Efficiency Combined Heat and Power Facility were projects "designed to generate electrical power and thermal energy from a single fuel source with a fuel-chargeable-to-heat rate yielding annual average energy savings of 20 percent" that could qualify for a 50% BETC. Facilities that did not meet the 20% savings requirement, however, could be eligible for a 35% tax credit under "Combined Heat and Power" facilities, or the facility could qualify and choose to take a tax credit relating to the heat recovery portion of the facility. See OR. ADMIN. R. 330-090-0110(34) (2011). Renewable Energy Resource Generation Projects had to use one or more types of renewable resources to produce, disclaim or displace energy, through solar, wind, hydro, geothermal, or biomass. The project had to replace at least 10% of the electricity, gas, or oil used to be eligible for the 50% credit taken over 5 years at 10% each year. Projects with eligible costs of \$20,000 or less could take the full credit in one year and carry forward unused credits for up to eight years. See OR. ADMIN. R. 330-090-0140 (2011). Renewable Energy Resource Equipment Manufacturing Facilities must manufacture equipment, machinery, or other products that will be used exclusively for renewable energy resource facilities. See OR. ADMIN. R. 330-090-0120(2)(e) (2011). The tax credit was 50% of eligible facility costs claimed over five years at 10% per year and the costs could not exceed \$40 million dollars a year.

<sup>368</sup> *Id.*

<sup>369</sup> H.B. 2523 allows for a 10% credit for 5 years for the certified cost of a "renewable energy resource equipment manufacturing facility." *Id.* § 2(1). The facility is defined in § 2(5) and applies generally to manufacturers of electric vehicles. The facility must be located in Oregon and the credit cannot be passed through to others. The costs under the old cannot exceed \$200 million. *Id.* Section 15. See also OREGON DEP'T OF ENERGY, *supra* note 351.

<sup>370</sup> OREGON DEP'T OF ENERGY, *Conservation Projects*, <http://www.oregon.gov/ENERGY/CONS/BUS/tax/BETC-Efficiency.shtml> (last visited Mar. 9, 2012).

projects.<sup>371</sup> Conservation projects included weatherization, which involved caulking, weather-stripping, replacing doors and windows, and duct, pipe, attic, floor, and wall insulation.<sup>372</sup> Qualifying conservation retrofit projects had to be 10% more efficient than existing installation.<sup>373</sup> “New construction projects [had to] have a simple payback of one to fifteen years.”<sup>374</sup> Qualifying lighting retrofit projects, on the other hand, had to be 25% more efficient than existing lighting.<sup>375</sup> Lighting for new construction projects had to be 10% more efficient than energy code or standard industry practice.<sup>376</sup> Lighting projects had to also have a simple payback of one to fifteen years.<sup>377</sup>

As stated above, homebuilders had two types of projects that could earn BETC credits—the High Performance Home and the Homebuilder Installed Renewable Energy Facility.<sup>378</sup> A High Performance Home was a new dwelling unit, intended for sale to a homebuyer, that had its own space-conditioning and water-heating systems, and which complied with the BETC technical requirements.<sup>379</sup> The credit for the High Performance Home was \$12,000.<sup>380</sup> A qualifying Homebuilder Installed Renewable Energy Facility included photovoltaic,<sup>381</sup> solar domestic water heating,<sup>382</sup> active solar space heating,<sup>383</sup> and passive solar.<sup>384</sup> The amount of the

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<sup>371</sup> *Id.*

<sup>372</sup> See OREGON DEP'T OF ENERGY, Div. 90, BUSINESS ENERGY TAX CREDITS (BETC) (2012), available at [http://arcweb.sos.state.or.us/pages/rules/oars\\_300/oar\\_330/330\\_090.html](http://arcweb.sos.state.or.us/pages/rules/oars_300/oar_330/330_090.html).

<sup>373</sup> *Id.* For new construction, the project had to reduce energy use by at least 10% as compared to a similar building that meets minimum standards.

<sup>374</sup> OREGON DEP'T OF ENERGY, *supra* note 372.

<sup>375</sup> *Id.*

<sup>376</sup> *Id.*

<sup>377</sup> *Id.*

<sup>378</sup> OREGON DEP'T OF ENERGY, *BETC-Renewable Energy Projects*, <http://www.oregon.gov/ENERGY/CONS/BUS/tax/BETC-Renewables.shtml> (last visited Apr. 4, 2012).

<sup>379</sup> *Id.*

<sup>380</sup> OR. REV. STAT. § 315.354(4)(c) (2011).

<sup>381</sup> *BETC-Renewable*, *supra* note 378. The credit amount was based on \$3 per watt of installed capacity.

<sup>382</sup> *Id.* The credit amount was equal to \$0.60 per kWh saved as determined by the ODOE solar domestic water heating yield table.

<sup>383</sup> *Id.* The credit amount was equal to \$0.60 per kWh saved based on a calculation procedure approved by ODOE staff.

<sup>384</sup> *Id.* The credit amount was equal to \$600 per home plus \$0.60 per square foot of heated floor space. Other renewable energy resource facilities (e.g., wind turbines, fuel

subsidy varied depending on the amount of the energy saved,<sup>385</sup> but in no event could it amount to more than \$9000.<sup>386</sup>

The credit could be taken either over a one-year period or a five-year period.<sup>387</sup> If the credit was taken over the five-year period, 10% of the credit was applied in the first and second years and 5% was applied each year thereafter.<sup>388</sup> If the credit was a 50% credit, the final three years would see 10% of the credit applied each year.<sup>389</sup> Any unused credit could be carried forward up to eight years.<sup>390</sup> Those with eligible project costs of \$20,000 or less could take the credit in one year.<sup>391</sup>

Eligible Costs	Carryover Period <sup>392</sup>	Year 1 – 2	Year 3 – 5
\$20,000 +	Credit was taken over five years	10 %	5% (or 10% a year for 50% tax credits)
\$20,000 or less	Credit could be taken in one year	100%	0%

### ***B. Passing-Through (Monetizing) the BETC***

Owners of buildings could sell their BETC credit by utilizing a pass-through option that allowed a project owner to transfer its tax credit to a partner in return for a lump-sum cash payment upon project completion.<sup>393</sup> The two situations in which this would arise were when (1) a public or nonprofit entity with no tax liability was unable to claim state and federal tax benefits, or (2) an owner lacked the financial capital to invest in the BETC project or preferred not to own

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cells) would be evaluated on a case-by-case basis and the credit amount would be equal to \$0.60 per kWh.

<sup>385</sup> *Id.*

<sup>386</sup> OR. REV. STAT. § 315.354(4)(b) (2011).

<sup>387</sup> See OREGON DEP'T OF ENERGY, Div. 90, *supra* note 372.

<sup>388</sup> *Id.*

<sup>389</sup> *Id.*

<sup>390</sup> OR. REV. STAT. § 315.354(6) (2011).

<sup>391</sup> *Id.* at (1)(b).

<sup>392</sup> For a Renewable Energy Resource Generation Project, a tax credit recipient could carry forward unused tax credit for a maximum of eight years. See ORS § 315.354(6) (2011).

<sup>393</sup> OR. ADMIN. R. 330-090-0140(1)(a) (2008). Also, it should be noted that BETC was a business credit; investors in an LLC that elect to be taxed as a partnership could effectively take the credit against personal income taxes.

or maintain a renewable energy system.<sup>394</sup> The project owners had the option to retain part of BETC and sell part, and they could even sell to multiple pass-through partners.

The pass-through partner was thus able to invest in a renewable energy system installed on a host property of another. The investor could typically receive all the financial incentives available; including utility rebates, federal and state tax credits, and accelerated depreciation.<sup>395</sup> The investor could then sell the pollution-free, fixed-price electricity to the host after six to seven years, earning a favorable return on the investment in the meantime.<sup>396</sup> This arrangement was often set up using complicated partnership or LLC arrangements and the use of special allocations that usually involved a flip in ownership after a set period of time.<sup>397</sup> Any pass-through entity could pay for a BETC on behalf of its shareholders and the pass-through partners did not have to be identified or secured before application for the final certification.<sup>398</sup> The credit was not lost as a result of a merger or even a sale, as long as this constituted a sale of the stock and not the sale of assets.<sup>399</sup> However, once a credit was purchased or passed-through, it was not revocable.<sup>400</sup>

ODOE assisted project owners in identifying an Oregon business or individual to serve as a pass-through partner to which the owner could transfer the tax credit.<sup>401</sup> The pass-through partner gave the project owner a cash payment at the state mandated discount from face value of the tax credit.<sup>402</sup> The one-year discount was 30.5% and the five-year

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<sup>394</sup> Some property developers retained a long-term interest in the projects as a third-party owner. An investor-owned utility could choose to become a utility pass-through partner or participate as a pass-through partner under the rules that governed other pass-through partners. OR. ADMIN. R. 330-090-0140(2).

<sup>395</sup> *Energy Info for Businesses, Business Energy Tax Credit Pass-through*, OREGON DEP'T OF ENERGY, available at [www.oregon.gov/ENERGY/CONS/BUS/tax/pass-through.shtml](http://www.oregon.gov/ENERGY/CONS/BUS/tax/pass-through.shtml).

<sup>396</sup> *Id.*

<sup>397</sup> Neil D. Kimmelfield, *The Oregon Business Energy Tax Credit*, TAXATION SECTION NEWSLS. (Oregon State Bar), Spring 2008, available at [http://www.lanepowell.com/wp-content/uploads/2009/04/kimmelfieldn\\_012.pdf](http://www.lanepowell.com/wp-content/uploads/2009/04/kimmelfieldn_012.pdf).

<sup>398</sup> *Energy Info for Business*, *supra* note 395.

<sup>399</sup> Rob O'Neill, Moss Adams, LLP, *Purchasing Oregon Business Energy Tax Credits ("BETC")* (Oct. 21, 2010), available at <http://www.mossadams.com/mossadams/media/Documents/Publications/Salt/PurchasingOregonBETC-102110.pdf?ext=.pdf>.

<sup>400</sup> *Id.*

<sup>401</sup> *Energy Info for Businesses*, *supra* note 395.

<sup>402</sup> *Id.*

discount was 25.5%.<sup>403</sup> The pass-through payment was paid before ODOE issued the partner an irrevocable tax credit certificate to recoup its investment.<sup>404</sup>

### *C. Oregon Residential Energy Tax Credits (RETC)*

Unlike BETC, the Oregon Residential Energy Tax Credit (RETC) program was extended by HB 3672 until January 1, 2018; except it eliminated some appliances, such as dishwashers, clothes washers, refrigerators, air conditioners, and boilers.<sup>405</sup> The RETC program parallels the BETC in many ways and compliments it in others. The RETC offers a personal income tax credit to its residents<sup>406</sup> who invest in either energy conservation projects or renewable projects.<sup>407</sup> Renters can also get the credit if they own the system.<sup>408</sup> The amount of the RETC is based on the amount of energy saved.<sup>409</sup> “Residents can obtain a credit for efficient appliance purchases” or for installation of renewable energy property up to a maximum of \$1500 per project per year.<sup>410</sup>

The RETC has two types of projects that qualify—conservation projects and renewable projects.<sup>411</sup> Conservation projects include purchases of energy-efficient appliances, heating and air conditioning

<sup>403</sup> OR. ADMIN. R. 330-090-0140(1)(B)(b) (2011).

<sup>404</sup> The ODOE reviewed and set the pass-through rate by taking into account the value of the money over time and other factors; this was known as the Net Present Value. The Net Present Value was applied to the final certified cost of the facility to determine the amount of the pass-through payment. The Net Present Value was the amount in effect when ODOE received the pass-through option agreement, not when the final certification was issued. *See* OR. ADMIN. R. 330-090-0140(1)(b). *See also Energy Info for Businesses, supra* note 395.

<sup>405</sup> *See* OREGON DEP’T OF ENERGY, *supra* note 341.

<sup>406</sup> Any Oregon resident who has a RETC qualifying equipment or project can apply for a RETC. To benefit from the RETC, the Oregon resident must owe Oregon income taxes, but may be able to use the pass-through option, similar to the BETC. Those that qualify include homeowners, renters, and landlords. *See* OREGON DEP’T OF ENERGY, *supra* note 341.

<sup>407</sup> *Id.*

<sup>408</sup> OREGON DEP’T OF ENERGY, OREGON RESIDENTIAL ENERGY TAX CREDIT, *available at* <http://www.oregon.gov/ENERGY/CONS/RES/tax/docs/retcbro.pdf>.

<sup>409</sup> *See* OREGON DEP’T OF ENERGY, *supra* note 341.

<sup>410</sup> ECONORTHWEST, ECONOMIC IMPACTS OF OREGON ENERGY TAX CREDIT PROGRAMS IN 2007 AND 2008 (BETC/RETC), 4 (Feb. 2, 2009), *available at* [http://oregon.gov/ENERGY/CONS/docs/BETC\\_RETC\\_Impacts-020209\\_FINAL.pdf](http://oregon.gov/ENERGY/CONS/docs/BETC_RETC_Impacts-020209_FINAL.pdf).

<sup>411</sup> *Id.*

systems, and water heaters.<sup>412</sup> The renewable projects include solar systems, wind systems, fuel cells, geothermal systems, and hydroelectric systems.<sup>413</sup> The RETC is based on the energy saved.<sup>414</sup> ODOE lists the maximum tax credit allowed, and the RETC will be the lesser of that maximum or 25% of the eligible net purchase loss.<sup>415</sup> The maximums range from \$1000 for qualifying appliances to \$1500 for systems, such as resource installations.<sup>416</sup> If any portion of the RETC is unused, the resident can carry it forward for up to five years. *See* Appendix A, Chart 6.

Like the BETC, if an applicant qualifies for a RETC but does not have an Oregon tax liability (or is not an Oregon resident), he or she may transfer the RETC to an individual or business with an Oregon tax liability in exchange for a lump-sum payment.<sup>417</sup> “For tax credits up to \$1,500, the payment amount is 95[%] of the tax credit amount.”<sup>418</sup> For solar-based credits above that amount, the payment is 80% for a business partner or 86% for a residential partner. The pass-through process parallels that of the BETC, requiring the applicant to first complete and submit the tax credit application form, which the ODOE will review for eligibility.<sup>419</sup> Then, if approved, the applicant and his pass-through partner (who the applicant must find on his own) must complete and return the pass-through option application to the ODOE.

#### ***D. Other State Initiatives***

The state of Oregon has several mandates and a host of loan and assistance programs related to green building. Oregon, like Portland, requires that new and renovated public buildings be LEED certified. In addition, Oregon has instituted a grant program, a low-interest loan program, and it offers technical assistance regarding green building practices.

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<sup>412</sup> *Id.*

<sup>413</sup> *Id.*

<sup>414</sup> OREGON RESIDENTIAL ENERGY TAX CREDITS, *supra* note 408.

<sup>415</sup> *Id.*

<sup>416</sup> *Id.* The applicant must be the owner of the equipment, the equipment must be new, meaning the original user is the applicant, and the qualifying equipment must be used in applicant's primary residence or vacation home (both of which must be used in Oregon). *Id.*

<sup>417</sup> *Id.*

<sup>418</sup> OREGON RESIDENTIAL ENERGY TAX CREDIT, *supra* note 408, at 11.

<sup>419</sup> *Id.*



### 1. Mandates

In November 2004, the Oregon Department of Administrative Services passed a policy that required all construction and renovation projects of state-owned facilities to meet the LEED Silver standard.<sup>420</sup> In 2007, Oregon enacted a statute requiring that new construction of public buildings or major renovations of public buildings must include solar technology in an amount equal to at least 1.5% of the contract price.<sup>421</sup> In addition, Oregon regulations prescribe that new construction be at least 20% more efficient than the building code.<sup>422</sup> Oregon's building codes mandate energy efficiency: the residential code is based on the 2006 version of the International Energy Conservation Code, whereas the nonresidential Structural Specialty Code is based off the International Building Code, certified by the U.S. Green Building Council.<sup>423</sup> Like other states, Oregon has a net-metering law<sup>424</sup> and a property tax exemption for the value of renewable energy systems.<sup>425</sup>

### 2. The Energy Trust of Oregon

The Energy Trust of Oregon (ETO) is a nongovernmental, nonprofit organization overseen by a volunteer board of directors appointed by the Oregon Public Utilities Commission (OPUC).<sup>426</sup> The

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<sup>420</sup> OREGON DEP'T OF ADMIN. SERVS., POLICY MANUAL NO. 125-6010 (Nov. 1, 2004), available at <http://www.oregon.gov/DAS/FAC/docs/1256010.pdf>.

<sup>421</sup> If it is determined that is inappropriate to include solar technology on the current project, the agency must include solar technology worth 1.5% on a future building. This is similar to the federal government's policy that green building is only appropriate if it is "cost effective." 10 C.F.R.s 433.1 (2009); 42 U.S.C.A. § 6834(a)(2) (West 2012).

<sup>422</sup> OR. ADMIN. R. 330-135-0040 (2009). The regulations state that existing buildings become more green by reducing energy they use by the year 2015. OR. ADMIN. R. 330-135-0010 (2009).

<sup>423</sup> BUILDING CODES ASSISTANCE PROJECT, *Oregon Code Chronology*, <http://bcap-or/state-country/oregon>.

<sup>424</sup> OR. REV. STAT. § 757.300 (2011).

<sup>425</sup> OR. REV. STAT. § 307.175 (2011). Property equipped with solar systems or certain other renewable energy systems used for heating or cooling or to generate electrical energy is exempt to the extent of the value added by the system. A property tax exemption may also arise under the Oregon Enterprise Zone Act which is tied to the project's geographic location, type of industry, and number of jobs created. OR. REV. STAT. § 285C.175 (2011).

<sup>426</sup> *Who We Are*, ENERGY TRUST OF OREGON, <http://www.energytrust.org/about/who-we-are/> (last visited Apr. 4, 2012); *Who We Are: Board of Directors*, ENERGY TRUST OF OREGON, <http://www.energytrust.org/About/who-we-are/BoardofDirectors.aspx> (last visited Apr. 4, 2012).

trust began in March 2002, and is “charged by the [OPUC] with investing in cost-effective energy efficiency, helping to pay the above-market costs of renewable energy resources,” and encouraging energy market transformation in Oregon.<sup>427</sup> OPUC aims to change how Oregonians produce and use energy by investing in efficient technologies and renewable resources that save money and protect the environment.<sup>428</sup> ETO offers a host of programs, including technical assistance.<sup>429</sup>

ETO funds come from a 1999 energy restructuring law that required “Oregon’s two largest investor-owned utilities to collect a three percent ‘public purposes charge’ from their customers.”<sup>430</sup> A portion of the money ETO receives each year from this charge is allocated to the following public purposes: (1) conservation (56.7%); (2) renewable resources (17.1%); (3) weatherization for low-income households (11.7%); (4) schools (10%); and (5) low-income housing (4.5%). ETO distributes the remaining funds as cash incentives to business owners, architects, engineers, contractors, and others private parties making efforts to incorporate green building features and energy efficient products into their workplaces.<sup>431</sup> ETO offers incentives to: (1) multifamily residential projects, (2) existing buildings, (3) new buildings, (4) product efficiency, and (5) solar projects.<sup>432</sup> ETO offers incentives under its New Building Efficiency Program for new construction projects or major renovations.<sup>433</sup> The project must qualify under one of three programs: the Standard Track,<sup>434</sup> the Custom Track,<sup>435</sup> or the U.S. Green Building Council

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<sup>427</sup> See ENERGY TRUST OF OREGON, *infra* note 432.

<sup>428</sup> *Id.*

<sup>429</sup> *Id.*

<sup>430</sup> OR. REV. STAT. § 757.612(1).

<sup>431</sup> See ENERGY TRUST OF OREGON, *infra* note 432.

<sup>432</sup> See *generally* ENERGY TRUST OF OREGON, <http://energytrust.org/> (last visited Apr. 4, 2012).

<sup>433</sup> See *Break Ground With Energy Efficiency and Solar in Your Plans*, ENERGY TRUST OF OREGON, <http://www.energytrust.org/business/new-building/> (last visited Apr. 4, 2012). Major renovation of an existing business structure includes decreasing the building’s carbon footprint, changing occupancy, reconstructing a vacant structure, or completely replacing two or more building energy systems (lighting fixture, HVAC systems, and building envelopes which include roof, insulation, and windows). *Id.*

<sup>434</sup> STOEL RIVES, LLP, *Tax and Government Incentives Promoting Sustainable Development in Oregon*, [www.stoel.com/showarticle.aspx?Show=4280](http://www.stoel.com/showarticle.aspx?Show=4280) (last visited Apr. 4, 2012). Incentives for purchasing and installing energy efficient equipment up to \$100,000 per project, but can be combined with the Custom Track, making up to \$400,000 available per project. *Id.*

LEED NC Track.<sup>436</sup> In addition, a project that qualifies through the Standard Track may also qualify for incentives through the Energy Star Track.<sup>437</sup> The Energy Trust also offers cash incentives for solar energy projects that can be combined with state and federal tax credits.<sup>438</sup>

Energy Trust offers incentives to increase the energy efficiency of existing buildings. The standard program provides rebates for the retrofit of insulation, water heaters, lighting equipment, and HVAC equipment. The custom incentive requires that the energy savings be at least 25% of the current energy use for lighting equipment and 10% for all other equipment.<sup>439</sup> Custom incentives for projects not involving lighting equipment are approved up to 50% of the total approved cost.<sup>440</sup> Both standard and custom incentives are capped at \$500,000 per site per year.<sup>441</sup>

Eligibility rules for the ETO grants require the applicant to be an Oregon customer of Portland General Electric, Pacific Power, NW Natural, or Cascade Natural Gas and have a project in Oregon or be a Washington customer of NW Natural with a project in Washington.<sup>442</sup> There is a five-step process to obtain the cash incentives: (1) applicants obtain a bid from a contractor for the costs of the project and complete a customer inquiry form that includes project start and end dates; (2) ETO reviews the application and sends an incentive offer that includes completed paperwork for the incentive; (3) the applicant contacts ETO within 30 days if the applicant decides to accept the offer; (4) schedule an inspection for the project as it nears completion; and (5) after the project is complete, the applicant sends invoices to ETO to receive incentives.

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<sup>435</sup> *Id.* Incentives for building energy systems that reduce energy use below code minimum, up to \$300,000 per project. *Id.*

<sup>436</sup> *Id.* Incentives for projects that receive LEED certification; cannot be combined with other tracks and up to \$300,000 per project. *Id.*

<sup>437</sup> Incentives from \$2000 to \$30,000 for achieving ENERGY STAR building performance certification from the EPA. Incentives can be combined with Standard Track. *Id.*

<sup>438</sup> *Id.*

<sup>439</sup> *Id.*

<sup>440</sup> *Id.*

<sup>441</sup> *Id.* The Energy Trust also offers cash incentives that can be combined with state and federal tax credits for solar energy.

<sup>442</sup> ENERGY TRUST OF OREGON, *supra* note 432.

### 3. Oregon State Energy Loan Program

The Oregon State Energy Loan Program (SELP), administered by the Oregon Department of Energy, was created in 1979 to promote energy conservation and renewable energy resource development.<sup>443</sup> SELP offers low-interest loans for projects that save energy, produce energy from renewable resources, or use recycled materials to create products.<sup>444</sup> Thus, installation of solar equipment on a new or existing building or using recycled materials during construction could likely qualify for a low-interest loan.<sup>445</sup> If an applicant receives a grant from another source, the statute will prevent double dipping by excluding that portion of the cost from the loan amount.<sup>446</sup>

#### *E. Harnessing Opportunities to “Double Dip”*

It is typical that a taxpayer receiving a grant will not be able to obtain a credit or loan on that grant amount.<sup>447</sup> In addition, a state credit is often not allowed in addition to a federal credit for the same expenditure. However, it is also typical that a loan, unlike a grant, will create basis and allow the taxpayer to depreciate the property. Often, local jurisdictions modify these rules to allow double dipping. Oregon had established that a taxpayer could use the BETC and the federal energy tax credit for the same qualifying property.<sup>448</sup> In addition, the BETC did not reduce depreciable basis in assets. The purchaser of a BETC credit could, in addition to receiving the credit, amortize the purchase price over the five-year discount period. That meant that in a consolidated tax return, any member of the group could purchase the

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<sup>443</sup> OR. REV. STAT. § 470.060 (2011); OREGON DEP'T. OF ENERGY, *Energy Loan Program*, [www.oregon.gov/ENERGY/LOANS/selphm.shtml](http://www.oregon.gov/ENERGY/LOANS/selphm.shtml) (last visited Apr. 4, 2012).

<sup>444</sup> The program also gives loans for projects that use alternative fuels.

<sup>445</sup> The rates are set after each bond sale and are fixed for the full term of the loan, which ranges from five to fifteen years.

<sup>446</sup> See OR. REV. STAT. § 470.120 (2011).

<sup>447</sup> See NANCY SHURTZ, EDUCATION PLANNING: TAXES, TRUSTS AND TECHNIQUES, 369 (exemplifying when a student receives a Pell Grant and wants to claim the American Educational Opportunity Credit).

<sup>448</sup> STOEL RIVES, LLP, *Energy Law Alert: Oregon Set to Expand Business Energy Tax Credit*, (July 2, 2007), [www.stoel.com/showalert.aspx?show=2841](http://www.stoel.com/showalert.aspx?show=2841).

credit and it can benefit all.<sup>449</sup> Lastly, state grants would not reduce certified costs.<sup>450</sup>

### *F. Assessing Oregon's Green Building Initiatives*

The BETC and the RETC have proven to be effective tools in promoting the efficient use of energy at both the business and residential levels. The ODOE commissioned ECONorthwest for a report assessing the economic effectiveness of Oregon's energy tax credits, which it issued in February 2009.<sup>451</sup> The report focuses on the RETC and the BETC during 2007 and 2008 and concludes that there were significant reductions in energy costs and carbon dioxide emissions as well as significant increases in the overall Oregon economy, jobs, wages, and state and local revenues as a consequence of these two credits. The report states that these benefits were "over and above what might have been achieved if the RETC and BETC did not exist and the tax credit dollars were reallocated and spent by Oregon state government on other programs."<sup>452</sup> There was no significant difference in results between the 2007 and 2008 years, although the numbers do vary.

For 2008, the report concludes that "[t]he combined spending on the BETC and RETC programs . . . totaled \$170.8 million for tax credits and program administration."<sup>453</sup> The effects of these tax credits, combined with businesses spending and residences utilizing these credits, was to decrease energy costs by \$194.3 million, reduce carbon dioxide emissions by 1.7 million tons, and strengthen Oregon's economy in numerous ways.<sup>454</sup> The study concluded that the overall output in Oregon's economy increased by \$390.7 million, created 806 new jobs, increased Oregon wages by \$21.1 million, and increased tax revenues for state and local governments by \$16.3 million.<sup>455</sup> Again, these net impacts reflect benefits over and above what would have

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<sup>449</sup> The new federal law allows double dipping. See Roberta F. Mann, *Federal, State, and Local Tax Policies for Climate Change: Coordination or Cross-Purpose*, 15 LEWIS & CLARK L. REV. 369, 386–87 (2011).

<sup>450</sup> OR. REV. STAT. § 315.354(6) (2011).

<sup>451</sup> ECONORTHWEST, *supra* note 410.

<sup>452</sup> *Id.* at 2 (emphasis in original).

<sup>453</sup> *Id.*

<sup>454</sup> *Id.*

<sup>455</sup> *Id.*

been achieved if the RETC and BETC did not exist and if the tax credit money was therefore reallocated and spent by the Oregon state government on other programs.

The ECONorthwest study also examined the effect of the RETC and BETC on energy savings over time. While the BETC and RETC are taken during the year of installation, the energy savings effects go well on into the future and the expected useful lives range from eight to sixteen or more years. The cost benefits of business and residential projects also extend into the future, as “[t]hese cost savings continue to benefit the economy, as households spend less on electricity and more on other consumer products and businesses are able to produce goods and services more efficiently.”<sup>456</sup> As the ECONorthwest study explains, the RETC and BETC provide economic benefits and savings that will extend far into the future and offer more than just a one-time tax credit.

The ECONorthwest study ended in October of 2008, around the period when the recession was becoming more serious and the country was experiencing a standstill in construction. It remains to be seen whether building players in Oregon will be able to afford the green building techniques and continue to receive Oregon state subsidies or whether conventional methods will prevail and green building will fall by the wayside.

Regardless of the uncertainty with the recession, many criticisms of BETC have been voiced. These criticisms were most likely instrumental in the 2011 sunset of that provision. First, some criticized the BETC for unfairly allowing corporations to avoid paying their fair share of the taxes. While critics saw the benefit in incentivizing green building and energy use, they argued that “[e]ach dollar that goes into reducing energy use is a dollar that a business doesn’t have to pay the state.”<sup>457</sup> Due to the fact that the BETC was calculated based on an eligible project’s costs and not the net energy efficiency created as a result, it was difficult to know whether the businesses would have made the improvements anyway as part of an expansion or renovation or as regular maintenance.<sup>458</sup> Many said that the savings these businesses would receive from making capital

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<sup>456</sup> *Id.*

<sup>457</sup> Roger Valdez, *Oregon Tax Credit Program Needs Improvement*, SIGHTLINE DAILY (May 20, 2009), <http://daily.sightline.org/2009/05120/oregon-tax-credit-program-needs-improvement/>.

<sup>458</sup> *Id.*

improvements should be incentive enough and the tax revenues were much needed for Oregon, which had been hit hard by the recession.<sup>459</sup>

The second main complaint was with the pass-through provision of the BETC, which could allow businesses who may have nonefficient, pollution-producing facilities to benefit from the sale of the BETC from Oregon entities without a tax liability. For example, in 2007, Solar World sold Wal-Mart \$11 million in tax credits for a cash sum of \$7.3 million.<sup>460</sup> This enraged advocates for low-income families and labor issues and highlighted the friction between social activists and environmental groups on the BETC issue.<sup>461</sup> A related criticism of the pass-through provision was that many of the beneficiaries were out of state banks, such as U.S. Bank or Bank of America, instead of Oregon businesses. The critics claimed that if the objective is to grow local industry, then the BETC was a failure.<sup>462</sup>

A third criticism was that the BETC and RETC have an adverse impact on low-income residents and thus frustrate environmental justice concerns.<sup>463</sup> A study by Hymel and Mann, however, indicated that while “it seems likely that the RETC will disproportionately benefit non-minority, higher-income households,” the BETC has generated economic expansion that “went to economic sectors that employ lower income workers.”<sup>464</sup> They conclude: “research does indicate that market instruments can be designed to ensure distribution equity concerns are addressed.”<sup>465</sup>

Despite the ECONorthwest study suggesting that the BETC was accomplishing what it set out to do, which was incentivizing businesses to move to Oregon, creating jobs while benefiting the environment through renovation and conservation projects, and

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<sup>459</sup> *Id.*

<sup>460</sup> *Id.*

<sup>461</sup> *Id.*

<sup>462</sup> David J. Petersen, TONKON TORP, LLP, *The State of Renewable Project Development in the Northwest*, (Apr. 24, 2008), available at <http://www.nebc.org/documents/mreph%2008/1-Petersen.pdf>.

<sup>463</sup> Richard J. Lazarus, *Pursuing “Environmental Justice”: The Distributional Effects of Environmental Protection*, 87 NW. U. L. REV. 787, 792–93 (1993) (describing the tendency of credits to fail to benefit low-income people).

<sup>464</sup> Mona L. Hymel, Roberta F. Mann & Beth S. Wolfson, *Trading Greenbacks for Green Behavior: Oregon and the City of Portland’s Environmental Incentives*, CRITICAL ISSUES IN ENVTL. TAXATION 4–5, vol. 5 (Dec. 2007), available at <http://ssrn.com/abstract=951107>.

<sup>465</sup> *Id.*

reducing Oregon's contribution to greenhouse gases, the 2011 legislation decided to sunset BETC. With the economic downturn and increasing state budget deficits, the legislature concluded that other issues were more important than developing Oregon's green building initiatives.

It is important to emphasize that the legislature did not decide to discontinue the tax incentives on the residential level. Although, Oregon residents will likely be more frugal and less likely to invest in conservation and renewable energy projects for their homes during the recession, they might also be inclined to implement retrofit projects that provide short- and long-term savings. It remains to be seen whether the current state program without BETC will continue to be an effective stimulus to green building in the future.

To revitalize its leadership in green building, Oregon should follow the lead of other noteworthy states that have been creative in the green building initiatives. First, Oregon should pass a new sustainable building tax credit that is moderate in amount, has an overall aggregate cap or financial limit on the credit amount, and does not have the pass-through feature. Second, Oregon should institute more green mandates. For example, all new and remodeled state buildings, public schools, and state college buildings could be LEED Silver certified. Third, Oregon's building code could be strengthened by requiring statewide minimum green building standards. This would promote uniform as opposed to piecemeal green building practices throughout the state. Finally, Oregon should continue its grant, loan, technical assistance, and education efforts. Until the economy rebounds, it would probably not wise to mandate LEED for private commercial or residential buildings. *See* Appendix A, Chart 7 for a comparison to other state initiatives.

## V

### THE BENEFITS AND CHALLENGES OF GREEN BUILDING

Green building is seen as part of the solution to the economic and environmental crises facing the United States.<sup>466</sup> A growing number of economists argue that green building is an effective means of creating

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<sup>466</sup> The federal government has taken a lead in this area through the stimulus package passed in the fall of 2008, the recent American Recovery and Reinvestment Act of 2009, and the new Waxman-Markey energy bill.



jobs and stimulating our suffering economy.<sup>467</sup> Environmentalists see green building as an immensely effective and proactive way to reduce greenhouse gas emissions and curb environmentally destructive practices.<sup>468</sup> Investors, developers, and other industry stakeholders see it as an opportunity to make a profit by appealing to a growing number of buyers with a sense of environmental responsibility.<sup>469</sup> Owners see it as an opportunity to obtain favorable subsidies and significantly reduce the costs of building operations. Local, state, and federal governments<sup>470</sup> see green building as a way to accomplish environmental, social, economic, and national security goals.<sup>471</sup> Consequently, governments are instituting, expanding, and even mandating green building incentives. A growing portion of the public is concerned with climate change, as well as economic security, and is becoming more interested in alternatives to traditional building methods. Lastly, developing countries hope that the subsidization of green building technologies in America can eventually be exported cheaply to them to help solve some of their most pressing problems.<sup>472</sup>

Unfortunately, the challenges to green building are many. Although there is a growing awareness of green building practices, there is a general lack of knowledge and expertise about green technologies and sustainable green construction practices. There is a perception of higher costs and risks as well as general uncertainty by those in construction and real estate. The multitude of stakeholders with varying interests have difficulty reaching any consensus on what policies to pursue. In addition, the current economic recession

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<sup>467</sup> See generally GREEN BUILDING TASK FORCE EXECUTIVE SUMMARY, EXECUTIVE SUMMARY 4–7 (2004), available at [www.cityofboston.gov/Images\\_Documents/GBTF\\_Exec\\_Summary\\_tcm3-16409.pdf](http://www.cityofboston.gov/Images_Documents/GBTF_Exec_Summary_tcm3-16409.pdf). See also *infra* Part VI.A.3.

<sup>468</sup> Carl J. Circo, *Using Mandates and Incentives to Promote Sustainable Construction and Green Building Projects in the Private Sector: A Call for More State Land Use Policy Initiatives*, 112 PENN ST. L. REV. 731, 733 (2008). See *infra* Part VI.A.1.

<sup>469</sup> See Sussman, *supra* note 14, at 4–7.

<sup>470</sup> The federal government, by enacting the Emergency Economic Stabilization Act of 2008 and the American Recovery and Reinvestment Act of 2009, has extended existing and created new tax benefits for green building. American Recovery and Reinvestment Act, Pub. L. No. 111-5, 123 Stat. 115 (2009). Congress has also recently debated the Waxman-Markey bill, which sets up a federal cap-and-trade program but unfortunately does not include offsets from green building as part of domestic offsets.

<sup>471</sup> Sussman, *supra* note 14, at 7.

<sup>472</sup> Timothy F. Malloy & Peter Sinsheimer, *Innovation, Regulation and the Selection Environment*, 57 RUTGERS L. REV. 183, 183 (2004).

provides challenges, including the lack of research funding for new green building technologies. Finally, not only do existing building code regulations act as a barrier to these green construction practices, but local, state, and federal jurisdictions have policies that are inconsistent with the promotion of green building practices.

### *A. The Benefits of Green Building*

#### *1. Environmental Benefits*

Tremendous environmental benefits can be realized through a revolution in the way the industry designs, constructs, retrofits, operates, and demolishes buildings. Green building conserves the planet's resources, reduces energy consumption, and minimizes air, water, and waste pollution. The environmental benefits of these effects include reduced global warming, increased protection of biodiversity, and a more sustainable future.

#### *a. Resource Conservation*

The United States currently has approximately 300 billion square feet of land dedicated to buildings with roughly an additional 5 billion square feet of land being developed annually for new construction.<sup>473</sup> Green building emphasizes redevelopment of brownfields and renovation of existing buildings, which reduces the demand for undeveloped land.<sup>474</sup> Green building further conserves resources by encouraging the use of salvage and recycled-content materials, which then reduces the demand for virgin raw materials; currently, construction worldwide accounts for 40% of raw material use.<sup>475</sup>

#### *b. Energy Consumption and Air Pollution*

Building operations currently account for more than 40% of all energy consumed in the United States.<sup>476</sup> When including the energy required to fabricate building materials and construct the buildings

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<sup>473</sup> Steve Winter, *Green Residential Building in North America: A Perspective From the United States*, GREEN BLDG. IN NORTH AMERICA 4, available at [www.cec.org/Storage/61/5380\\_GBPaper4b\\_en.pdf](http://www.cec.org/Storage/61/5380_GBPaper4b_en.pdf).

<sup>474</sup> ENVTL. PROT. AGENCY, *2003 Smart Growth in Brownfield Communities Grant Recipients*, available at [www.epa.gov/smartgrowth/2003\\_sgbf\\_recipients.htm](http://www.epa.gov/smartgrowth/2003_sgbf_recipients.htm).

<sup>475</sup> BROWN, *supra* note 310, at 221.

<sup>476</sup> U.S. DEP'T OF ENERGY, BUILDINGS ENERGY DATA BOOK § 1.1.1 (2008), available at <http://buildingsdatabook.eren.doe.gov/ChapterView.aspx?chap=1>.

themselves, the percentage of energy consumed increases to 48%.<sup>477</sup> Additionally, buildings consume more than 73% of all electricity.<sup>478</sup> By improving energy efficiency through the green building techniques discussed in Part II of this Article energy consumption can be reduced.

Because buildings last for 50 to 100 years, construction methods and operations systems in existing buildings employ outdated, and inefficient technologies; an energy retrofit of an older inefficient building can cut energy use by 20% to 50%.<sup>479</sup> Through the increased use of green building technologies and practices, a significant impact can be made not only in increasing the energy efficiency of the operations of these buildings, but in reducing the negative impact traditional buildings have on global warming, water consumption, air quality, waste production, and biodiversity.

In light of the aforementioned statistics on building construction and energy use, it follows that the building sector is the single largest contributor to global warming, consuming more energy than either transportation or agriculture.<sup>480</sup> Building construction and operations account for 39% of carbon dioxide emissions in the United States and almost 8% of total global emissions.<sup>481</sup> Researchers have described these massive levels of consumption as the hidden culprit in the battle against climate change.<sup>482</sup> Ironically, while many people take refuge from air pollution by heading into buildings, indoor air is often more polluted than outdoor air.<sup>483</sup> Utilizing low-VOC and nontoxic materials improves indoor air quality just as green roofs improve outdoor air quality due to plants providing a cooling effect and processing harmful carbon dioxide.

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<sup>477</sup> Baum, *supra* note 6.

<sup>478</sup> BUILDINGS ENERGY DATA BOOK, *supra* note 476. For slightly different numbers see *Why Build Green*, ENVTL. PROT. AGENCY (2010), <http://www.epa.gov/greenbuilding/pubs/whybuild.htm> (stating that buildings make up 39% of total energy use, 68% of total electricity consumption, and 38% of carbon dioxide emissions).

<sup>479</sup> Retrofit energy savings from Clinton Foundation, *Energy Efficiency building Retrofit Program* fact sheet (New York: May 2007). See also Edward Mazria, *It's the Architecture, Stupid! Who Really Holds the Key to the Global Thermostat? The Answer Might Surprise You*, WORLD AND I (May/June 2003).

<sup>480</sup> BUILDINGS ENERGY DATA BOOK, *supra* note 476.

<sup>481</sup> *Id.*

<sup>482</sup> See UNEP, *Building and Construction*, <http://www.unep.org/climateneutral/Topics/Buildingandconstruction/tabid/141/Default.aspx> (last visited Mar. 26, 2012).

<sup>483</sup> See Baum, *supra* note 6.

*c. Water Use and Solid Waste*

The impact of buildings on the environment and earth's resources is not limited to energy consumption and air pollution. Building construction and operations account for 12% of water used in the United States and significant quantities of stormwater runoff, which contributes to soil erosion, mudslides, and other environmental problems.<sup>484</sup> In addition to wasteful water use and water-related problems, each year the construction, renovation, and demolition of buildings generates 30 to 35 million tons of solid waste.<sup>485</sup> Waste from building construction comprises one-third of all waste sent to landfills,<sup>486</sup> and yet, 95% of these materials are recyclable.<sup>487</sup> Eliminating wasteful construction methods and encouraging use of salvage and recycled materials for new construction reduces the amount of solid waste currently created by traditional construction.

*d. Protection and Cultivation of Biodiversity*

Green building is also seen as a vehicle for protecting and cultivating biodiversity and ecosystems while conserving and restoring natural resources. The Environmental Protection Agency lists the enhancement and protection of biodiversity as one of the advantages to green building.<sup>488</sup> Not only can green building help protect biodiversity by being more sensitive to and aware of the buildings' impact on the area, it can actually foster biological diversity. Both ecoroofs and green or living walls can have similar results. Researchers in Europe have recently published several studies with growing evidence that green roofing can provide a living space for small animals and plants.<sup>489</sup> Green roofs can take up the whole

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<sup>484</sup> See Del Percio, *supra* note 22, at 125–26.

<sup>485</sup> See Baum, *supra* note 6.

<sup>486</sup> Linda Monroe, *Diverting Construction Waste*, BUILDINGS (Mar. 1 2008), <http://www.buildings.com/ArticleDetails/tabid/3334/Default.aspx?ArticleID=5758#top>.

<sup>487</sup> *Id.*

<sup>488</sup> ENVT'L PROT. AGENCY, *infra* note 499.

<sup>489</sup> Jane Marinelli, *Green Roofs Take Root*, NAT'L WILDLIFE MAG., (Dec. 1, 2007), <http://www.nwf.org/NationalWildlife/article.cfm?issueID=119&articleID=1538> (noting that European research studies have found that green roofs can support living spaces for plants and animals). See also Susan Loh, *Living Walls—A Way to Green the Built Environment*, BEDP ENVTL. DESIGN GUIDE (Aug. 2008), <http://www.environmentdesignguide.net.au/media/TEC26.pdf> (noting that green roof projects have seen an increase in the growth of native plants); Felicity Carus, *Eco Worldly, Living Walls and Green Roofs Pave Way for Biodiversity in New Building*, <http://www.guardian.co.uk/environment/2009/mar/30/green-building-biodiversity>.

horizontal surface of a building and with planned vegetation, regular watering, and protection from predators; they can often promote biodiversity. Green or living walls, although not as common in commercial buildings as in residential buildings, can provide 100% permeable exterior surfaces that can provide lush life for plants and insects.<sup>490</sup>

*e. Coordination of Green Building with Sustainability Principles and Efforts*

It is imperative that sustainable urban development policies incorporate green building principles. These policies should include an integration of “green building with sustainable urban infrastructure for transportation, gas and electric utilities, potable water, waste disposal and recycling, storm water and wastewater management and sewage.”<sup>491</sup> Climate change and lack of affordable housing in the United States however may add additional challenges to this integration.<sup>492</sup> Nonetheless, sustainable green building is important not only to improve the lives of the current generation, but also those of future generations.

*2. Social and Health Benefits*

Green building is also seen as a way to promote social and health benefits.<sup>493</sup> All the major green building standards incorporate factors involving health, indoor air quality, building density, and proximity to public transportation. Studies have shown that these features can enhance the overall health of its occupants. Green building can also eliminate many building-related illnesses and enhance worker productivity.

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<sup>490</sup> See Lando & Associates Landscape Architects, [www.lando-landscapearchitecture.com](http://www.lando-landscapearchitecture.com) (last visited Apr. 4, 2012); Orange PDX, [www.orange-pdx.com](http://www.orange-pdx.com) (last visited Mar. 9, 2012). A proposed \$133 million federal building renovation, that of the Edith Green-Wendell Wyatt Federal Building in Portland, will cultivate vegetated fins that will grow more than 200 feet high on one side of the federal building. See *How Does Tower Grow? Seed Money*, ST. PETERSBURG TIMES, 12A (Jan. 31, 2010).

<sup>491</sup> *Opportunities and Challenges*, SECRETARIAT OF THE COMMISSION FOR ENVTL. COOPERATION 69 (2008), [http://www.cec.org/storage/61/5386\\_GB\\_report\\_EN.pdf](http://www.cec.org/storage/61/5386_GB_report_EN.pdf).

<sup>492</sup> *Id.*

<sup>493</sup> *The Social Benefits of Sustainable Design*, U.S. DEP'T OF ENERGY, available at [www.eere.energy.gov/femp/pdfs/buscase\\_section3.pdf](http://www.eere.energy.gov/femp/pdfs/buscase_section3.pdf); *Green Building Benefits*, CITY OF BLOOMINGTON, <http://bloomington.in.gov/green-building-benefits> (last visited Apr. 4, 2012).

*a. Overall Health Benefits of Going Green*

In addition to the environmental advantages of green buildings, there are a multitude of social and health advantages to green buildings, benefiting their occupants, and their communities at large.<sup>494</sup> Green building enhances occupant comfort and health by using safer and more natural building materials. Studies show that a green building's increased indoor air quality has been associated with increased occupant health and comfort,<sup>495</sup> and that increasing population and employment densities can encourage increased physical activity and transit use, thereby lowering obesity rates for the building occupants.<sup>496</sup> Construction that includes outdoor features and provides views of the environment can reduce stress.<sup>497</sup> Some studies show that most kinds of cancer are linked to environmental factors, and since most people spend a significant part of their lives inside buildings, a building that uses more natural materials could help decrease the risk for cancer.<sup>498</sup>

*b. Building-Related Illnesses*

While green buildings generally improve health, they might also be a safe haven from specific illnesses linked to poor air quality in conventional buildings, which are constructed from more chemically ridden materials. Sick building syndrome and building related illness, which result in "acute health and comfort effects . . . linked to time spent in a building," are some illnesses identified as resulting from poor indoor air quality.<sup>499</sup> A Harvard University study found that an estimated 23% of all buildings caused noticeable symptoms, such as headaches, eye, nose and throat irritation, fatigue, and difficulty

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<sup>494</sup> Pekka Huovila et al., *U.N. Envtl. Programme, Buildings and Climate Change: Status, Challenges and Opportunities* 7–8 (2007), available at [http://www.unep.fr/pc/sbc/documents/Buildings\\_and\\_climate\\_change.pdf](http://www.unep.fr/pc/sbc/documents/Buildings_and_climate_change.pdf).

<sup>495</sup> Laura Anne Spriggs, *Green Building and Indoor Air Quality*, FACILITIES MGMT. SUSTAINABILITY, <http://www.fmlink.com/ProfResources/Sustainability/Articles/article.cgi?USGBC:200710-17.html>.

<sup>496</sup> Reid Ewing & Richard Kreutzer, *Understanding the Relationship Between Public Health and the Built Environment*, U.S. GREEN BLDG. COUNCIL (May 2006), available at <http://www.usgbc.org/ShowFile.aspx?DocumentID=3901>.

<sup>497</sup> *Id.* at 136.

<sup>498</sup> See Del Percio, *supra* note 22, at 126–27.

<sup>499</sup> *Sick Building Syndrome*, ENVTL. PROT. AGENCY, [www.epa.gov/iaq/pubs/sbs.html](http://www.epa.gov/iaq/pubs/sbs.html) (last visited Apr. 4, 2012).

breathing.<sup>500</sup> Even when buildings have no noticeable immediate impact, the long-term exposure to indoor pollutants can cause damage to the gastrointestinal, circulatory, respiratory, and central nervous systems, cancer, and genetic toxicity.<sup>501</sup> Since green buildings improve indoor air quality by providing more ventilation and reducing chemical contaminants by using alternative building materials, it follows that green buildings will likely decrease the prevalence of building-related health conditions.<sup>502</sup>

*c. Increased Productivity*

Companies concerned with the well-being of their employees could capitalize on the benefits of green building to provide a more pleasant working space that will in turn boost productivity and retention. Not only do these negative health effects from some buildings cause discomfort and poor health for those affected, building-related illness can be a publicity nightmare for building owners. The ability to reduce the incidence of these conditions could be a good marketing tool to attract employees, customers, or tenants. Research indicates that increased natural lighting and ventilation and reduction of indoor irritants have a significant positive effect on worker productivity.<sup>503</sup> Similar studies in classrooms have shown improved learning and scholastic performance by children.<sup>504</sup> The currently identified benefits of green building to business are many, and there is still much to be learned from future research and technology.

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<sup>500</sup> William Fisk, *Health and Productivity Gains from Better Indoor Environments and their Relationship with Building Energy Efficiency*, 25 ANN. REV. OF ENERGY & ENV'T 537–66 (2000).

<sup>501</sup> Hal Levin, *Best Sustainable Indoor Air Quality Practices in Commercial Buildings*, BUILDINGGREEN.COM, [http://www.buildingecology.net/index\\_files/publications/BestSustainableIAQPracticesCommercialBuildings.pdf](http://www.buildingecology.net/index_files/publications/BestSustainableIAQPracticesCommercialBuildings.pdf) (last visited Apr. 4, 2012).

<sup>502</sup> *Id.*

<sup>503</sup> Peter Yost, *Green Building Programs—An Overview*, BLDG. STANDARDS 12–16 (Mar.–Apr. 2002).

<sup>504</sup> HESCHONG MAHONE GROUP, *Daylighting in Schools: An Investigation into the Relationship Between Daylight and Human Performance* (1999); see also Michael H. Nicklas & Gary B. Bailey, *Energy Performance of Daylit Schools in North Carolina*, INNOVATIVE DESIGN, INC. (2002), available at <http://www.innovativedesign.net/energyperformance.htm>.

### 3. *Economic Benefits*

Improved worker productivity is both an economic benefit and a health benefit. Green building also has the potential to spur economic development by creating new jobs and by creating, expanding, and shaping markets for green products and services. Lastly, green building can reduce operating costs and optimize life cycle economic performance of buildings.

#### *a. Economic Stimulation and Job Creation*

The building and construction sector makes up an important percentage of the gross domestic product (GDP) and employs many Americans. In 2002, the building and construction sector employed approximately 1.7 million employees and generated more than \$531 billion in annual revenue,<sup>505</sup> which represented approximately 5.2% of the country's GDP.<sup>506</sup> In 2006, more than \$1 trillion worth of construction occurred.<sup>507</sup> Despite its large historic presence in the U.S. economy, the building sector is one of the hardest hit in the recent recession. Estimates from March 2009 showed that the "construction of residential buildings was down 48% from March 2008 and a staggering 66% from March 2007," and the trend continues.<sup>508</sup> The industry hopes to see an upturn with stimulus funds, and the private sector seems to be the preferred recipient.

The current economic climate presents a key moment for green building to take off in prevalence within the building sector. The value of green building construction in the United States is estimated currently to be down to approximately \$40 to \$50 billion from a peak of \$90 billion.<sup>509</sup> That value is expected to increase to more than \$60

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<sup>505</sup> *Buildings and Their Impact on the Environment: A Statistical Summary*, ENVTL. PROT. AGENCY, at 1 (Dec. 2004), available at <http://www.epa.gov/greenbuilding/pubs/gbstats.pdf>.

<sup>506</sup> Percentage based on calculation using October 2002 estimate of GDP from [http://www.data360.org/dataset.aspx?Data\\_Set\\_Id=354](http://www.data360.org/dataset.aspx?Data_Set_Id=354) and EPA's Green Building Statistical Report. This compares with other countries, where the construction industry provides 5–10% of employment and 5–15% of the GDP. *Id.*

<sup>507</sup> See *Value of Construction in Place—Seasonably Adjusted Annual Rate*, U.S. CENSUS BUREAU, available at <http://www.censs.gov/const/C30/totsa2006.pdf>.

<sup>508</sup> *Hope Resides in the Private Building Sector: The One-Year, 4.5 Million-Jobs Investment Plan*, ARCHITECTURE 2030, [http://www.architecture2030.org/downloads/4.5\\_million\\_jobs\\_Plan.pdf](http://www.architecture2030.org/downloads/4.5_million_jobs_Plan.pdf) (last visited Mar. 9, 2012).

<sup>509</sup> *Green Building Facts*, U.S. GREEN BLDG. COUNCIL, available at <http://www.usgbc.org/showFile.aspx?DocumentID=3340>.



billion in 2010 and more than double to nearly \$1.4 trillion by 2013.<sup>510</sup> Green building thus has the potential to generate billions of dollars of economic activity. One study claims that an increase in green building activity will generate new jobs and that, once built, the occupants will be better able to both recruit and then retain their employees.<sup>511</sup> Job creation is also a forecasted result of green building.<sup>512</sup> Because green building utilizes regional materials and new technologies, green jobs can be created that are not likely to be outsourced to other countries.<sup>513</sup> While it is challenging to forecast how many jobs green building will create, research suggests that just moving to more energy efficient retrofitting would create somewhere between 600,000 to 900,000 ongoing national jobs.<sup>514</sup> The American Council for Energy-Efficient Economy (ACEEE) released a June 2008 study estimating that the net employment benefit from a 20% energy savings was the creation of 1.2 million new jobs by 2030.<sup>515</sup> After examining several state-level studies, the ACEEE concluded there was “a small but positive benefit for the American economy as a result of policies that emphasize investment-led energy efficiency improvements.”<sup>516</sup> Green building is a hopeful solution to the current economic crisis, as it has the potential to stimulate the economy and create sustainable jobs.

*b. Advantages for Businesses to Go Green*

*(i) Marketing Value*

Green buildings can create, expand, and shape markets for green products and services. Due to the popularity of becoming greener, green and sustainable buildings are often seen as having a higher

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<sup>510</sup> *Id.*

<sup>511</sup> See Spriggs, *supra* note 495. See also *Green Building Task Force Report*, BOSTON GREEN BLDG. at 5, available at [www.cityofboston.gov/.../GBTF\\_Exec\\_Summary\\_tcm3-16409.pdf](http://www.cityofboston.gov/.../GBTF_Exec_Summary_tcm3-16409.pdf).

<sup>512</sup> *Id.*

<sup>513</sup> Green building will thus create more jobs than traditional building. See *U.S. Green Building Council—Green Jobs Study*, USGB, <http://www.usgbc.org/ShowFile.aspx?DocumentID=6435> (last visited Apr. 4, 2012).

<sup>514</sup> *Unlocking Energy Efficiency in the U.S. Economy*, MCKINSEY & COMPANY, 99, (2009), available at [http://www.mckinsey.com/Client\\_Service/Electric\\_Power\\_and\\_Natural\\_Gas/Latest\\_thinking/Unlocking\\_energy\\_efficiency\\_in\\_the\\_US\\_economy](http://www.mckinsey.com/Client_Service/Electric_Power_and_Natural_Gas/Latest_thinking/Unlocking_energy_efficiency_in_the_US_economy).

<sup>515</sup> John A. Laitner & Vanessa McKinnery, “Positive Returns” *State Energy Efficiency Analyses Can Inform U.S. Energy Policy Assessment*, Report No. E084, AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON. (2008).

<sup>516</sup> *Id.*

market value.<sup>517</sup> An April 2008 study by the Institute of Business and Economic Research and the Fisher Center for Real Estate and Urban Economics found that rents for green office space were 6% higher than comparable non-green space and that the average green office building had \$5 million more of market value than a non-green office building.<sup>518</sup> A company that becomes greener could potentially improve its reputation, especially if the company is perceived as having a bad environmental track record.<sup>519</sup> In fact, a recent survey shows that 40% of corporate leaders “now believe that ignoring green building will result in public relations problems.”<sup>520</sup> This survey also revealed that 52% believe “green is a market differentiation opportunity;” 57% think green building will foster innovation; and 31% envision that their companies will be involved in sustainability as a form of “market leadership.”<sup>521</sup> By voluntarily adopting green building policies for new facilities before local governments adopt regulations, companies could also take advantage of a unique marketing opportunity.<sup>522</sup> The better reputation that generally accompanies a transition to green building practices may also help to insulate companies from lawsuits by environmental groups<sup>523</sup> and might lead to the formation of collaboration alliances between industry and environmentalists.<sup>524</sup>

(ii) *Reduction of Costs*

Green building reduces building operating costs and makes businesses more economically competitive, as one of the effects of going green is an increase in energy efficiency and a corresponding

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<sup>517</sup> Circo, *supra* note 468, at 736.

<sup>518</sup> Piet Eichhotz, Nils Kik & John M. Quigley, *Doing Well by Doing Good? Green Office Buildings*, INST. OF BUS. AND ECON. RESEARCH & THE FISHER CTR. FOR REAL ESTATE & URBAN ECON., April 2008.

<sup>519</sup> Sonja Persran & Mark Lucuik, *Marketing Green Building to Owners of Leased Properties*, CANADIAN GREEN BLDG. OWNERS, available at <http://www.cagbc.org/AM/Marketing/020green%20Building%20to%20Owners.pdf>.

<sup>520</sup> *Id.*

<sup>521</sup> *Id.*

<sup>522</sup> *Id.*

<sup>523</sup> See Claudia H. Deutsch, *Companies and Critics Try Collaboration*, N.Y. TIMES, May 17, 2006, available at <http://query.nytimes.com/gst/fullpage.html?res=9B06EED9153EF934A25756C0A9609C8B63&pagewanted=all>.

<sup>524</sup> Jennifer Bowmar & Laurie Wireman, *Hopping on the Green Wagon: How Corporations Can Overcome Potential Political Pitfalls Associated With Sustainability Initiatives*, 76 U. CIN. L. REV. 1479, 1488–89 (2008).

decrease in energy costs.<sup>525</sup> One comprehensive study concluded that green buildings will produce a lifetime savings of more than ten times that of conventional buildings, despite the greater initial construction costs.<sup>526</sup> A five-year study in Seattle concluded that additional funds to obtain LEED certification were “cost effective” because of the life cycle payoffs.<sup>527</sup> Green building might also have a direct effect on operational costs in terms of increased productivity,<sup>528</sup> lower absenteeism,<sup>529</sup> and reduced health care claims.<sup>530</sup> While these benefits may be more difficult to quantify than savings on utility bills, they may have significant and measurable financial benefits.<sup>531</sup>

Green building can also result in lower costs for the government, which in turn could result in lower taxes to the public. Green buildings require less public infrastructure for stormwater, sewage, potable water, and power plants. And, several studies have indicated that low impact development can reduce flooding, improve water quality, and increase groundwater recharge.<sup>532</sup>

#### 4. National Security Benefits

Since buildings use such a large proportion of U.S. energy, the use of alternative energy sources for building operations would have a huge impact on United States demand for foreign oil.<sup>533</sup> Both federal and state jurisdictions have emphasized the need to decrease this dependence. For example, the Office of Energy Efficiency and

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<sup>525</sup> *Everyone Benefits From Green Building*, MAYOR’S GREEN BLDG. TASK FORCE, 4 (2004), available at <http://www.unl.edu/centers/cfwc/reports/Buildinggreen.pdf>.

<sup>526</sup> Greg Kats et al., *The Costs and Financial Benefits of Green Buildings: A Report to California’s Sustainable Building Task Force II* (2003), available at [www.usgbc.org/DOCS/News/News477.pdf](http://www.usgbc.org/DOCS/News/News477.pdf).

<sup>527</sup> Lucia Athens, *Sustainable Building Program 5-Year Report 2000–2009*, CITY OF SEATTLE, 9 (2005), available at <http://www.seattle.gov.dpd/static/5-year-report-Latest Released-DPDp-009930.pdf>.

<sup>528</sup> See Yost, *supra* note 503.

<sup>529</sup> See Judith Heerwagen, *Sustainable Design Can Be an Asset to the Bottom Line*, ENVTL. DESIGN AND CONSTR., at 16 (July 15, 2002), available at <http://www.edcmag.com/articles/sustainable-design-can-be-an-asset-to-the-bottom-line>.

<sup>530</sup> *Id.* at 3.

<sup>531</sup> *Id.* at 16.

<sup>532</sup> Study by Braden & Johnson (2004) and Plumb & Seggos (2007) cited in ECONORTHWEST, *supra* note 410.

<sup>533</sup> Dependence on foreign oil both impacts relations with foreign countries and renders the United States susceptible to attacks on the oil supply.

Renewable Energy lists that two of its goals are to increase the energy efficiency of buildings and decrease dependence on foreign oil.<sup>534</sup> Green buildings fit perfectly as a solution to meet both of these challenges. For example, on the municipal scale, San Jose, California, expects that through its Green Building Program, which requires that municipal buildings meet a LEED Silver standard, it will be part of the effort to reduce the United States' dependence on foreign oil.<sup>535</sup> Through federal, state, and local action, the United States can take steps to become more nationally secure and self-sufficient by vamping up its efforts in green building.

### ***B. The Challenges of Green Building***

While progress has been made in many cities throughout the country (including Portland, Oregon), green building has yet to gain widespread acceptance. There seem to be five main barriers to adopting green building practices and technologies: (1) a general lack of knowledge and understanding of green technologies, including the perceived higher costs and risks;<sup>536</sup> (2) the conflicts between and among the various stakeholders; (3) the additional challenges imposed by the current economic recession; (4) the absence of adequate research on green building technologies; and (5) the lack of consistent and coordinated governmental policy supporting green building practices.

#### *1. Lack of Expertise and Perception of High Risks and Costs*

Perhaps the greatest hurdle to green building is the general lack of awareness of green building practices and its benefits. First, investors, developers, architects, construction companies and their subcontractors, and tradespeople working on green building projects have a very limited amount of knowledge and perhaps even less experience in the area.<sup>537</sup> Second, vendors, installers, and other trade personnel lack a critical mass of knowledge to advertise and

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<sup>534</sup> U.S. GREEN BLDG. COUNCIL, WHITE PAPER ON SUSTAINABILITY, 46 (2003), available at <http://www.usgbc.org/Docs/Resources/BDCWhitePaperR2.pdf>.

<sup>535</sup> Press Release, U.S. GREEN BLDG. COUNCIL, CITY GOING FOR THE GOLD (Mar. 9, 2007), <http://www.usgbc.org/News/LEEDNewsDetails.aspx?ID=2999>.

<sup>536</sup> ALLEN MATKINS, GREEN BLDG. INSIDER: 3RD ANNUAL GREEN BLDG. SURVEY (2009), available at <http://www.jdsupra.com/post/documentViewer.aspx?fid=0d255d50-204a-4b13-aa9b-cf60fd394919>.

<sup>537</sup> *Diffusion of Green Building Report*, available at [http://personal.anderson.ucla.edu/charles.corbett/papers/difussion\\_green\\_building.pdf](http://personal.anderson.ucla.edu/charles.corbett/papers/difussion_green_building.pdf), at 8.

recommend green products. Third, many of these professionals have a perception of the increased costs of green building and are hesitant to try what they consider risky practices. Lastly, consumers are generally unaware of green practices and the associated benefits so they are hesitant to pay higher up-front costs to save on long-term operating costs.<sup>538</sup>

*a. Lack of Knowledge and Experience*

Surveys of industry professionals have found a general lack of knowledge and understanding of green building practices and technologies.<sup>539</sup> Not only is there no uniform acceptance of green building practices by industry professionals,<sup>540</sup> some builders have publicly stated that the benefits have not been proven so they currently have no plans to pursue green building.<sup>541</sup> Many in the field believe that both the risks and costs are greater with these new technologies. Industry professionals tend to rely on personal experience and personal relationships with other professionals in their local building markets for information on the efficacy of new methods and technologies,<sup>542</sup> which is a significant barrier to the novel green building movement. Additionally, there is a lack of experienced workforce, which could easily lead to an increase in risks and error.

*b. Perceived Risks and Costs Too High*

*(i) Uncertainty and Perception of Increased Risks*

The highly risk averse and insular nature of the building and real estate industries make the adoption of new practices and technologies extremely difficult. Research has shown that most developers tend to

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<sup>538</sup> A survey indicated that of 10,000 respondents: (1) 44% thought green design added significantly to first costs, (2) 42% responded that the real estate market was not interested nor willing to pay the premium for green building features, (3) 35% said green building design was hard to justify even in light of operating cost savings, (4) 19% asserted they were uncomfortable with green technologies, and (5) 16% believed LEED to be too complicated and burdensome. WHITE PAPER, *supra* note 18, at 15–16.

<sup>539</sup> MATKINS, *supra* note 536.

<sup>540</sup> *Id.*

<sup>541</sup> Michael Brick, *Commercial Real Estate: Not Going Green Is Called a Matter of Economics*, N.Y. TIMES, Jan. 15, 2003, at C5, available at <http://www.nytimes.com/2003/01/15/business/commercial-real-estate-not-going-green-is-called-a-matter-of-economics.html?pagewanted=1>.

<sup>542</sup> *Id.*

rely on methods and designs that have been proven to be very predictable and reliable.<sup>543</sup> They, in fact, “go to great lengths to avoid and diminish the uncertainties involved with buying, selling, and developing properties.”<sup>544</sup> A survey conducted in December 2008 found that building industry professionals believed the risks associated with green construction were significantly greater than with traditional construction, but that those perceived risks decreased with greater knowledge of and experience in building green projects.<sup>545</sup> One significant explanation for the conservative and anti-innovative tendencies of developers is that the risk of design and construction defect litigation is greater when working with new technologies that are more likely to be unfamiliar to project participants.<sup>546</sup> Also, the current practices follow the current building codes, whereas there is more uncertainty of compliance in adopting green building practices.<sup>547</sup>

(ii) *Perception of Increased Costs*

In addition to greater risks, the industry also believes the costs are greater with green building practices. Builders do not consider many of the statistical analyses of green building costs significant in determining the value of green technologies and practices on their own projects.<sup>548</sup> A Boston study noted that developers might have a hard time justifying increased costs to lenders during the loan application

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<sup>543</sup> See Benjamin S. Kingsley, *Making it Easy to be Green: Using Impact Fees to Encourage Green Building*, 83 N.Y.U. L. REV. 532, 544 (2008).

<sup>544</sup> *Id.* at 545 (quoting Lutzenhiser et al., *Market Structure and Energy Efficiency: The Case of New Commercial Buildings* 23, 33 (2001)).

<sup>545</sup> *Id.*

<sup>546</sup> See generally Jeffrey D. Masters & John R. Musitano, *Managing Liability Risks in Green Construction*, L.A. LAW. (Dec. 2007).

<sup>547</sup> See *id.* at 18.

<sup>548</sup> Lisa Fay Matthiessen & Peter Morris, *Costing Green: A Comprehensive Cost Database & Budgeting Methodology* 3 (2004), available at [http://www.chs.ubc.ca/archives/files/Costing%20Green\\_A%20Comprehensive%20Cost%20Database%20and%20Budgeting%20Methodology.pdf](http://www.chs.ubc.ca/archives/files/Costing%20Green_A%20Comprehensive%20Cost%20Database%20and%20Budgeting%20Methodology.pdf). *Costing Green* concludes that

comparing the average cost per square foot for one set of buildings to another does not provide any meaningful data for any individual project to assess what—if any—cost impact there might be for incorporating LEED and sustainable design. The normal variations between buildings are sufficiently large that analysis of averages is not helpful. Remember, buildings can never be budgeted on averages.

*Id.* at 23.

period until there is more evidence to show that green buildings are more valuable.<sup>549</sup>

*c. Consumers' Hesitancy*

Like the developers and builders, consumers are hesitant to look to green building in order to save energy and reduce their carbon footprints<sup>550</sup> even though the potential benefits to consumers are vast. While the green building industry is doing its part to incorporate the growing information about green buildings into building materials, products, and services, consumer demand continues to play a key role in the prevalence of these products on the market.<sup>551</sup> An additional obstacle adding to consumer uncertainty is the current lack of a single uniform method of classification and rating of green buildings.<sup>552</sup> The green building industry can increase consumer demand and certainty about green building by informing consumers about green materials, putting more efforts into the research and development of green products, and by pushing for a unified, simplified rating system for green buildings.

*d. Actual Costs and Benefits of Green Building*

*(i) Construction and LEED Certification Costs*

While there are conflicting results from various studies regarding the payoffs of green building, the majority of research suggests that green building is more cost effective overall, especially when looking at the full life cycle of buildings. In fact, some studies show that there is no large difference in construction cost between conventional and green methods. In 2003, California's Sustainability Task Force received what has become a widely cited report on the costs and financial benefits of green buildings.<sup>553</sup> Based upon surveys and interviews of more than thirty LEED certified projects and project

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<sup>549</sup> *Id.* at 10.

<sup>550</sup> As of June 2009, only 5% of Americans have actually calculated their carbon footprint while 40% expressed interest in knowing. Calculate yours by going to <http://www.carbonfootprint.com/calculator.aspx>.

<sup>551</sup> *Green Building: Builders, Consumers and Realtor Prime*, BLDG. ENVTL. SCI. AND TECH., <http://www.energybuilder.com/greenbld.htm> (last visited Mar. 9, 2012).

<sup>552</sup> *Id.*

<sup>553</sup> GREG KATS ET AL., THE COSTS AND FINANCIAL BENEFITS OF GREEN BUILDINGS (2003), available at <http://www.calrecycle.ca.gov/Greenbuilding/Design/CostBenefit/Report.pdf>.

professionals, the study found that the average added cost premium for green buildings is about two percent.<sup>554</sup> Other research has estimated the average premium costs to be approximately one to four percent for LEED Silver buildings, three to six percent for LEED Gold buildings, and eight to ten percent for LEED Platinum buildings.<sup>555</sup> Several studies have concluded that there is no statistically significant overall cost difference between buildings that achieve a LEED certification and those that do not.<sup>556</sup> A July 2007 study comparing 83 LEED certified buildings to 138 conventional buildings, concluded there is “no significant difference in average costs for green buildings as compared to non-green buildings.”<sup>557</sup>

Other studies show “that green buildings are only marginally more expensive up front and that the payback on the original investment is quite short due to the energy cost savings.”<sup>558</sup> Additionally, green building may increase the building’s value by enhancing its marketability and raising the return on investment.<sup>559</sup> It is important for the building industry to keep in mind the life cycle costs of green buildings when determining whether to go green; construction is merely the first phase of the building’s life and the long-term savings resulting from green building practices are plentiful.

#### *(ii) Life Cycle Savings of Green Buildings*

Despite the potential or actual increased costs accrued during construction, green buildings more than make up for their investment over the building’s lifetime. Not surprisingly, some of the most significant data supporting the cost-effectiveness of green buildings are based on life cycle studies.<sup>560</sup> Life cycle studies take into account

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<sup>554</sup> *Id.* at 15.

<sup>555</sup> See Matthiessen & Morris, *supra* note 548. These estimations will fluctuate depending on different geographic regions and the relative experience levels of builders and designers. *Id.* at 14. See also Randy Udall & Auden Schendler, *LEED is Broken—Let’s Fix It*, I GREEN BUILD, <http://igreenbuild.com/cd-1706.aspx> (last visited Apr. 4, 2012).

<sup>556</sup> See Matthiessen and Morris, *supra* note 548, at 18–19.

<sup>557</sup> LANGDON, DAVIS, COST OF GREEN REVISITED (2007), available at <http://www.davislangdon.com/USA/Research/ResearchFinder/2007-The-Cost-of-Green-Revisited/>. Although this study focused on academic buildings, the results would seem to have similar application to all green buildings.

<sup>558</sup> Edna Sussman, *Reshaping Municipal and County Laws to Foster Green Building, Energy Efficiency, and Renewable Energy*, 16 N.Y. ENVTL. L.J. 1, 9 (2008).

<sup>559</sup> NATURAL RES. DEF. COUNCIL, *Increase the Market Value of Your Project*, <http://www.greenerbuildings.com.au/improve-building-value> (last visited Apr. 4, 2012).

<sup>560</sup> Circo, *supra* note 468, at 739.



not only the initial construction costs but also the lifetime operational costs of a building: energy, water, and other utility bills; maintenance and repair; potential environmental benefits; and more.<sup>561</sup> These studies have demonstrated that most of the key features of a green building will pay for themselves in a relatively short period of time.<sup>562</sup> California's Sustainability Task Force estimates that green buildings can produce life cycle savings of approximately ten times the additional up-front costs involved.<sup>563</sup> Assuming a two percent cost premium for building green, this would yield a life cycle savings equal to twenty percent of the total construction cost of the building.<sup>564</sup> For the green building movement to have impact, it is important to dispel industry fears of costs and risks of green building. This can be done with continued studies, more research, and aggressive education and training. The building and real estate sectors of the market need to be shown the actual benefits and advantages of green building.

## 2. *Conflicts Among Stakeholders*

Another challenge to the green building movement and the policy makers who have to incentivize change is the conflict among the various stakeholders. The stakeholders may have conflicts within and among groups. The primary stakeholders in green building are developers, builders, realtors, lenders, investors, employers, employees, owners, and tenants. Some of the conflicts revolve around who will most directly recognize the benefit of green building. Some of the conflicts are specific to the different stakeholders, such as conflicts within publicly traded companies.

### a. *Conflicts at the Construction Level*

The developer, builder, and realtor are all interested in making a quick profit. The cost savings that accrue over time to the green building, which are cited as making up for additional construction costs, are not realized directly by these industry professionals. Since developers and builders do not benefit from operational savings like lower electricity bills, they do not want to add any costs during the

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<sup>561</sup> *Id.*

<sup>562</sup> Charles J. Kibert, *Green Buildings: An Overview of Progress*, 19 J. LAND USE & ENVTL. L. 491, 495 (2004).

<sup>563</sup> See KATS ET AL., *supra* note 553, at ii.

<sup>564</sup> *Id.*

construction phase, as it would decrease their profit margin.<sup>565</sup> Also, the benefits realized from lower operational building costs are not often directly profitable to other parties involved in a building's financing and sale.<sup>566</sup> A United Nations report on buildings and climate change notes that the life cycle cost-benefit analysis that justifies higher up-front construction costs does not prevent the cost premium from acting as a deterrent to builders because their

interest is not to keep running costs low; their interest is to keep investment costs low as their profit depends on them. As the actors responsible for the operational phase differ from those involved in the building process, there is usually a conflict of interests which can hamper the introduction of energy-efficient technologies.<sup>567</sup>

The United Nations report views this market failure, often called the split-incentive problem, as critical in explaining why green and energy efficient technologies have not been widely embraced in the building community.<sup>568</sup>

*b. Owner-Tenant Conflict*

Many building owners are hesitant to build green because they view the benefits as passing directly to the tenants, while tenants want their landlords to provide the healthiest living space at the lowest cost. Owners who view green building as expensive with little return might not be interested in spending more money on the building project so that the tenant will reap the benefits of lower operational costs. Some studies suggest, however, that building owners could personally benefit by the building's increased marketability, increased satisfaction, and retention of tenants, and can reduce their liability and risk, by lower incidence of building-related illnesses.<sup>569</sup> Also, if a gross lease is signed, the building owner pays for water and electricity, allowing he/she to benefit more directly. The gross lease approach may give the owner an incentive to install green items such as energy saving windows, but it does not provide incentives for the tenants to

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<sup>565</sup> Circo, *supra* note 468, at 741.

<sup>566</sup> Huovila, Pekka, et al., *Buildings and Climate Change: Status, Challenges and Opportunities*, U.N. ENVTL. PROGRAMME 43 (2007), available at <http://www.unep.fr/scp/publications/details.asp?id=DTI/0916/PA>.

<sup>567</sup> *Id.* at 43.

<sup>568</sup> *Id.* at 43–44.

<sup>569</sup> *Why Go Green: Improve Building Value*, GREENER BLDGS., <http://www.greenerbuildings.com.au/improve-building-value> (last visited Apr. 4, 2012).

do their part in decreasing energy consumption or boosting the building's energy efficiency. If the tenants do not see *any* benefit, it may be harder to justify a higher rent due to the additional costs of green building.<sup>570</sup>

*c. Conflicts Unique to Publicly Owned Companies*

In a similar vein to tenant-owner conflicts, if a publicly owned company uses green building methods while constructing a commercial facility exclusively for its own use, shareholders may be dissuaded from investing if the company engages in efforts that will raise costs and decrease profitability. If shareholders emphasize immediate gain over long-term returns (like lower operating costs of the green building), they may be dissatisfied with the company's decision to build green and therefore choose to sell their stock. While a board of directors' decision to implement aggressive sustainable strategies is likely protected from lawsuit by the business judgment presumption, it may not make good business, and specifically marketing, sense to disregard the concerns of shareholders.<sup>571</sup>

*d. Employer-Employee Conflicts*

Employees might also object to green building if the increased costs result in a reduction of their wages. While green buildings are cited as providing a better work environment and by doing so enabling employers to retain more employees, this theory does not necessarily take into account what would happen if those employees were being paid less due to costs incurred by the employer for retrofitting.<sup>572</sup>

*e. Sustainability Players and Green Builders*

There may also be a conflict between those involved in the sustainability movement and those within the green building movement. Green building should take into account the sustainability of the materials used and the potential impact on future generations. As previously discussed in the benefits section, one of the

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<sup>570</sup> Michael Brick, COMMERCIAL REAL ESTATE, *Not Going Green is Called a Matter of Economics*, N.Y. TIMES, Jan. 15, 2003, at C5, available at <http://www.nytimes.com/2003/01/15/business/commercial-real-estate-not-going-green-is-called-a-matter-of-economics.html?pagewanted=1>.

<sup>571</sup> Bowmar & Wireman, *supra* note 524, at 1483–84.

<sup>572</sup> *Id.* at 1485.

environmental benefits of green building is protection and fostering of biodiversity, an element of sustainable living. If the sustainability and green building movements coordinate and cooperate, then this type of conflict is easily solved as both groups have an interest in protecting the environment and health of humans.

### 3. *Economic Challenges*

The recent recession in the United States presents an additional challenge to green building. The recession has resulted in a reduction in construction, a drying up of investment funds, and a tightening of the budgets on the state and local levels, all of which result in fewer opportunities for new green building projects. The recession further exacerbates consumer concerns regarding the additional costs, perceived and actual, frequently associated with green building.

#### *a. Building Sector Hit Hard by Recession*

On April 1, 2009, the U.S. Census Bureau of the Department of Commerce announced that total public and private construction spending in the United States during the first two months of 2009 was 10.9% below the same period in 2008.<sup>573</sup> Residential housing starts for April 2009 were 54.2% lower than in the same period a year before.<sup>574</sup> Housing completions were 15% below the revised 2008 rate.<sup>575</sup> These dramatic decreases are indicative of a large and vital sector of the U.S. economy undergoing what promises to be a very difficult period of time. Additionally, the real estate bubble bust has resulted in a decline in construction of new residential homes.

During most recessions, however, many people choose to renovate their own homes rather than purchase new houses, thus creating a terrific opportunity for green building renovations to occur. Many of the benefits of green building can be seen in the green retrofitting of existing buildings, and this smaller step may serve as a good test run that would likely prove the value of green building.

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<sup>573</sup> Press Release, *March 2009 Construction at \$969.7 Billion Annual Rate*, U.S. CENSUS BUREAU (Apr. 1, 2009), available at <http://www.census.gov/const/C30/pr200903.pdf>.

<sup>574</sup> Press Release, *New Residential Construction in April 2009*, U.S. CENSUS BUREAU (May 19, 2009), available at <http://www.census.gov/const/C30/pr200903.pdf>.

<sup>575</sup> *Id.*

*b. Decrease in Investments*

Investment monies have dried up as a result of the recession. The lack of investment funds has resulted in the stalling of many green building projects. Hopefully, President Obama's stimulus package, with its emphasis on environmentally friendly projects, and tax provisions that allow for immediately beneficial tax grants instead of tax credits may help to stimulate investment once again.<sup>576</sup>

*c. State and Local Budget Freezes*

As a result of the recession, states and municipalities are balancing their budgets and tightening their belts.<sup>577</sup> Governments focus their attention on what they see as the more pressing needs of creation and protection of jobs, health, welfare, and education before the promotion of green building. During a recession, governments are less likely to impose financial burdens on developers or construction companies that do not engage in green building practices and are less likely to invest in publicly funded green buildings. At the same time, green building construction is a potential solution to many of the aforementioned higher-priority issues.<sup>578</sup> Green building would likely

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<sup>576</sup> Tilde Herrera, *Path to \$3B in Stimulus Funds Revealed to Renewable Energy Developers*, GREENBIZ.COM, <http://greenbiz.com/news/2009/07/10/path-3b-stimulus-funds-revealed-renewable-energy-developers> (last visited Apr. 4, 2012).

<sup>577</sup> Leslie Eaton, Ryan Knutson & Phillip Shishkin, *States Shut Down to Save Cash*, WALL ST. J., Sept. 4, 2009, at A1.

<sup>578</sup> The ODOE commissioned ECONorthwest for a report assessing the economic effectiveness of Oregon's energy tax credits, which it issued in February 2009. ECONorthwest, *Economic Impacts of Oregon Energy Tax Credit Programs in 2007 and 2008 (BETC/RETC) (2009)*, available at [http://oregon.gov/ENERGY/CONS/docs/BETC\\_RETC\\_Impacts-020209\\_FINAL.pdf](http://oregon.gov/ENERGY/CONS/docs/BETC_RETC_Impacts-020209_FINAL.pdf). The report focuses on the RETC and the BETC during 2007 and 2008 (up until September). *See generally id.* The report concludes that significant reductions in energy costs and carbon dioxide emissions were made as well as significant increases in the overall Oregon economy, jobs, wages, and state and local revenues as a consequence of the two credits. The report states that these benefits were "over and above what might have been achieved if the RETC and BETC did not exist and the tax credit dollars were reallocated and spent by Oregon state government on other programs." *Id.* at 2. The combined spending on the BETC and RETC programs for 2008 totaled \$170.8 million for tax credits and program administration. *Id.* The effect of these tax credits, combined with businesses spending and residences utilizing these credits, was to decrease energy costs by \$194.3 million, reduce carbon dioxide emissions by 1.7 million tons, and strengthened Oregon's economy in numerous ways. *Id.* The study concluded that the overall output in Oregon's economy increased by \$390.7 million, created 806 new jobs, increased Oregon wages by \$21.1 million, and increased tax revenues for state and local governments by \$16.3 million. *Id.* The ECONorthwest study also examined the effect of the RETC and BETC on energy savings over time. *Id.* at 34. While the BETC and RETC

create jobs and increase revenue for the country; healthier building practices will lead to healthier lifestyles for the building occupants and will decrease many of the ailments associated with conventional buildings; and green buildings will help cut school operation costs. While the recession may seem like a barrier to green building, green building may actually be one of the solutions for many of the problems associated with decreased budgets.

#### *4. Lack of Research on Green Building*

Another obstacle to green building is a current lack of research with no foreseeable efforts to remedy this gap in sight. A recent report found that green building research funding in the United States makes up a mere 0.02% of the estimated annual budget for the building industry and a puny 0.2% of all federal research funding.<sup>579</sup> The need for increased research is imperative for the green building movement, as “advances in green building research can result in significant consumer savings and a strong return on investments.”<sup>580</sup> More comprehensive studies must be done on the environmental, health, and economic benefits of green building. Research will help to improve the existing green building technology and will lead to findings that may result in even more environmentally and economically valuable discoveries. It is important for the United States to tap into its tremendous research community and help support the future of green building.

#### *5. Lack of Consistent, Coordinated, and Effective Government Policy*

One of the greatest barriers to green building is the inconsistent, uncoordinated, and ineffective policies in place by state, local, and federal governments. Statutory barriers exist when state or municipal building codes impede green building technologies. Similarly,

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are taken during the year of installation, the energy savings effects continue into the future and the expected useful lives range from eight to sixteen or more years. *Id.* The cost benefits of business and residential projects also extend into the future, as “[t]hese cost savings continue to benefit the economy, as households spend less on electricity and more on other consumer products and businesses are able to produce goods and services more efficiently.” *Id.*

<sup>579</sup> *Green Building Research Funding: An Assessment of Current Activity in the United States*, U.S. GREEN BLDG. COUNCIL (Apr. 2007), available at <http://www.usgbc.org/ShowFile.aspx?DocumentID=2465>.

<sup>580</sup> Communications Department of the Commission for Environmental Cooperation Secretariat, *Green Building in North America: Opportunities and Challenges* 56 (2008), available at [www.cec.org/files/PDF//GB\\_Report\\_EN.pdf](http://www.cec.org/files/PDF//GB_Report_EN.pdf).

regulatory barriers exist when land use planning encourages urban sprawl. And fiscal barriers exist when tax policies are uncertain and ineffective. These barriers serve to confuse the builder, consumer, and other important stakeholders in the green building movement.

*a. Current Building Codes Are Limiting to Green Building*

As a preliminary matter, the overall scope of conventional building codes may not be conducive to green building practices. Building codes are often concerned with the health and safety of building residents, but they only examine individual components of buildings in order to address building-related risks.<sup>581</sup> Green building practices address integrated big picture issues considering the relationship between building components and the site, water, natural resource use, pollution, and end of life disposal of the building.<sup>582</sup> Current building codes thus often act as barriers to these alternative and innovative building techniques, even though these practices may exceed minimum safety requirements.<sup>583</sup> Greywater reuse, rainwater harvesting, on-site renewable energy generation, energy efficiency requirements, and net-zero energy and water use could all run afoul of current building codes. Generally, codes that are performance-based, as opposed to prescriptive, are more flexible and better serve governments' needs.

Building codes often prohibit both capturing rainwater for reuse and the actual reuse of greywater. Many western states hold that trapping rainwater for use impedes the rights of senior water users.<sup>584</sup> In addition, plumbing systems that reuse greywater are typically prohibited because of fears that reuse of the water is unsanitary.<sup>585</sup>

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<sup>581</sup> David Eisenberg, *Big Barriers to Living Buildings: Help for Approval Seekers*, Slideshow presentation at the 2008 Living Building Conference (Apr. 16–18, 2008).

<sup>582</sup> SECRETARIAT OF THE COMMISSION FOR ENVIRONMENTAL COOPERATION, ARTICLE 13 REPORT: GREEN BUILDING IN NORTH AMERICA: OPPORTUNITIES AND CHALLENGES 56 (Can. 2008), available at [http://www.cec.org/pubs\\_docs/documents/index.cfm?varlan=english&ID=2242](http://www.cec.org/pubs_docs/documents/index.cfm?varlan=english&ID=2242).

<sup>583</sup> *Id.* For example, the California Building Standards Commission passed on February 2010 CALGreen, a uniform state green building code.

<sup>584</sup> Peter Friederici, *A Good Idea—If You Can Get Away With It*, HIGH COUNTRY NEWS, Oct. 13, 2008, <http://www.hcn.org/issues/40.18/a-good-idea-2013-if-you-can-get-away-with-it>. (citing Utah, Colorado, and Washington as three states with these rules).

<sup>585</sup> Arizona is such a state. See U.S. DEP'T OF HOUSING AND URBAN DEV., FINAL REPORT FOR FIELD EVALUATION OF PATH TECHNOLOGIES 10 (Oct. 2004), available at <http://www.toolbase.org/pdf/fieldevaluations/ChapmanFinalReport.pdf>. Joe Gelt, *Home*

Furthermore, these greywater systems often require additional plumbing and additional costs to operate.

Traditional building codes (and zoning regulations) may even prevent a building from generating its own power. Both on-site solar and window power systems may be prohibited. Traditional codes may prevent these for aesthetic reasons. And planned developments often include mutual deed restrictions meant to preserve aesthetic uniformity and property values.

*b. Land Use Planning Encourages Urban Sprawl*

Most communities outside of Oregon do not have urban growth boundaries.<sup>586</sup> In fact, their zoning ordinances and low-density growth planning are aimed at creating automobile accessibility to the suburbs. Many “subdivision regulations, parking and street design standards also pose barriers to smart growth projects.”<sup>587</sup> A major challenge to green building is getting cities on board with effective land use planning.

*c. Lack of Effective Government Incentives for Green Building*

Although green building legislation has advanced greatly since the original inception with LEED, there are still very few states and localities that have strong incentives for green building.<sup>588</sup> Most states and localities adopt a laissez-faire approach that allows private actors to take green building initiatives voluntarily. Federal tax law has also consistently subsidized the use of fossil fuels,<sup>589</sup> and favors operating

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*Use of Graywater, Rainwater Conserves Water—and May Save Money*, UNIV. OF ARIZ., available at <http://ag.arizona.edu/azwater/arroyo/071rainrain.html> (last visited Apr. 4, 2012).

<sup>586</sup> Portland is well known for its 2040 Growth Concept which defines development in the metropolitan region through the year 2040 by enhancing transportation systems, directing development to existing urban centers, and accommodating bicycling and walking to work. See *Urban Devopment and Revitalization*, OREGON METRO, <http://www.oregonmetro.gov/index.cfm/go/by.web/id=26>.

<sup>587</sup> Marilyn A. Brown & Sharon (Jess) Chandler, *Governing Confusion: How Statutes, Fiscal Policy, and Regulations Impede Clean Energy Technologies*, 19 STAN. L. & POL’Y REV. 472, 496 (2008).

<sup>588</sup> See ELIZABETH BROWN ET AL., *Tax Credits For Energy Efficiency And Green Buildings: Opportunities for State Action*, AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., REPORT NO. E021 (Mar. 2001).

<sup>589</sup> These include percentage depletion (I.R.C. § 613), intangible oil and gas drilling expenses (I.R.C. § 263(c)), tax credit for nonconventional fuels (I.R.C. § 45K), and enhanced oil recovery costs (I.R.C. § 193(b)). See Salvatore Lazzari, *Energy Tax Policy*:



expenses over capital expenditures for buildings.<sup>590</sup> The federal government's fiscal policies have imposed frequent sunsets and extensions<sup>591</sup> as well as the alternative minimum tax,<sup>592</sup> which can deny enacted tax benefits. What is needed is a comprehensive environmental tax policy that eliminates the bad statutes, regulations and subsidies, and consistently and effectively supports green building practices.

## VI CONCLUSION

The United States and the world are now facing two of the greatest challenges of all times. The use of fossil fuels to produce energy has created an unsafe level of greenhouse gasses in the atmosphere. The trapped greenhouse gases are disrupting the world's climate and changing the weather patterns. Second, the overleveraging in the subprime mortgages and the failure of banks, insurance, investment, and other firms caused a worldwide economic recession adversely affecting workers, consumers, and businesses. Although buildings are unmoving and silent, they consume more than 40% of U.S. energy resources, use 40% of raw materials, contribute 35% to non-industrial waste, consume more than 12% of our water, and emit 38% of the United States' carbon dioxide emissions. Changing our policy on green building by initiating mandates, providing grants and subsidized loans, passing environmental taxes, and rebate incentives can have a significant impact on all of these fronts. Although municipal and state governments are limited in the direct measures they can take to effect change outside their own jurisdictions, they can set examples, either positive or negative, to other municipalities, states, and even to the federal government. Portland, Oregon, provides a good example of

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*History and Current Issues*, Res. Serv., RL33578 (July 28, 2006), available at <http://www.policyarchive.org/handle/10207/2938>.

<sup>590</sup> Capital costs must be depreciated over many years, whereas operating costs are fully deductible. I.R.C. § 168 allows for 39-year depreciation for nonresidential buildings. See discussion, *supra* note 150.

<sup>591</sup> Brown and Chandler, *supra* note 587, at 486 (giving an example of the renewable production tax credit which sunset in 1999, was extended to 2001 and then to 2003 and again to the end of 2007).

<sup>592</sup> I.R.C. § 55, which takes away certain deductions and credits. The hybrid electric car credit (I.R.C. § 30B) and the residential photovoltaic systems credit (I.R.C. § 25D(a)(1)) are two examples. However, the Emergency Economic Stabilization Act of 2008 allows taxpayers to use any of the section 48 credits to offset AMT liability.

what one community can do to help solve our environmental problems. Portland has been a leader in getting consensual stakeholders together to promote sustainable development; but to continue as a leader in the green building field, Portland needs to pass more mandates and a stronger rebate or environmental tax program. Oregon needs to revitalize its green building initiatives after the gutting of BETC. It should enact a sustainable building tax credit with an overall aggregate cap, strengthen its building code by instituting minimum green building standards, and pass more green building mandates for public buildings.

**APPENDIX A**  
**CHARTS AND GRAPHS**

Chart 1. Comparison of Features of Green Building Standards

<b>Green Standards</b>	<b>Target Building Groups</b>	<b>Evaluation Criteria</b>	<b>Point Rating System</b>
U.S. LEED	New, existing, core and shell, commercial interiors, homes, neighborhood development, schools, multiple buildings	Six criteria: sustainable sites; water efficiency; energy and atmosphere; materials and resources; indoor environmental quality; innovative design	Out of 100 total points: 40–49 points is certified; 50–59 points is silver; 60–79 points is gold; and 80 or more points is platinum
BREEAM	New, existing (major refurbishments, fit-out, and new build extensions), combination, mixed use	Ten criteria: management; materials, energy; water; pollution; waste; health and well-being; land use and ecology; transport; innovation	Out of 100 total points: Fewer than 30 points is unclassified; 30–44 points is pass; 45 to 54 points is good; 55 to 69 points is very good; 70 to 84 points is excellent; and 85 points and more is outstanding
Green Globes	New, significant renovations, existing building management	Seven criteria: project management; site; energy; water; resources, building materials and solid waste; emissions and other impacts; indoor environment	Out of 1,000 total points: 35–54 percent of points is 1 globe; 55–69 percent of points is 2 globes; 70–84 percent of points is 3 globes; and 85–100 percent of the points is 4 globes
Seattle	Affordable Housing Projects	Eight criteria: integrated design; site location; site improvements; water conservation; energy efficiency; materials; healthy living; operations and management	Mandates of 50 points for new construction and 40 points for retrofits
Canada LEED		Same as U.S. LEED	Project can receive up to six stars
Green Star (Australia)	Multi-unit residential, commercial, industrial	Nine criteria: management; indoor environmental quality; energy; transport; water; materials; land use	Out of 105 total points: 10–19 points is one star; 20–29 points is two stars; 30–44 points is three stars; 45–59 points is four stars (also called achieving Best Practices status); 60–74

Green Standards	Target Building Groups	Evaluation Criteria	Point Rating System
		and ecology; pollution; innovation	points is five stars (also called achieving Australian Excellence status); 75 or more is six stars (also called achieving World Leader status). The Green Building Council of Australia only certifies buildings that are 4, 5, or 6 stars
CASBEE (Japan)	Pre-design, new construction, redevelopment	Multiple criteria plus subcategories	Rating of C, B-, B+, A, and S (the top rating)

Chart 2. LEED Categories and Subcategories

Categories					
Sustainable Sites	Water Efficiency	Energy and Atmosphere	Materials and Resources	Indoor Environmental Quality	Innovative Design
Site Selection	Water Efficiency Landscaping	Fundamental Commissioning of the Building and Energy Systems	Storage & Collection of Recyclables	Outdoor Air Delivery Monitoring	Innovation in Design
Development Density and Community Connectivity	Innovative Wastewater Technologies	Minimum Energy Performance	Building Reuse	Increased Ventilation	LEED Accredited Professional <sup>1</sup>
Brownfield Redevelopment	Water Use Reduction	Fundamental Refrigerant Management	Construction Waste Management	Construction Management Plan	
Alternative Transportation		Optimize Energy Performance	Material Re-use	Low Emitting Materials	
Site Development		On-site Renewable Energy	Recycled Content	Indoor Chemical and Pollutant Source Control	
Storm Water Design		Enhanced Commissioning <sup>2</sup>	Regional Materials	Controllability of Systems	
Heat Island Effect		Enhanced Refrigerant Management <sup>3</sup>	Rapidly Renewable Materials	Thermal Comfort	
Light Pollution Reduction		Measurement and Verification <sup>4</sup>	Certified Wood	Daylight and Views	
		Green Power			

<sup>1</sup> This means at least one principal participant in the project is LEED certified.

<sup>2</sup> For the chart, Enhanced Commissioning requires that the project's commissioning process start early. A contract must be in place to have an independent commissioning authority that includes some additional activities, such as developing a system manual that will give operating staff the information they need to optimally operate the building's systems.

<sup>3</sup> Enhanced Refrigerant Management requires that either no refrigerants are used, or that the ones selected minimize/eliminate the emission of compounds that cause climate change. The overall intent is to help reduce ozone depletion and help to ensure compliance with the Montreal Protocol.

<sup>4</sup> Measurement and Verification provides a process that will examine the building's energy consumption over time. This includes installing metering equipment so that energy use can be monitored and then reviewed against baseline statistics. It also can alert staff if the equipment is not being operated in a way that will optimize its benefits.

Chart 3. Green Globes Categories and Subcategories

Categories						
Project Management	Site	Energy	Water	Resources, Building Materials, and Solid Waste	Emissions and Other Impacts	Indoor Environment
Integrated design	Site development area	Energy consumption	Water	Materials with low environmental impact	Air emissions	Effective ventilation system
Environmental purchasing	Reduce ecological impacts	Energy demand minimization	Water conservation features	Minimized consumption and depletion of material resources	Ozone depletion and global warming	Source control for indoor pollutants
Commissioning documentation	Enhanced watershed features	"Right sized" energy efficient systems	Reduce off-site treatment of water	Reuse of existing structures	Contamination of sewer or waterways	Lighting design and integration of lighting systems
Emergency response plan	Site ecological improvement	Renewable sources of energy		Building durability, adaptability, and disassembly	Land and water pollution	Acoustic comfort
		Energy-efficient transportation		Reduction, re-use, and recycling of waste	Integrated pest management	
					Storage for hazardous materials	

Chart 4. BREEAM Categories and Subcategories

Innovation	Management	Materials	Energy	Water	Pollution	Waste	Health and Well-Being	Land Use and Ecology	Transportation
Exemplary performance levels	Commissioning	Life cycle impact of materials	CO <sub>2</sub> emissions	Water consumption	Refrigerant use and leakage	Construction waste	Daylight	Site selection	Public transport network connectivity
New technologies and building processes	Construction site impacts	Material reuse	Low or zero carbon technologies	Leak detection	Flood risk	Recycled aggregates	Occupant thermal comfort	Protection of ecological features	Pedestrian and cyclist facilities
	Security	Responsible sourcing	Energy submetering	Water re-use and recycling	NO <sub>2</sub> emissions	Recycled facilities	Acoustics	Mitigation/enhancement of ecological value	Access to amenities
		Robust-ness	Energy efficient building systems		Watercourse pollution <sup>1</sup>		Indoor air and water quality		Travel plans and information
					External light and noise pollution		Lighting		

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<sup>1</sup> Watercourse pollution involves reducing the potential for runoff to get into natural waterways. Installing sustainable drainage systems and making drainage plans for the building site are examples.

Chart 5. Comparison of Leading “Green” Cities for Mandates/Market Mechanisms

	Mandates		Market Mechanisms			
	Public Buildings	Private Buildings	Affordable Housing Initiatives	Grants/ Rebates	Permits Expedited	Tax
Boston	X <sup>1</sup>	X <sup>2</sup>	X <sup>3</sup>	X <sup>4</sup>		
Chicago	X <sup>5</sup>				X <sup>6</sup>	
Denver				X <sup>7</sup>		
Los Angeles	X <sup>8</sup>	X <sup>9</sup>			X <sup>10</sup>	
Portland	X <sup>11</sup>			X <sup>12</sup>		X <sup>13</sup>

<sup>1</sup> Exec. Order No. 484 Mass. (Apr. 18, 2007), *available at* <http://www.mass.gov/governor/docs/executive-orders/leading-by-example-ee.pdf>; [www.mass.gov/governor/legislationexecorder/executiveorder/executive-order-no-484.html](http://www.mass.gov/governor/legislationexecorder/executiveorder/executive-order-no-484.html).

<sup>2</sup> BOS. MUNICIPAL ZONING art. 37 (2007), *available at* <http://www.bostonredevelopmentauthority.org/pdf/ZoningCode/Article37.pdf>.

<sup>3</sup> *Green Affordable Housing at DND*, CITY OF BOSTON DEP'T OF NEIGHBORHOOD DEV., [http://www.cityofboston.gov/dnd/D\\_green\\_housing.asp#About](http://www.cityofboston.gov/dnd/D_green_housing.asp#About) (last visited Apr. 4, 2012).

<sup>4</sup> *OTA Outlook*, OFFICE OF TECHNICAL ASSISTANCE AND TECH., [www.mass.gov/eea/docs/eea/ota/newsletters/ota-outlook-32-final.pdf](http://www.mass.gov/eea/docs/eea/ota/newsletters/ota-outlook-32-final.pdf) at 3 (last visited Apr. 4, 2012).

<sup>5</sup> *Environment: Programs and Initiatives*, CITY OF CHICAGO, [www.cityofchicago.org/content/city/en/progs/env.html](http://www.cityofchicago.org/content/city/en/progs/env.html) (last visited Mar. 7, 2012) (Chicago “mandate[s] the construction of environmentally friendly buildings.”).

<sup>6</sup> U.S. GREEN BLDG. COUNCIL, Public Policies Adopting or Referencing LEED, *available at* <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1852>.

<sup>7</sup> *OTA Outlook*, *supra* Appendix A, Chart 5 note 4.

<sup>8</sup> Los Angeles, Cal., Ordinance 180633 (Apr. 15, 2009), *available at* [http://clkrep.lacity.org/onlinedocs/2006/06-1963\\_ord\\_180633.pdf](http://clkrep.lacity.org/onlinedocs/2006/06-1963_ord_180633.pdf).

<sup>9</sup> Los Angeles, Cal., Ordinance 179820 (Apr. 22, 2008), *available at* [www.clkrep.lacity.org/onlinedocs/2007/07-0705\\_ord\\_179820.pdf](http://www.clkrep.lacity.org/onlinedocs/2007/07-0705_ord_179820.pdf).

<sup>10</sup> *Summary of Government LEED Initiatives*, U.S. GREEN BLDG. COUNCIL (Aug. 2007), *available at* <http://www.co.mchenry.il.us/departments/countyboard/MtgDocs/200708/081407ms/081407ms6.3.pdf>.

<sup>11</sup> Council of the City of Portland, *Green Building Resolution*, PORTLAND ONLINE (2005), <http://www.portlandonline.com/bps/index.cfm?c=50447&a=112681> (last visited May 1, 2012).

<sup>12</sup> *GIF*, *supra* note 235.

<sup>13</sup> Proposed New Green Building Policy, CITY OF PORTLAND OFFICE OF SUSTAINABLE DEV., *available at* <http://www.portlandonline.com/bds/index.cfm?a=202128&c=49007>. The policy proposes a combination of incentives and penalties.



	Mandates		Market Mechanisms			
	Public Buildings	Private Buildings	Affordable Housing Initiatives	Grants/ Rebates	Permits Expedited	Tax
Phoenix	X <sup>14</sup>			X <sup>15</sup>		
San Francisco	X <sup>16</sup>	X <sup>17</sup>		X <sup>18</sup>	X <sup>19</sup>	
Scottsdale	X <sup>20</sup>	X <sup>21</sup>			X <sup>22</sup>	
Seattle	X <sup>23</sup>			X <sup>24</sup>	X <sup>25</sup>	
Washington D.C	X <sup>26</sup>	X <sup>27</sup>			X <sup>28</sup>	

<sup>14</sup> Phoenix Exec. Order No. 2005-05 (Feb. 11, 2005), *available at* [http://www.governor.state.az.us/eo/2005\\_05.pdf](http://www.governor.state.az.us/eo/2005_05.pdf) (requiring that all state-funded buildings are required to achieve LEED Silver and incorporate renewable energy into the buildings).

<sup>15</sup> *Id.*

<sup>16</sup> S.F., Cal., Ordinance No. 88-04 (Apr. 26, 2004) (codified as S.F. CAL., ENVT. CODE §§ 700-10 (2007)).

<sup>17</sup> S.F., Cal., Building Inspection Comm'n Code, § 1204C.07-.3.2.2 (2008).

<sup>18</sup> *Financial Incentives for Solar PV*, SFENVIRONMENT, <http://sfenvironment.org/article/solar-electricity-photovoltaic/financial-incentives-for-solar-pv> (last visited May 1, 2012).

<sup>19</sup> Plan Submittal Guidelines, SAN FRANCISCO PLANNING DEP'T (Feb. 2012), <http://sf-planning.org/modules/showdocument.aspx?documentid=8676>.

<sup>20</sup> Council of the City of Scottsdale, *Resolution #6644*, CITY OF SCOTTSDALE, AZ. (Mar. 23, 2005), <http://www.scottsdaleaz.gov/Assets/Public+Website/greenbuilding/Resolution+6644.pdf>. The resolution requires that all future renovations and nonoccupied city buildings will be designed, contracted, and built to include as many principles of both the LEED program and the City's Green Building Program as feasible. *Id.*

<sup>21</sup> *Id.*

<sup>22</sup> *Id.*

<sup>23</sup> *Seattle's First Sustainable Building Policy*, SEATTLE OFFICE OF SUSTAINABILITY AND ENV'T. (July 26, 2010), <http://www.cityofseattle.net/dpd/GreenBuilding/CapitalProjects/SeattlesPolicy/default.asp>.

<sup>24</sup> *2010 Built Green Incentives Guidelines Application*, BUILT GREEN, <http://www.builtgreen.net/incentive> (last visited Mar. 7, 2012).

<sup>25</sup> *Our Program*, SEATTLE OFFICE OF SUSTAINABILITY AND ENV'T., <http://www.seattle.gov/dpd/greenbuilding/ourprogram/default.asp> (last visited May 1, 2012).

<sup>26</sup> D.C. MUNICIPAL REGS. R. No. 20-3501 (2011), *available at* <http://www.dcregs.org/Gateway/RuleHome.aspx?RuleNumber=20-3501>.

<sup>27</sup> Green Building Act of 2006, 20 D.C. ADC chpt. 35 (Mar. 8, 2007), *available at* <http://trc.dc.gov/green/cwp/view,a,1231,q,460953.asp>.

<sup>28</sup> Dep't of Consumer and Regulatory Affairs, *Get Answers on Green Building*, District of Columbia, <http://dcra.dc.gov/DC/DCRA/Permits/Green+Permits/Gets+Answers+on+Green+Building#6> (last visited May 1, 2012).

Chart 6. Oregon Residential Energy Tax Credit Program

Item	Eligibility Level	Incentive
<i>Heating and Ventilation</i>		
Ducts	Sealing existing ductwork or installing a well-designed and sealed duct system in a new home	25% of the cost of the work, up to \$250
Furnaces	AFUE is 90% or higher	\$225
	The air has an ECPM	\$125
Heat pump systems	Installed on or after October 8, 2001; HSPF of 8.5 or higher; SEER of 13 or higher and EER of 11 or higher	\$300-\$500
Heat recovery and energy recovery ventilation system	No performance level specified	Amount listed on Office of Energy's qualifying equipment list or 25% of the net purchase price, whichever is less
Geothermal space heating/ground-source heat pumps	No performance level specified	\$1,500 through 2/28/2002; \$600-\$900 beginning 3/1/2002
Combo space and water heating systems	AFUE of 90% or better and the air handler has an ECM	\$350 or 25% of the purchase price, whichever is less
<i>Water heaters</i>		
Water heater unit	Rating of 70%; most of those that qualify have 80%	The amount noted on the list of qualifying equipment or 25% of the net purchase price of the equipment (not including labor), whichever is less, up to \$1,000 annually.
Installation of 5 feet vertical drainpipe and other components	At least 5 feet of vertical drainpipe from the shower or on the main water drain; also includes the cost of other installation components	\$80-\$120, not to exceed 25% of the cost
Notes: SEER = seasonal energy efficiency ratio; EER = energy efficiency ratio; ECPM = electronically commutated permanent magnet motor; Heating Season Performance Factor. Work must be performed by an OOE-certified contractor to qualify for these tax credits. For more information, see <a href="http://www.energy.state.or.us/res/tax/taxcdt.htm">http://www.energy.state.or.us/res/tax/taxcdt.htm</a> .		

Chart 7. Comparison of “Green State” Mandates/Market Mechanisms

	Mandates		Market Mechanisms					
	Public	Private	State Loans	State Grants	Income Tax	Sales Tax	Property Tax	Net Metering
Oregon	X <sup>1</sup>		X <sup>2</sup>	X <sup>3</sup>	X <sup>4</sup>		X <sup>5</sup>	X <sup>6</sup>
California	X <sup>7</sup>	X <sup>8</sup>					X <sup>9</sup>	X <sup>10</sup>
New York	X <sup>11</sup>		X <sup>12</sup>	X <sup>13</sup>	X <sup>14</sup>	X <sup>15</sup>	X <sup>16</sup>	X <sup>17</sup>
Colorado	X <sup>18</sup>					X <sup>19</sup>	X <sup>20</sup>	X <sup>21</sup>

1 OR. REV. STAT § 279C.527 (2010).

2 ENERGY TRUST OF OREGON, *supra* note 433.

3 OR. DEP’T. OF ENERGY, COMMUNITY RENEWABLE ENERGY FEASIBILITY FUND, (CREFF) ANNUAL PROGRESS REPORT (Jan. 2010), available at [http://www.oregon.gov/ENERGY/RENEW/docs/Annual\\_CREFF\\_Report\\_2009.pdf](http://www.oregon.gov/ENERGY/RENEW/docs/Annual_CREFF_Report_2009.pdf).

4 OR. DEP’T. OF ENERGY, *State Tax Credits for Oregon Residents* (Jan. 2010), available at <http://www.oregon.gov/ENERGY/RESIDENTIAL/residential-energy-tax-credits.shtml>.

5 OR. REV. STAT. § 307.150.

6 *See* OR. REV. STAT. § 757.300.

7 CAL. BLDG STANDARDS COMM’N, CAL. GREEN BLDG. STANDARDS CODE (June 2010), available at [http://www.documents.dgs.ca.gov/bsc/CALGreen/2010\\_CA\\_Green-Bldg.pdf](http://www.documents.dgs.ca.gov/bsc/CALGreen/2010_CA_Green-Bldg.pdf) (set to begin in January 2011).

8 *See generally id.*

9 CAL. REV. & TAX CODE § 73 (2011).

10 CAL. PUB. UTIL. § 2827.8-10 (2012).

11 N.Y. STATE OFFICE OF GEN. SERVS., *New York State Green Building Construction Act Information* (Aug. 26, 2009), <http://www.ogs.ny.us/EO/GBCA/Default.asp>.

12 N.Y. STATE ENERGY RESEARCH AND DEV. AUTH., *New York Energy Fund Loan Program*, <http://www.nyserda.org/resloanfund.asp> (last visited Apr. 4, 2012).

13 N.Y. STATE ENERGY RESEARCH AND DEV. AUTH., *Assisted Home Performance Grants*, [www.ogs.ny.gov/EO/GBCA/Default.asp](http://www.ogs.ny.gov/EO/GBCA/Default.asp) (last visited Feb. 15, 2012).

14 N.Y. STATE DEP’T. OF ENVTL. CONSERVATION, *New York State Green Building Tax Credit Legislation Overview* (2010), <http://www.dec.ny.gov/regs/4475.html>.

15 N.Y. TAX LAW § 1115 (2010).

16 N.Y. STATE DEP’T OF TAXATION AND FIN., NEW YORK STATE REAL PROP. TAX § 487, [http://www.tax.ny.gov/research/property/assess/manuals/vol4/pt1/sec4\\_01/sec487.htm](http://www.tax.ny.gov/research/property/assess/manuals/vol4/pt1/sec4_01/sec487.htm) (last updated Sept. 10, 2010).

17 N.Y. CLS Pub Ser 66-j (2010).

18 COLO. REV. STAT. § 24-30-1305(9A) (2010).

19 *Id.* at § 39-26-724.

20 *Id.* at § 39-3-102.

21 *Id.* at § 40-2-124(1)(e).

	Mandates		Market Mechanisms					
	Public	Private	State Loans	State Grants	Income Tax	Sales Tax	Property Tax	Net Metering
Washington	X <sup>22</sup>							X <sup>23</sup>
Nevada						X <sup>24</sup>	X <sup>25</sup>	X <sup>26</sup>
Virginia	X <sup>27</sup>		X <sup>28</sup>				X <sup>29</sup>	X <sup>30</sup>
Maryland					X <sup>31</sup>	X <sup>32</sup>		X <sup>33</sup>
New Mexico	X <sup>34</sup>				X <sup>35</sup>			X <sup>36</sup>

<sup>22</sup> Wash. Exec. Order No. 05-01 (Jan. 5, 2005), available at [http://www.governor.wa.gov/execorders/eoarchive/eo\\_05-01.pdf](http://www.governor.wa.gov/execorders/eoarchive/eo_05-01.pdf).

<sup>23</sup> WA. REV. CODE § 80.60.020 (2010).

<sup>24</sup> *Exemption for LEED Certified Green Buildings*, NEV. DEP'T OF TAX., <http://tax.state.nv.us/documents/AB-3.pdf> (last visited Apr. 4, 2012).

<sup>25</sup> NEV. REV. STAT. ANN. § 701A.110 (2010).

<sup>26</sup> *Id.* at § 704.766.

<sup>27</sup> VA. Exec. Order 49 (June 10, 2009), available at <http://www.dsireusa.org/documents/Incentives/VA12R.pdf>.

<sup>28</sup> COMMONWEALTH OF VIRGINIA, Dep't of Treasury, *Treasury Board's Energy Leasing Program* (July 22, 2010), available at <http://www.trsvirginia.gov/documents/debt/MELP/EnergyDescription.pdf>.

<sup>29</sup> VA. CODE ANN. § 58.1-322(d)(12).

<sup>30</sup> *Id.* 56.594.

<sup>31</sup> COMPTROLLER OF MD., *Green Building Tax Credit*, <http://business.marylandtaxes.com/taxinfo/taxcredit/greenbldg/default.asp> (last visited Apr. 4, 2012).

<sup>32</sup> Alternative Energy Tax Incentive Act of 2009, H.B. 1171, Chapter 444 (May 7, 2009), available at [http://mlis.state.md.us/2009rs/chapters\\_noln/Ch\\_444\\_hb1171T.pdf](http://mlis.state.md.us/2009rs/chapters_noln/Ch_444_hb1171T.pdf).

<sup>33</sup> MD. PUB. UTIL. CODE ANN. § 7-306 (2010).

<sup>34</sup> 22nd Gen. Assem., Spec. Sess. (Nev. 2005), available at [http://www.leg.state.nv.us/22ndSpecial/bills/AB/AB3\\_EN.pdf](http://www.leg.state.nv.us/22ndSpecial/bills/AB/AB3_EN.pdf).

<sup>35</sup> N.M. STAT. ANN. § 7-2-18 (2011).

<sup>36</sup> N.M. CODE R. § 17.9.570 (Lexis Nexis 2010).

## APPENDIX B PORTLAND GREEN BUILDING CASE STUDIES

Portland has numerous landmark buildings that illustrate the general characteristics of green building highlighted in Part II of the paper.<sup>1</sup> I have chosen two such buildings—River Campus One, which is a newly constructed LEED Platinum building, and the Jean Vollum Natural Capital Center, which is a LEED Gold retrofit of a historic building. In addition to their sustainable features, each has been subsidized by numerous taxes, grants, and other incentives that have reduced their overall building costs.

### A. *River Campus One*<sup>2</sup>

In April 2004, the Oregon Health & Science University decided to build its River Campus One building to LEED Platinum standards. The building was the first large medical research facility to be certified LEED Platinum. The building was completed in October 2006 at a total cost of \$150 million.<sup>3</sup> The grants and tax incentives from local,

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<sup>1</sup> Examples include (1) the Portland Convention Center, Silver LEED with a nine-acre rooftop which sends water through troughs to a garden of native grasses and vegetation (*see* <http://www.oregoncc.org/sustainability/>); (2) the Casey Condominiums, the first high rise condominium complex with Platinum certification (utilizing renewable energy and low volatile organic compounds, and regional materials) (*see* <http://www.jetsongreen.com/2007/12/the-casey-proba.html>); (3) the White Stag Building (a gold LEED retrofit) that houses University of Oregon events (*see* <http://pdx.uoregon.edu/index.php?p=about>); (4) Mercy Corps. Global Headquarters, home to a nonprofit humanitarian agency (*see* <http://www.portlandonline.com/bes/index.cfm?c=29323>); (5) One Waterfront Place, platinum LEED office building (*see* <http://www.portlandonline.com/osd/index.cfm?c=47148>); (6) Park Avenue West (high rise with office, rental, and residential condominiums) (*see* <http://www.worldarchitecturenews.com/index.php?fuseaction=wanaplmm.projectviewofuplaod=id924>); (7) 14th and Everett Warehouse in Portland's oldest industrial district using mechanized stacked parking (*see* <http://www.portlandonline.com/osd/index.cfm?c=47151>); (8) East Portland Community Center Aquatics Addition (LEED platinum planned community center with solar energy and innovative spa water reuse system) (*see* <http://www.portlandonline.com/parks/index.cfm?c=43798>); (9) June Keg Delta House, a sorority for black college-educated women (*see* <http://www.portlandonline.com/shared/cfm/image.cfm?id=156136>); (10) Shizen, a new 7-unit residential condominium (*see* <http://www.shizenpdx.com/>); (11) Dolph Creek Townhouses (a new 14-unit townhouse) (*see* <http://www.portlandonline.com/osd/index.cfm?c=42545=119979>).

<sup>2</sup> The ODOE will not disclose data about a facility, unless allowed by an applicant or required to do so under Oregon law (OR. ADMIN. R. 330-090-0130 (2011)). OHSU River Campus House is one such project.

<sup>3</sup> Total Building Costs:

state, and federal subsidies totaled \$1.553 million.<sup>4</sup> Other financial savings from the various green features totaled \$2.654 million.<sup>5</sup> The building is a sixteen-story, 400,000 square-foot mixed-use building, which features numerous environmental benefits,<sup>6</sup> including the following green technologies:

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• Site Cost:	\$ 425,000
• Due Diligence:	\$ 67,500
• Permits:	\$ 1,200,000
• System Development Charge:	\$ 600,000
• Construction Hard Costs:	\$ 71,000,000
• Construction Soft Costs:	\$ 8,800,000
• Tenant Improvements:	\$ 45,600,000
• LEED Certification Costs:	\$ 200,000
• Total Costs:	\$150 million

<sup>4</sup> ETC (*see supra* note 163):

• LEED Platinum certification:	\$ 801,000
• BETC: Solar Photovoltaic (PV) System:	\$ 12,800
• Oregon Energy Trust: Energy Modeling:	\$ 221,000
• Oregon Energy Trust: Microturbines:	\$ 100,000
• Oregon Energy Trust: Solar PV System:	\$ 187,000
• Federal Credit (EPACT) (The Energy Policy Act of 2005 (EPACT), signed by President Bush on August 8, 2005, offers taxpayers credits beginning in January 2006 for purchasing fuel-efficient hybrid-electric vehicles and energy-efficient appliances and products. <i>See</i> Tax Credits, Rebates & Savings, ENERGY.GOV, <a href="http://energy.gov/savings">energy.gov/savings</a> (last visited Feb. 15, 2012).	
• Solar PV System:	\$ 56,000
• Federal Credit (EPACT) ( <i>see supra</i> note 163): Microturbines:	\$ 60,000
• TOTAL	\$1.553 million

<sup>5</sup> Other Financial Savings

• Ventilation systems:	\$ 1,160,000
• Reduced size of HVAC System:	\$ 400,000
• Reduced size for central air units:	\$ 210,000
• Interior atrium smoke control and garage exhaust fans:	\$ 180,000
• Variable-flow primary chiller instead and a primary-secondary loop system:	\$ 175,000
• Projected total operational cost savings from energy measures:	\$ 528,959
• TOTAL	\$2.654 million

<sup>6</sup> Annual or modeled energy savings (beyond code): 50,677,166 kBTU

• Annual CO <sub>2</sub> emissions savings: (based on energy savings only)	213,915lbs CO <sub>2</sub>
• Annual water savings:	50 percent
• Construction waste diversion:	98.71 percent or 1145.95 recycled tons
• Annual reduced storm-water runoff:	50 percent

(1) Site Selection

- New construction on a brownfield site.<sup>7</sup>
- Located in an area of Portland undergoing redevelopment.
- Accessible by public transportation.

(2) Integrated Design

- Goals for energy efficiency were set early on in the process.
- The construction team was involved in all design phases to carry out common goals.

(3) Materials

- Use of low-toxicity materials including low-VOC paints, adhesives and sealants, carpets, and interior finishes to prevent persistent off-gassing.
- Better insulated walls help to save heating and cooling energy, as well as the energy used in pumps and fans.
- The project had a focus on locally and regionally-sourced materials, including concrete, paint, and wood.
- 95% of the construction waste from the project was recycled.

(4) Energy Consumption

- The final energy model documented a more than 60% energy savings over code. This was accomplished through a combination of many innovative and integrated mechanical design strategies.
- Renewable energy/60 kilowatt photovoltaic panels were integrated into sunshades on the building's south-facing facade, producing approximately 66,000 kilowatt hours annually. The sunshades that support the array save roughly as much electricity as the PV panels produce.
- Solar collector for hot water preheat, passive solar heating and double envelope reduction of heat loss. This system is designed as a trombi wall, a unique two-story double envelope solar air collector located on the fifteenth and sixteenth floors of the building.

(5) Water Consumption

- Water-conserving fixtures and showerheads contribute to 40 percent less water use than a base code building.
- On-site wastewater treatment with treated water used for non-potable needs. All of the wastewater from the building is treated by a membrane bioreactor.

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• Restored or new habitat: (ecorooft) 20,000 sq. ft.

<sup>7</sup> See *supra* note 47.

- Use of ecoroofs and bioswales contribute to a 50% reduction in storm-water runoff.

(6) Air Quality

- CO<sub>2</sub> monitoring exists throughout the building.
- Prior to completion, the building was flushed-out to eliminate contaminants in the air system. HVAC occupancy sensors reduce air conditioning when it is not needed.
- Excess building air is recycled for lab air, and heat from the electrical rooms is recovered for use in other areas.

(7) Landscaping

- 20,000 square foot green roof (50% of total roof area) contributes to storm-water management, rainwater harvesting, and temperature moderation; also provides limited wildlife habitat.
- Focus on native and drought-tolerant species decreases the overall water needed for irrigation. Rainwater collection system installed with captured rainwater used for irrigation.

(8) Management and Operations

- Use of various energy efficient lighting fixtures, occupancy sensors, design features that utilize natural light, etc.





Photo of Exterior of the River Campus One Building courtesy of Reid Haataja.



Photo of transportation systems outside of River Campus One courtesy of Reid Haataja.

### ***B. Jean Vollum Natural Capital Center (Ecotrust Building)***

The Ecotrust building is home to Portland's Office for Sustainable Development. Erected in 1999, it was the first building in the Pacific Northwest—and the first historic building—to receive LEED Gold certification for renovation. The building is a mixed-use building<sup>8</sup> consisting of three floors and 70,000 square feet,<sup>9</sup> featuring numerous environmental benefits<sup>10</sup> and the following green technologies:

#### (1) Site Selection

- Easily accessible by foot, bicycle, and by public transportation, and with limited parking.
- More than fifty parking spots for bicycles, as well as a bike-sharing program for the tenants in the building.
- Charging stations exist for electric cars in the parking lot.

#### (2) Integrated Design

#### (3) Materials

- FSC-certified wood was used to construct third-floor terrace.
- Walsh Construction, the general contractor on the project, estimated that more than 98% of the construction waste from this project has been recycled or reclaimed.
- All carpets meet the carpet industry's green standards, rubber flooring is made from recycled tires, and the linoleum is made entirely from renewable sources.
- Reclaimed wood and salvaged doors were also used in the construction, and all the structural steel contains 97.5% recycled steel scrap.

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<sup>8</sup> EcoTrust Building, Community of Tenants, [http://www.ecotrust.org/ncc/ncc\\_tenants.html](http://www.ecotrust.org/ncc/ncc_tenants.html).

<sup>9</sup> EcoTrust Building, Jean Vollum Natural Capital Center, <http://www.ecotrust.org/ncc/>.

<sup>10</sup> • Energy savings of 23% overall. Materials Guide to the Jean Vollum Natural Capital Center, [http://www.ecotrust.org/ncc/NCC\\_Materials\\_Guide.pdf](http://www.ecotrust.org/ncc/NCC_Materials_Guide.pdf).

• Daylight available in 75% of spaces, and efficient windows have achieved a 20% energy savings. EcoTrust, Natural Capital Center Fact Sheet, [http://www.ecotrust.org/ncc/NCC\\_Fact\\_Sheet.pdf](http://www.ecotrust.org/ncc/NCC_Fact_Sheet.pdf).

• 32% reduction in water use when compared with a similar code-compliant building. *Id.*

• 95% of the storm-water is managed through the building's various strategies. *Id.*

• 21% energy conservation over a similar code-compliant building due to more efficient heating and cooling systems. *Id.*

(4) Energy Consumption

- The building's appliances meet national standards and are shared by all the tenants on the second floor. Sharing one set of appliances helps to contribute to the overall energy savings of 23%.
- Clean wind and salmon-friendly power is purchased monthly through Portland General Electric's program for renewable power.

(5) Water Consumption

- The green roof absorbs and filters almost all rainwater, helping to eliminate runoff.
- Semi-permeable asphalt was used in the parking lot, which allows rainwater and stormwater to recharge the groundwater supply.
- Water conserving fixtures are used throughout the building.

(6) Air Quality

- The building's HVAC system lets the percentages of fresh and recycled air vary depending on current air conditions in the building.
- Space temperatures are set at more efficient levels, allowing for energy costs that are 23% lower than ASHRA standards.
- The insulation contains no ozone destroying gases and is the only type certified by the Envirodesic Program for healthier air quality.

(7) Landscaping

- Tenants on the third floor are surrounded by a green roof planted with vegetation to absorb and filter stormwater.

(8) Management and Operations

- The parking lot of the EcoTrust center is used in the summers for a weekly farmers market.

(9) Other Financial Savings

- Earned a Federal Historic Preservation tax credit of 10% (it would have earned 20% but the addition of a penthouse changed the appearance of the building).<sup>11</sup>

Ecotrust received City of Portland funding of almost \$100,000.<sup>12</sup> Ecotrust was eligible on project costs of \$321,700 for a 35% BETC of

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<sup>11</sup> *Historic Preservation and Green Building: A Lasting Relationship*, <http://www.preservationnation.org/issues/sustainability/additional-resources/HPandGreenBuildingArticle.pdf>.

<sup>12</sup> City of Portland Ecoroof funding of \$75,000 and City of Portland Certification funding of \$20,000. LEED for New Construction, EcoTrust Case Study, [http://www.buildgreennw.com/resource/CaseStudy\\_EcotrustNW.pdf](http://www.buildgreennw.com/resource/CaseStudy_EcotrustNW.pdf).

\$112,595.<sup>13</sup> The total building costs were \$12.4 million. As a nonprofit, Ecotrust passed the tax credit to Walsh Construction, which paid \$86,859, the discounted net present value of the tax credit.<sup>14</sup> The building was also eligible for the federal historic preservation tax credit.<sup>15</sup>

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<sup>13</sup> Nancy J. King & Brian J. King, *Creating Incentives for Sustainable Buildings: A Comparative Law Approach Featuring the United States and the European Union*, 23 VA. ENVTL. L.J. 397, 422 (2005).

<sup>14</sup> *Id.* at 422–23.

<sup>15</sup> Since 1976, the federal government has offered an income tax credit as an incentive for rehabilitating historic buildings. This tax credit program is administered in Oregon by the State Historic Preservation Office in conjunction with the National Park Service, in Washington, D.C., which makes the final decisions on project eligibility. The incentive is a federal income tax credit equal to 20% of the rehabilitation costs. The building must be listed in the National Register of Historic Places, either individually or as a contributing building in a historic district. The rehabilitation work must meet the Secretary of the Interior's Standards for Rehabilitation. Approval from the National Park Service and the State Historic Preservation Office are required before the project is completed, preferably even before it is started in order to avoid ineligible work and expenses. The building must be used for income-producing purposes after its rehabilitation. The project must exceed either the greater of the adjusted basis of the building or \$5000. [http://www.oregon.gov/OPRD/HCD/SHPO/tax\\_federal.shtml](http://www.oregon.gov/OPRD/HCD/SHPO/tax_federal.shtml).

In Oregon, it is possible to enter into the Special Assessment of Historic Property Program. Participation in the program provides a tax incentive that freezes a property's assessed value for 15 years. The tax benefit is most effective when the freeze starts before substantial rehabilitation work is undertaken that would otherwise increase the assessed value considerably. There are several basic requirements for this program: (1) the property must be listed in the National Register of Historic Places, either individually or as a contributing property in a historic district; (2) a preservation plan must be prepared that outlines substantial rehabilitation work the building will undergo during the 15-year period; (3) there is an application fee equal to one-third of 1% of the real market value; (4) a 4-hour public open house is required annually; (5) an approved plaque must be installed on the building; and (6) approval from the State Historic Preservation Office is needed for exterior and interior work of any substance. Recent legislation now leaves it up to the local jurisdiction to decide whether or not a property owner may reapply for a second 15-year term of the benefit. *Id.*



Photo of Exterior of the Ecotrust Building courtesy of Ecotrust.



Photo of Interior Ceiling of Ecotrust Building courtesy of Ecotrust.

