Art History 415: Space and the Urban Environment

# Going Green

## Sustainable Building in Seattle

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As early as the 1970s, Seattle began taking steps to become a greener city. In the late 1990s, with the opening of Seattle's Office of Sustainability and Environment, the city undertook more initiatives aimed at lowering pollution and reducing energy use. Through government support and the ambitions of private architects, more "Green Buildings" are being built in both the public and private sectors, using LEED certification standards.

Front image: "Seattle Central Library" http://ninetysixhundred.com/2011/04/11/one-of-the-best-architecture-since-1980/

The buzz on the street these days seems to focus around terms such as "green building", "sustainability", "eco-friendly", "sustainable design", but what does that all really mean? These terms are part of the movement to reduce human impact upon the environment. While this awareness seems to be new to the popular realm, as it becomes a growing trend, internationally this is an old effort; in 1987, the concept of "Our Common Future" was coined by the Brundtland Commission, also called the United Nation's World Commission on Environment and Development. The idea is to improve society socially, environmentally, and economically through development in a sustainable way. According to the Seattle government's website, the United States Construction market contributes significantly to the worsening of the environment through use of energy, waste, and greenhouse gas emissions.[1] To counteract this massive impact, or at least lessen the continuing impact, professionals in the development field need to begin to think about building more sustainable structures.

In 1993, the U.S. Green Building Council was established in an effort to promote sustainability in design and living. The non-profit organization based in Washington DC has chapters all over the nation, the biggest draw being the LEED certification program that was founded in 1998. This is a voluntary program that helps give a structure for assessing benefits of green building that owners, developers, and designers can use. LEED certification can be used for both commercial projects and residents, measuring the sustainability of the project using several different criteria. These key areas determine how sustainable a building is: (1) Location: LEED discourages building on undeveloped land to minimize the ecological impact, and encourages design that reflects the natural landscape. (2) Water efficiency: low-flow fixtures,

[1] Department of Planning and Development, "City Green Building: What is Green Building?" City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Overview/WhatisGreenBuilding/default.asp (accessed October 20, 2009). The U.S. construction market is responsible for: 39% of total energy use; 39% of municipal solid waste; 35% of greenhouse gas emissions; 40% of all raw materials, including; 25% of timber harvests; 12% of potable water withdrawal.

native plants, and collection of rainwater are all ways a building can be more water efficient. (3) Energy and atmosphere: this focuses on measuring energy use, equipping buildings with energy efficient appliances and lighting systems, and using renewable energy when possible. (4) Materials and resources: construction generates much waste, and the degree to which this is lessened increases the sustainability; also the use of recycled materials is taken into account. (5) Indoor environment quality: LEED does not exclusively focus on the environmental impacts, but also the quality of the environment for the people residing or working there; in this sense, LEED encourages systems to improve air quality and natural light. (6) Locations and linkages: this area is for residents, encouraging placing new homes in already developed regions and away from undeveloped areas. (7) Awareness and education: simply building a sustainable structure doesn't go the full length, but people must be educated to how to that new green space to its fullest potential. (8) Innovation in design: LEED has minimum requirements, but really praises those who design beyond those minimum standards, becoming creative in their design for green structures.[2] LEED sets a common standard and shared understanding by which people across the nation can communicate about sustainable practices.

Seattle has always been flagged as one of the top "environmentally conscious" cities of the United States. Both the government and the people seem to be interested in this movement, and the government has tried to lead the way and shown their own commitment through building green City-funded projects and providing resources for citizens and private developers attempting their own sustainable building projects. How exactly has the City of Seattle government begun to fulfill their goal of "leading by example" for sustainable building, and provided resources and incentives to promote green building outside of government projects?

[2] U.S. Green Building Council, "About USGBC," U.S. Green Building Council, http://www.usgbc.org (accessed October 25, 2009); U.S. Green Building Council, "Intro - What LEED Measures," U.S. Green Building Council, http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1989 (accessed October 25, 2009).

The roots of Seattle's commitment to the environment dates back before the Brundtland Commission. In the late 1970's Seattle City Light (SCL) and Seattle Public Utilities (SPU) began launching conservation programs to help conserve electricity, water, and solid waste. In the 1990s, the environmental movement picked up speed, and major green building landmarks in the City's history show this continual process of expansion. In 1992, the City declared sustainability as one of eleven guiding principles in their Environmental Action Agenda. A comprehensive plan for Seattle's growth was adopted in 1994, with aims for a more sustainable city. Seattle founded the Office of Sustainability and Environment in 1997, which centralizes different programs, businesses, and organizations that collaborate to help Seattle become more environmentally friendly as a whole. In 1999, the City Green Building Team was formed, and in 2006, the City Green Building Program was incorporated into the Department of Planning and Development (DPD).[3] The founding of USGBC, and the LEED certification program had a major influence in Seattle's emphasis on sustainability. In 2000, Seattle adopted the Sustainable Building Policy, which did not exist in any other city at the time. The Sustainable Building Policy requires that City-funded renovations or new projects exceeding 5,000 square feet must achieve a LEED Silver certification or higher.[4] In the same year, the Justice Center became the first LEED certified project in Seattle.[5] In 2001 and 2002, SCL and SPU created different incentive plans to provide more resources to the public for building green. By 2005, Seattle

[3] Department of Planning and Development, "City Green Building: Timeline: Green Building Milestones," City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Overview/Programhistory/DPDS_007658.asp (accessed November 18, 2009).
[4] Department of Planning and Development, "City Green Building: Seattle's Policy & Progress," City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/CapitalProjects/SeattlesPolicy/default.asp (accessed November 10, 2009).
[5] Department of Planning and Development, "City Green Building: Timeline: Green Building Milestones," City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Overview/Programhistory/DPDS_007658.asp (accessed November 18, 2009).

became the number one city with LEED certified projects and LEED accredited professionals. Major Nickels passed a new legislation for downtown zoning in 2006, which further incorporated LEED values into Seattle building by adding a LEED incentive.[6] These landmarks are only several of many accomplishment through the years.

The City Green Building Program is the strongest foundation for the sustainability movement in Seattle, in terms of City contributions. Since its birth in 2000, the program has altered to help private green projects, beyond its original focus on City-funded projects only.[7] The new program, run through the DPD, is designed to help more people build green, offering assistance and resources. The program's mission statement is "to make green building standard practice in Seattle through education, technical assistance, and incentives."[8] The team members that compose this program strongly believe that they can help build a more environmentally friendly city, and preserve the beauty of the Pacific Northwest. Their four core values parallel those created in Seattle's Comprehensive Plan. The first is "economic opportunity and security", which refers to reducing building maintenance costs, and increasing their durability. The second, "environmental stewardship" is about using resources efficiently and thus protecting the environment. "Community benefits", the third core value, emphasizes the idea that green building provides a more healthy and productive environment in which to live. Lastly, "social equality" focuses on supporting alternative transportation systems and keeping green building

[6] Department of Planning and Development, "City Green Building: Development Incentives," City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/OurProgram/PublicPolicyInitiatives/DevelopmentIncentives/default.asp (accessed November 12, 2009).
[7] Department of Planning and Development, "City Green Building: Introduction," City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Overview/default.asp (accessed November 5, 2009).
[8] Department of Planning and Development, "City Green Building: Our Mission," City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Overview/OurMission/default.asp (accessed November 30, 2009).

costs low as possible, to make it more available to lower income citizens.[9] In line with these core values, the program attempts to accomplish the goals established by the City. The first goal is to show the City it committed to the environment and society's health. Secondly, they aim at saving taxpayers money through the lowered utility costs of green City-owned buildings. The third goal is to provide workers and visitors to Seattle and City-owned buildings a healthy environment. The last goal is to be a part of the City's goals in conserving the local resources.[10] The City Green Building program tries to fulfill these goals and hold to their true values through the services they provide to the public. They offer incentive programs, technical assistance, education about green building, and recognition of green building projects.[11]

The City of Seattle has thirty-eight green building projects, sixteen completed with LEED certification, and the rest either in the planning or construction stage. These range from community centers, libraries, City government buildings, and police stations.[12] Debera Harrell, in her Seattle PI article, states these buildings "have a secret identity: They've been placed among us to help save the planet."[13] This is true, since many of the newly constructed green buildings do not look any different from their conventional counterparts. Through careful analysis, one can reveal how these buildings have been designed to help the environment. Three case studies, out of the total sixteen, are the Seattle Central Library, the Yesler Community Center, and the Seattle City Hall.

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[9] Department of Planning and Development, "City Green Building: Our Mission," City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Overview/OurMission/default.asp (accessed November 30, 2009).
[10] Department of Planning and Development, "City Green Building: Seattle's Policy & Progress," City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/CapitalProjects/SeattlesPolicy/default.asp (accessed November 10, 2009).
[11] Department of Planning and Development, "City Green Building: Introduction," City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Overview/default.asp (accessed November 5, 2009).
[12] Department of Planning and Development, "City Green Building: Seattle's Policy & Progress," City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/CapitalProjects/SeattlesPolicy/default.asp (accessed November 10, 2009).
[13] Debera Carlton Harrell, "Seattle leads 'green' wave in building," *Seattlepi.com*, April 22, 2005, http://www.seattlepi.com/local/221169_green22.html (accessed October 28, 2009).

Spring of 2004, the newly renovated Seattle Central Library branch was unveiled. Achieving a Silver LEED certification, the Central Library incorporates some unique features of sustainable design. Dutch Architect Rem Koolhaas worked alongside former Seattleite designer Joshua Ramus to create the somewhat awkward gleaming glass and steel structure that sits snugly in downtown Seattle. The building is a massive trapezoid with jutting sides and angled walls. The idea was to place function and sustainability above form, and in that direction, the form created turned into an eye catching architectural masterpiece. The outside of the building is a mix of glass and steel, with a high-performance glazing system aimed at reducing heat build-up while maximizing the natural light filtered into the building. The March 2004 issue of dpdINFO, Seattle's DPD newsletter, explains this system:

> Half of the glazing is a triple-layer of glass with an expanded aluminium metal mesh sandwiched between the two outer panes. This metal mesh serves as a shading device, keeping the sun off the interior glass, and thus reducing heat buildup from sunlight and modulating the light entering the interior spaces.[14]

The air between the layers of glass acts as an insulator also. This system is one part of accomplishing the library's goal of outperforming by 10%, the required efficiency that the Seattle Energy Code mandates. Another piece is the ventilation system, called "displacement ventilation", aimed at pulling in fresh air to highly occupied areas by using low speed fans, and subtle temperature changes. This takes advantage of the temperate climate of the Pacific Northwest. The library has a rainwater collection tank that can hold 40,000 gallons of water, which limits the need for potable water. The low use of materials helps save building materials and cuts cost of building the library. Much of the structure doubles as the design, eliminating that need for extra finishing material. The outside structure and finish is the glass and steel, which

[14] dpdINFO, "Seattle's New Central Library," Excerpt from June 2004 issue of dpdINFO, http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpds_007263.pdf (accessed November 15, 2009).

also acts as the inside finish.[15] Most of the materials used in the new library were recycled, non-toxic, or locally produced, and over 75% of the waste generated from the demolition and construction process was saved and recycled. One of the biggest issues in building sustainably is cost. Building green can be, if done smartly, not very costly compared to old methods of building. Compared to the San Francisco library, which cost $480 per square foot, the Central Library is cheap at $273 per square foot. The people of Seattle also seem to think that building green is worth it; out of the $165.5 million budget needed for the Central Library, private donations amounted to $14 million.[16]

The Yesler Community Center was completed in January of 2005, receiving a LEED Gold certificate, meaning it is a highly sustainable building. The center, located on First Hill, in an area that connects several inner city neighborhoods, houses a gymnasium, teen centre, childcare facilities, a recreation room, computer lab, and meeting spaces. The sustainable statistics the center claims include a 42% reduced energy use overall, being 95% naturally ventilated and lit, a decrease in water use by 63%, and lastly the construction saved 76% of materials that could have gone to landfills, and obtained 41% of its materials locally. The location of the center supports sustainability by allowing easy access to bus routes, providing special parking to carpool vans and low emissions vehicles, and saves building space by providing underground parking. They also moved the building back from its original location to preserve the large red oaks growing, and gave the roots more space through larger tree wells. The use of native plants lessens to need for watering and use of pesticides. In terms of water

[15] dpdINFO, "Seattle's New Central Library," Excerpt from June 2004 issue of dpdINFO, http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpds_007263.pdf (accessed November 15, 2009).
[16] The Seattle Public Library, "Library Locations, Central Library: Sustainable Design & Features," The Seattle Public Library, http://www.spl.org/default.asp?pageID=branch_central_building_green&branchID=1 (accessed November 25, 2009).

efficiency, low-flow showers and urinals were installed, creating a savings of $1,796 in upkeep costs per year. The low-flow urinals save 20,000 gallons of water per year, and the showers save another 15,000 gallons of water. Installation of this system did not cost more, and saves money and water in the long run of the building's life. Energy saving comes largely from the building being naturally ventilated and lit. Even the gymnasium, despite skepticisms this could be done, is lit through the use of skylights and naturally ventilated; the ventilation system was engineered around how air moves through the building and how the temperature of the air effects that movement. Lastly, the materials used all are highly durable, promoting a long life for the building. A couple materials used, which are more clearly sustainable than some others, include KEE roofing membrane and a stainless steel base with flashing.[17] KEE (Ketone Ethylene Ester) roofing is a lightweight, flexible, and extremely waterproof vinyl material. It is easily installed using hot air to bond the molecules together, which both eliminates the need for possibly toxic adhesives, and allows for tight seals in uneven surfaces of buildings. Another feature of this bond style is that it can be easily placed over existing roofs, decreasing waste generated by completely tearing down old structures and starting fresh.[18] The second point is the use of stainless steel at the base of the building, using a method called flashing, this helps seal the base to avoid water damage and leaks. During the construction process of the community center, much attention was paid to the use of resources. Most of the construction waste was recycled (77%), diverting it

[17] City of Seattle Department of Planning and Development, "City Projects Case Study: Yesler Community Center; Seattle Parks and Recreation," http://www.seattle.gov/dpd/static/YeslerComm%20web_LatestReleased_DPDP016094.pdf (accessed November 5, 2009).
[18] 4MyRoof, "KEE Ketone Ethylene Ester Membrane," 4MyRoof, http://4myroof.com/commercial-roofing/single-ply-rubber-roofing/kee-ketone-ethylene-ester-membrane/ (accessed November 15, 2009).

from landfills. By acquiring local materials, it fostered the local economy and decreased pollution created from transportation of materials over long distance.[19]

Another new LEED certified City-funded building is the Seattle City Hall, located in downtown Seattle next to the Justice Center and a plaza by the light rail station. Completed in the summer of 2007, designed by Bassetti Architects and Bohlin Cywinski Jackson, the City Hall achieved a Gold certification by LEED. The most unique feature in this building is the vegetated roof, which aids in reducing runoff and collect rainwater that goes into the 225,000 gallon retention tank. The water collected in this tank is used for toilets and irrigation, thus reducing the need for potable water. Having a green roof also helps the environment in general, by adding plant life in a creative way to counteract some of the damage done from deforestation. To help reduce energy use, the building is complexly design to take advantage of natural light. The City Green Building case study pamphlet about the City Hall explains very well how the building was designed to do so:

> Each side has special adaptations that reduce energy needs, based on solar orientation. South and southeast sides are dominated by low-e (emissivity) glass with built-in shading from ceramic frit strips. On the west side, clear upper glazing and light shelves bounce light deep into the space while workers are protected from glare by exterior frit glass sunshades below. Vertical fins serve as light catchers on the north side. The east side is shaded by the taller, adjacent Justice Center.[20]

The use of "direct drive" for the elevators further reduced energy use compared to the old hydraulics system. Over 75% of the waste generated from construction and demolition was recycled, and many of the materials used in constructing the City Hall were recycled content

[19] City of Seattle Department of Planning and Development, "City Projects Case Study: Yesler Community Center; Seattle Parks and Recreation," http://www.seattle.gov/dpd/static/YeslerComm%20web_LatestReleased_DPDP016094.pdf (accessed November 5, 2009).

[20] City of Seattle Department of Planning and Development, "City Projects Case Study: Seattle City Hall; Seattle Fleets & Facilities Department," http://www.seattle.gov/DPD/static/CityHall%20web_LatestReleased_DPDP016103.pdf (accessed November 27, 2009).

products. As much as possible, they tried to acquire local materials to help the economy and lessen transportation for materials.

The City is setting an example through building green themselves. In conjuncture with setting an example to others, the city has incentive programs for private developers and residents. Those programs offer a range of compensation and assistance for green building projects. While City-funded projects are required to achieve a LEED Silver certification or higher, privately developed commercial or residential projects have much more flexibility. Seattle's Green Building Program, operating within the DPD, offers an abundance of resources and incentives for going green. www.seattle.gov/dpd/GreenBuilding is Seattle's website for the Green Building Program, and it is almost overwhelming how much information is available. The City is aiming to expand green building practices beyond City-funded projects by making sustainable building more attainable for smaller or lower-budget projects. The 5-year report on sustainable building, published in 2005, reported that the City has contributed at least $2 million for energy conservation incentives, a matching figure to water conservation incentives, and $300,000 to aid in technical assistance fees on green projects.[21] Almost as important as those financial contributions, is the City's support, assistance, and recognition for those who have already created green projects. In a Seattle PI article from 2005, architect and City Councilman Peter Steinbrueck said that he believed if a building had a green roof, it "should get a reduction in its utilities fee for controlling the spread of polluted storm water."[22] This allows people to see a fiscal reason for going green if they are not committed for philosophical reasons of helping the

[21] City of Seattle: Sustainable Building Program, "5-Year Report 2000-2005: Building a Better City," http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpds_007594.pdf (accessed December 1, 2009), 3.
[22] Debera Carlton Harrell, "Seattle leads 'green' wave in building," *Seattlepi.com*, April 22, 2005, http://www.seattlepi.com/local/221169_green22.html (accessed October 28, 2009).

planet. This also shows that the City aims to support those who are going green, to encourage their efforts, and give motivation for others to do equal.

One of the many efforts of the City in this whole movement is to explain and show people why they should build green. The City explains that everyone needs to make an efforts to be sustainable for several reasons. First, it saves money in the long run in terms of maintenance and rebuilding costs, even if the initial costs might be higher. Another reason is the increased value of the property; the buildings are designed to be longer standing structures, and more environmentally friendly, so they help preserve the land they are built upon. Green building is important not just for the environment, but also to increase the occupant's health and productivity. Lastly, there is the "good Samaritan" argument, which is that it is simply right to help in prolonging the planet's life for future generations.[23]

The incentives, awareness raising, and educational programs the City offers are extensive, vary in size and level of funding, and range in the spectrum of eligible projects for each. Three general programs are the City LEED Incentive Program, the BEST Awards for Sustainable Businesses, and the Sustainable Building Advisor Program.

In 2001, SCL and SPU co-created the City's LEED Incentive Program. This gives funding to projects that commit to being LEED certified, and the funds can help with design and consultation fees. The developers of the project must also hold one LEED workshop in order to receive funding. This extra requirement is interesting, because its drawing two benefits from one, by taking the opportunity of a project being sustainable, to promote awareness and educate others. A project that is LEED certified may receive $15,000, and one that obtains a LEED Silver or higher certification can receive $20,000. Eighteen projects have participated in this

[23] Department of Planning and Development, "City Green Building: Why Build Green?" City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/OurProgram/WhyBuildGreen/default.asp (accessed October 20, 2009).

program since its inception, two of which are Woodland Park Zoo's Family Science Learning Center, and the University of Washington's Merrill hall.[24]

The City of Seattle, beginning in 2002, gives out yearly BEST Awards (Businesses for an Environmentally Sustainable Tomorrow) to businesses who demonstrate sustainable efforts through building design and practices. Businesses eligible to win can range in function. For example, winners in the past years have been the University of Washington Facilities Services, Miller Hull Partnership (architects of LEED certified Northgate Community Center), Seattle University, and the PCC in Fremont.[25]

SCL, SPU and Seattle Central Community College originally created the Sustainable Building Advisor Program, in 2000, but in the recent years, it has gained national recognition and garnered funding from more institutions. Its goal is to provide professional in the development field a deeper understanding of the green building industry. It is an academic program to certify professionals and draws students from within Washington, along with Oregon, British Columbia, and even as far as Chicago. The new sponsors to support this program are the Seattle Art Institute, University of Washington, Cornish College of the Arts, and Antioch University.[26]

The incentive programs compiled for builders, developers, apartment owners, homeowners, or tenants, are similar in theory, though they differ in specifics and scale. The incentives are rebates, tax credits, discounts, or some other form of financial aid to reduce the cost of a green project, thus allowing those on a tighter budget the option of building sustainably. The DPD created incentive fact sheets available online, organized into three different types.

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[24] City of Seattle: Sustainable Building Program, "5-Year Report 2000-2005: Building a Better City," http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpds_007594.pdf (accessed December 1, 2009), 9.
[25] Ibid., 14.
[26] Ibid.

There are Commercial Incentives (for builders, owners, and tenants), homeowner incentives (for developers, owners, and tenants), and multi-family incentives (for developers, builders, owners and tenants). The incentives are divided into categories, and some are similar amongst the three different types listed above, whereas some cater to the specific needs of the project type. The categories shared are efficiency, renewable energy, lighting, and water.

Many of the incentives between commercial and multi-family project overlap. Most likely this is because the two types of projects are often times similar in scale, as opposed to the scale of a single-family home. Incentives of services and technical assistance are offered to commercial and multi-family projects. For example, both have an incentives through the DPD called "priority green", which provides free technical assistance for projects that are creative models of sustainable building. It also gives the project permit review and land use priority.[27] This shows the City giving green projects an advantage and encouraging visible models of green building for others to see. SCL offers a "renewable energy production incentive", which gives up to $5,000 per year for multi-family projects and up to $2,000 per year for commercial projects that generate electricity using alternative energy systems such as solar panels or wind power. There are many incentives reserved solely for commercial projects. For example, SCL offers "energy analysis assistance", which gives businesses free technical assistance to design systems that are more efficient. SCL also offers a financial incentive, up to 70% of the system, for the installation of energy efficient insulation, HVAC, and lighting. The IRS offers tax deductions to buildings that save energy in their heating and cooling systems, and tax credits for those using

[27] City of Seattle Department of Planning and Development: City Green Building, "Seattle Green Building Incentives: Commercial Projects," http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpdp017693.pdf (accessed November 20, 2009); City of Seattle Department of Planning and Development: City Green Building, "Seattle Green Building Incentives: Multi-family," http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpdp017694.pdf (accessed November 20, 2009).

alternative energy, such as solar light or wind power. SPU has incentives for buildings using water-saving equipment such as low-flow toilets, showerheads, efficient laundry machines, and complementing this Puget Sound Energy (PSE) offers some rebates to help purchase this equipment.[28] The Downtown Density Bonus, through the DPD, allows projects in the heart of downtown to expand vertically and horizontally if they achieve a LEED Silver or higher. This gives green projects priority to valuable downtown property.[29]

The push to get residential projects to be sustainable is more difficult than for commercial buildings, since these are often privately owned and on a tighter budget. The City is still encouraging residential projects, from apartment complexes and condominiums to single-family homes, to include as many green elements as manageable. As of 2005, 17% of all new residential construction within in King and Snohomish Counties are sustainably built homes.[30] The City-supported Build Green and SeaGreen programs direct the sustainable residential market, by providing guidelines for building. Established by the Master Builders Association of King and Snohomish Counties, Built Green aids builders and architects to produce efficient, well-designed, and durable homes. It provides resources to obtain the best materials and technologies in green building.[31] SeaGreen (Greening Seattle's Affordable Housing), was created by the City's Office of Housing to provide green affordable housing. In 2002, the City worked with

[28] City of Seattle Department of Planning and Development: City Green Building, "Seattle Green Building Incentives: Commercial Projects," http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpdp017693.pdf (accessed November 20, 2009).
[29] Department of Planning and Development, "City Green Building: Development Incentives," City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/OurProgram/PublicPolicyInitiatives/DevelopmentIncentives/default.asp (accessed November 12, 2009).
[30] City of Seattle: Sustainable Building Program, "5-Year Report 2000-2005: Building a Better City," http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpds_007594.pdf (accessed December 1, 2009), 3.
[31] Department of Planning and Development, "City Green Building: Built Green," City of Seattle Government, http://www.seattle.gov/dpd/GreenBuilding/OurProgram/DesignToolsStrategies/BuiltGreen/default.asp (accessed December 1, 2009).

experts of affordable housing to create a guide to sustainable building, allowing those who are less fortunate to benefit from quality, healthy green building design and practices. Those applying for funding through the Office of Housing must submit a SeaGreen plan, using the guide, in addition to the standard application requirements. So far, 18 SeaGreen multi-family projects have applied, which would create 711 sustainable build affordable housing units. Traugott Terrace, the first of these projects, was completed in 2003. This is the very first housing project of its kind in the whole nation, providing homeless and low-income families with sustainably built, LEED certified, "clean and sober" housing. This project expects yearly saving in energy to be 25%, along with 33% for water, and $9,000 savings in water heating energy. They used recycled content materials for carpet, insulation, ceiling construction, and concrete. The ventilation system was designed to increase natural air flow and reduce mold build-up. Lastly, 78% of the waste generated during construction was recycled instead of going to the landfill.[32] In the Sustainable Building 5-year report, the manager of the program, Jacqueline Raymond was quoted making this statement about the use of green building in Traugott Terrace:

> The use of natural light helps combat isolation and depression. Recovering addicts/alcoholics need to begin to care about something other than themselves and their circumstances. Traugott has helped them care about electricity and water usage, recycling, and the importance of fresh air. This has translated into better self-care and preparation for home ownership.[33]

Hopefully, the example of using green building techniques for better low-income housing will resonate to other cities in the nation.

The incentives for developers, building owners, and tenants of multi-family projects aim to help more middle-income projects, as opposed to SeaGreen projects. The Build Smart rebate

[32] City of Seattle: Sustainable Building Program, "5-Year Report 2000-2005: Building a Better City," http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpds_007594.pdf (accessed December 1, 2009), 11.
[33] Ibid.

from SCL is a financial incentive to install efficient and well-insulated walls, ceilings, floor, windows, and doors. The IRS offers builders a $2,000 tax credit for saving energy through heating and cooling systems. To qualify for this, the units must be three stories or shorter, although occasionally a four or five story building may be eligible given certain conditions. SPU and PSE offer a number of equipment rebates and discounts for remodeling projects and new construction. Equipment includes water-saving washing machines, both coin-op and individual unit machines, efficient showerheads (only for those with natural gas heating), automatic sprinklers, and water-efficient toilets. The Built Green grant is to aid in the costs, which can be high, for certifying and designing a green project aiming for LEED certification. This grant is part of the Built Green program, supported by the Master Builders Association, and can give funding from $2,500 up to $20,000. Cascade Risk Placement offers green building insurance to developers and housing organization that provide affordable housing. This is the only incentive that seems to be in line with the SeaGreen program, to help build affordable housing sustainably. Lastly, the Downtown Density Bonus, as described under the commercial incentives section, also applies to multi-family housing projects downtown.[34]

The incentives for homeowners focus on helping replace old conventional heating, lighting and water systems with new high performance ones, while also providing some aid to new construction. Many people deciding to go green may simply want to renovate their present home, rather than moving into a new house; there is aid for those projects, as well as newly constructed sustainable homes. The IRS provides tax credits to existing homes that renovate energy systems to be more efficient, as well as for new homes that achieve a certain level of

[34] City of Seattle Department of Planning and Development: City Green Building, "Seattle Green Building Incentives: Multi-family," http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpdp017694.pdf (accessed November 20, 2009).

energy savings. PSE offers rebates and discounts for homeowners or builders installing water efficient laundry machines, showerheads, faucets, and water-heating systems (either on-demand water heating or a natural gas tank heater).[35] The IRS and SCL both have their own incentives for homeowners who use alternative energy systems. The IRS gives tax credit for installation and use of "solar energy systems (including solar water heating and solar electric systems), small wind systems, geothermal heat pumps, and residential fuel cell and micro-turbine systems".[36] SCL, on the other hand, gives payments to those showing production of energy using only solar, wind, or anaerobic digester systems. The "HomeWise" grant, offered through the Seattle Office of Housing, helps moderate-income families repair insulation, and replace windows and out-of-date heating systems in their home or condominium. For new homes already constructed with these high-performance features, the IRS offers a tax credit of 30% of the system (being the building).[37] These types of incentives help curtail the costs of installing green features even in small ways, which for individuals and families makes a difference. Homeowners and condominium owners need to realize that going green is not just for large projects built with expansive budgets to afford complexly engineered light-catching designed surfaces and fancy ventilation systems. It seems the City is trying to show this by offering even small incentives like a few dollars off water efficient showerheads.

In an effort to spread awareness to the public about green building, because people are not going to live or build more sustainably if they are completely uneducated on the topic, the City has sponsored many different lectures, exposes, workshops, competitions, ad campaigns, and other education programs over the past decade.

[35] City of Seattle Department of Planning and Development: City Green Building, "Seattle Green Building Incentives: Home Owner," http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpdp017695.pdf (accessed November 20, 2009).
[36] Ibid.
[37] Ibid.

The Green Home Remodel Program, supported by SPU, offers classes and guides to help homeowners with remodeling with sustainable methods. The classes, two hours long, are offered at public libraries free of cost; twelve classes were offered in 2004, and the number of participants totaled at least 200 people. The goal is to increase that number, and draw in a wider range of participants through classes offering resources to professionals in construction and remodeling. The guides are free to Seattle residents, offered both in hardcopy print and online at seattle.gov. This program helps spread green building within the residential market, and responds to citizens' desire to be more educated on green building.[38]

In an attempt to foster to development of Built Green homes, and again, to spread awareness of sustainable building, the City, in 2005, began the Built Green Design Competition. $100,000 was raised through government and non-government sponsorship, and under direction of the DPD, winners of the competition would be given public commendation and a cash prize. BLIP Design, Velocipede Architects, GreenLeaf Construction, and Seattle Housing Authority were just a few of the several winners. In conjuncture with the design competition, there was a toolkit for builders and developers, comprised of fact sheets, pamphlets, and informational brochures, made to help sell Built Green houses. The marketing campaign got *Sunset Magazine* and *Pacific Northwest Magazine* to promote the idea of healthy, efficient, and cost beneficial green build homes.[39]

The awareness, educational, and incentive programs all outlined promote green building in both commercial and residential markets, but the biggest roadblock in progress is still the issue of cost. When it comes to the cost of building sustainably, there are both the myths that deter

[38] City of Seattle: Sustainable Building Program, "5-Year Report 2000-2005: Building a Better City," http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpds_007594.pdf (accessed December 1, 2009), 11.
[39] Ibid., 13.

people, and the reality. The myth seems to be that green building is only for the rich, who can afford the very expensive materials and high-performance equipment. The SEAgreen program shows that this is not true, since they created Traugott Terrace, a sustainably built affordable housing project. Ellen Mirro, of Seattle architecture firm The Johnson Partnership, thinks that green building can be more expensive depending on the individual. She explains that using brand new materials and energy star appliances can cost more, but if an individual uses recycled materials, paints, and appliances, then it can cost less. She also agrees that it does save money in the long run through energy and water savings. This fact is one of the realities of green building. It is more cost effective in over all through lowered maintenance and utility costs. It is those incentives that SLC, PSE, SPU, and the IRS offer that try to break down the barrier of those initial costs stopping green building's progress. One issue that seems fuzzy is how aware people are of this movement to build green. There are lectures, classes at libraries, workshops, and a growing number of green buildings all over the city, but does the public really know what the City is doing aid green building? It is hard to tell. The City's accomplishment of having *Sunset Magazine* and the *Pacific Northwest Magazine* post ads is one way to get the public more aware, and maybe inspire them explore and educate themselves on the topic. There is always a need to educate people on sustainable building, but it is obvious from the past twenty years of progress that building green has not been hindered; sustainable living and building is a process, and it is one that will continue forward and expand.

**Works Cited**

4MyRoof. "KEE Ketone Ethylene Ester Membrane." 4MyRoof. http://4myroof.com/commercial-roofing/single-ply-rubber-roofing/kee-ketone-ethylene-ester-membrane/ (accessed November 15, 2009).

City of Seattle Department of Planning and Development: City Green Building. "Seattle Green Building Incentives: Multi-family." http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpdp017694.pdf (accessed November 20, 2009).

———. "Seattle Green Building Incentives: Home Owner." http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpdp017695.pdf (accessed November 20, 2009).

———. "Seattle Green Building Incentives: Commercial Projects." http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpdp017693.pdf (accessed November 20, 2009).

City of Seattle Department of Planning and Development. "City Projects Case Study: Seattle City Hall; Seattle Fleets & Facilities Department." http://www.seattle.gov/DPD/static/CityHall%20web_LatestReleased_DPDP016103.pdf (accessed November 27, 2009).

———. "City Projects Case Study: Yesler Community Center; Seattle Parks and Recreation." http://www.seattle.gov/dpd/static/YeslerComm%20web_LatestReleased_DPDP016094.pdf (accessed November 5, 2009).

City of Seattle: Sustainable Building Program. "5-Year Report 2000-2005: Building a Better City."

http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpds_007594.pdf (accessed December 1, 2009).

Department of Planning and Development. "City Green Building: Built Green." City of Seattle Government. http://www.seattle.gov/dpd/GreenBuilding/OurProgram/DesignToolsStrategies/BuiltGreen/default.asp (accessed December 1, 2009).

———. "City Green Building: Development Incentives." City of Seattle Government. http://www.seattle.gov/dpd/GreenBuilding/OurProgram/PublicPolicyInitiatives/DevelopmentIncentives/default.asp (accessed November 12, 2009).

———. "City Green Building: Introduction." City of Seattle Government. http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Overview/default.asp (accessed November 5, 2009).

———. "City Green Building: Our Mission." City of Seattle Government. http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Overview/OurMission/default.asp (accessed November 30, 2009).

———. "City Green Building: Seattle's Policy & Progress." City of Seattle Government. http://www.seattle.gov/dpd/GreenBuilding/CapitalProjects/SeattlesPolicy/default.asp (accessed November 10, 2009).

———. "City Green Building: Timeline: Green Building Milestones." City of Seattle Government. http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Overview/Programhistory/DPDS_007658.asp (accessed November 18, 2009).

———. “City Green Building: What is Green Building?” City of Seattle Government. http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Overview/WhatisGreenBuilding/default.asp (accessed October 20, 2009).

———. “City Green Building: Why Build Green?” City of Seattle Government. http://www.seattle.gov/dpd/GreenBuilding/OurProgram/WhyBuildGreen/default.asp (accessed October 20, 2009).

dpdINFO. “Seattle’s New Central Library.” Excerpt from June 2004 issue of dpdINFO. http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpds_007263.pdf (accessed November 15, 2009).

Harrell, Debera Carlton. “Seattle leads ‘green’ wave in building.” *Seattlepi.com*, April 22, 2005. http://www.seattlepi.com/local/221169_green22.html (accessed October 28, 2009).

The Seattle Public Library. “Library Locations, Central Library: Sustainable Design & Features.” The Seattle Public Library. http://www.spl.org/default.asp?pageID=branch_central_building_green&branchID=1 (accessed November 25, 2009).

U.S. Green Building Council. “About USGBC.” U.S. Green Building Council. http://www.usgbc.org (accessed October 25, 2009).

———. “Intro - What LEED Measures.” U.S. Green Building Council. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1989 (accessed October 25, 2009).