

Connecting the Dots: Green Building and Climate Change



King County
Department of Parks and Natural Resources
Solid Waste Division



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Department of Natural Resources and Parks

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King County's Department of Parks and Natural Resources and the
Green Tools Program.

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Introduction

Evidence is mounting that greenhouse gases (GHG) generated by human activity are driving an increase in the temperature of the earth's surface and oceans. This phenomenon, climate change, is predicted to have great impacts on our region, including increasing temperatures, sea level rise, decreasing snow pack and receding glaciers. Our ability to mitigate and adapt to the impacts of climate change will be critical to our vitality. Green building is one piece of the solution necessary to meet the challenges presented by climate change.

King County has adopted many green building strategies that will enable us to be proactive in adapting to and mitigating climate change. Some of the strategies that the County has put in place include:

- Implementation of the Green Building Program in 2000.
- Executive Green Building Initiative adopted in 2001 requiring County buildings to be built to Leadership in Energy and Environmental Design (LEED) standards.
- County-wide Green Building team created in 2005 to implement the Green Building Initiative.
- Incentives for building green, including grants for commercial and residential buildings, are provided through the County.

The aim of this paper is to highlight the benefits of green building in relation to climate change and provide action steps that cities can take to adopt green building practices.

Benefits of Green Building in light of climate change

Significant gains can be made in efforts to combat climate change by adopting green building techniques. Highlighted below are some of the opportunities that green building presents.

Mitigation

Mitigation refers to actions taken to curtail climate change. Green building will lead to a reduction in greenhouse gas emissions in King County, mitigating the impacts of climate change.

- **Reducing Energy:** “Worldwide, 30-40% of all primary energy is used in buildings” (UNEP, 2007). In the U.S., 76% of the electricity generated by power

plants supplies the 'building sector' with energy (www.architecture2030.org). Further, data from the U.S. Energy Information Administration (EIA) indicates that buildings are responsible for almost half (48%) of annual GHG emissions.

In the Puget Sound, however, only 22% of the GHG emissions are attributed to the building sector. Emissions from the built environment in our region are less than the national average due to the fact that the majority of our electricity is generated by hydropower, not fossil fuels. However, Puget Sound's emissions from the buildings and facilities are expected to increase by 36% from 2000 to 2020 (The Puget Sound Clean Air Agency Climate Protection Advisory Committee, 2004). The projected increase in emissions from the built environment signifies the importance of reducing energy consumption in this sector.

Some cities and counties have adopted market solutions for reducing energy consumption by requiring homeowners to pay for high rates of energy consumption. For example, Pitkin County Colorado enacted a carbon tax for homeowners who use "excessive" amounts of energy or build houses over 5,000 square feet (www.renewableenergyaccess.com).

- **Reduce emissions and pollution from transportation of materials:** It is estimated that transportation energy accounts for 20% to 25% of total construction energy used in buildings (Malin, Nadav 1996). Efforts made to utilize locally available materials can significantly reduce energy use and pollution, especially for heavy or bulky materials such as stone and concrete.
- **Use of recycled materials:** The use of recycled, salvaged and biodegradable materials reduces the amount of waste sent to landfills, thereby reducing landfill emissions. Methane emissions from King County's landfills are about 20% of King County's total emissions. The greenhouse effect of methane is 23% more powerful than carbon dioxide, illustrating the importance of controlling this greenhouse gas. Reducing the amount of building materials disposed of in landfills will considerably reduce the methane emissions from King County landfills.

Additionally, the use of recycled materials in green buildings mitigates the amount of energy that would be consumed in the production of new materials. Further, replacing wood products with recycled materials allows the carbon absorbing qualities (carbon sink) of the forest to be maintained (www.buildinggreen.com).

- **Accessible public transportation:** Providing easily accessible public transportation will reduce reliance on automobiles and decrease greenhouse gas emissions. LEED certification offers incentives for buildings to be located near public transportation, as well as for employers to provide alternative fuel vehicles, support carpooling, and accommodate bicycle storage and changing rooms. Conversely, LEED certification provides disincentives for designing excessive parking within a building site (LEED manual, 2003).
- **Compact Communities:** Controlling low density sprawl and creating well designed compact communities reduces reliance on fossil fuels and reduces greenhouse gas emissions (Sightline Institute, 2005). Decreasing reliance on personal automobiles through increasing opportunities for public transportation and walking in compact communities will help mitigate climate change.

Adaptation

Adaptation refers to actions that can be taken to adjust to the impacts of climate change. Planning for adaptation will make us less vulnerable to the negative impacts of climate change. Green building will makes us more adaptable to climate change in the following ways:

- **Energy Sources:** King County's dependence on hydropower makes us highly susceptible to the impacts of climate change. The County's hydroelectric capabilities are predicted to decrease as the region warms and snow pack declines. Moreover, as our region becomes warmer, energy demand will increase at times when less energy is available due to decreased stream flows. Therefore, energy conservation achieved through green building will decrease our vulnerabilities to climate change.
- **Health and Comfort:** Attention to the building site promotes less energy consumption and ensures that the building is comfortable to live and work in. When a building is well placed, it can take advantage of the natural systems available for heating and cooling, reducing the electrical demand. The proper orientation of a building will allow it to cool in a cost efficient manner in a warmer climate.
- **Reducing water supply demand:** Maximizing water efficiency will reduce demands placed on the municipal water supply and wastewater systems, reducing King County's vulnerability in the face of a reduced snow pack.
- **Water efficiency:** Building designs that maximize water efficiency will reduce vulnerabilities to fluctuations in the cost of water.

A Call to Action: Steps that your city can take to address climate change

Actions that your city takes to implement green building practices will help mitigate climate change and enhance your ability to adapt to a changing climate. The most important actions that your city can take to implement a green building program follow:

- Adopt a green building ordinance: Please visit the “Roadmap to a green building ordinance” article in the Green Tools for governments section of this tool kit to learn how your city can adopt and implement a green building ordinance today.
- Promote low-impact development: Adopt incentives for builders and developers such as expedited permit review and permit project management. King County provides a good example of how low-impact development can be promoted through the permitting process.
- Adopt incentives for recycling construction and demolition material: The Green Tools for building materials, construction and demolition materials recycling section of the tool kit highlights steps your city can take to reduce construction and demolition waste.
- ‘Walk the talk’ by implementing green building and recycled materials procurement practices within your city facilities and operations.

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