

# Climate Change PBL #1: Sustainable Buildings

## Problem

Buildings are responsible for approximately 30 – 40 percent of the world's energy consumption.<sup>1</sup> How can local small and medium sized businesses improve the energy efficiency of their existing (and new) facilities?

## Background

The concept of environmental sustainability posits that local activities can have global consequences. Concern for the future of our planet is creating an awareness of the broader implications of resource consumption and waste disposal at the national, regional, and local levels. Green building design and renovation is one of the practical trends resulting from this rise in global awareness. This trend is gaining momentum in British Columbia. Throughout Greater Vancouver, building design and construction practices are increasingly based on sustainable principles. As part of the City of Vancouver's Greenest Action plan, the city aims to have all buildings constructed from 2020 onwards be carbon neutral. The plan also targets to reduce green house gas emissions of existing buildings by 20% below 2007 levels<sup>2</sup>.

Conventional construction and design methods typically produce buildings that are resource and energy intensive. Building construction worldwide consumes roughly 3 billion tons of raw materials annually, using natural resources at an unsustainable rate. Exorbitant amounts of fossil fuels are used in the processing and delivery of construction material, contributing greatly to global climate change. Furthermore, once built, the energy required to operate a building over its life span is significantly greater than the energy required during construction. Another environmental concern of the global construction industry is what happens to buildings once they are torn down. In the Lower Mainland, building demolition generates waste composed of potentially reusable or recyclable materials and represents over one-third of the region's solid waste<sup>3</sup>. Metro Vancouver's has begun to address this issue in its Zero Waste Challenge by banning all organic materials (such as wood waste) from landfills<sup>4</sup>.

## Potential Direction

Design practices based on sustainable principles place a new priority on resource

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<sup>1</sup>UN Environment Programme SBCI report. 2007. *Buildings and Climate Change: Status, Challenges and Opportunities*. Accessed Jan 8<sup>th</sup>, 2008 from <http://www.unep.org/Documents/Multilingual/Default.asp?DocumentID=502&ArticleID=5545&l=en>

<sup>2</sup> City of Vancouver. 2012. Greenest City Action Plan. Last Retrieved July 11, 2012 from <http://vancouver.ca/greenestcity/PDF/GC2020ActionPlan-Goal3.pdf>

<sup>3</sup> Metro Vancouver. 2003. Sustainable Building Design. Last retrieved July 11, 2012 from <http://www.metrovancouver.org/about/publications/Publications/sustainablebldgdesign08-1.pdf>

<sup>4</sup> <http://www.metrovancouver.org/services/solidwaste/mvandsolidwaste/zwc/Pages/default.aspx>

conservation, harmony with the natural environment, environmental impact reduction, occupant health, life-cycle performance, and the future adaptability of a building. From sustainability perspective, the building, its systems, and its site are interdependent parts. As part of its holistic view of system interactions, sustainable design emphasizes collaboration between fields of expertise, using a team approach to make all design aspects work together toward sustainability performance goals.

### Guiding Questions

- How could energy consumption be reduced through small changes in design practices?
- What are those changes and how will they impact carbon emissions as well as overall environmental protection?
- How could these changes be applied to local businesses?
- Considering the climate in Vancouver and the particular needs of local businesses what would be the main aspects to focus on?
- Compare various options such as retrofitting a current building, constructing an entirely new building, and changing electrical appliances.

Resources (Do NOT directly contact individuals in these organizations).

City of Vancouver Sustainability - [http://vancouver.ca/sustainability/building\\_green.htm](http://vancouver.ca/sustainability/building_green.htm)

BuildSmart Program - <http://www.gvrd.bc.ca/BUILDSMART/>

Green Builder Resource - <http://www.greenbuilder.com/sourcebook/>

World Business Council For Sustainable Development –  
<http://www.wbcsd.org/buildings.aspx>

Centre for environmental research in minerals, metals and materials (cerm<sup>3</sup>) -  
<http://www.cerm3.mining.ubc.ca/energyresearch.htm>

LEED certification - <http://www.usgbc.org/DisplayPage.aspx?CategoryID=19>

UN sustainable buildings and construction initiative (SBCI) –  
<http://www.unep.fr/pc/sbc/index.htm>

International Living Future Institute-<http://living-future.org/lbc>

### Potential Community Engagement

UBC Sustainability Office - <http://www.sustain.ubc.ca/greenbuilding.html>

Sustainable Buildings Canada - <http://www.sbcanada.org/>

Centre for Interactive Research on Sustainability (CIRS), Great Northern Way campus -  
<http://www.cirs.ubc.ca/>

Journal of Commerce: Western Canada's Construction Newspaper -  
<http://www.journalofcommerce.com/article/20060403100>

Vancouver Valuation Accord - <http://www.vancouveraccord.org/>