Building Blocks: Greening Canada's Codes, Policies and Programs

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The Heritage Imperative: Old Buildings
in an Age of Environmental Crisis
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Buildings and Impacts

- Energy – Pollution & Global Warming
- Water – Waste & Pollution
- Sprawl – Habitat Loss & Species at Risk
- Health – Toxics & Clean Water
- Waste – Construction & Operation
- Resource Consumption

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Project Description

1. Review of Existing Standards
2. Draft Benchmarks
3. Stakeholder Survey and Consultation
4. Final Benchmarks
5. Research of federal, provincial and territorial instruments
6. Survey of Jurisdictions and Responses
7. Final Stakeholder Consultation
8. 2008 Report Card
9. Revisit Research
10. 2009 Report Card

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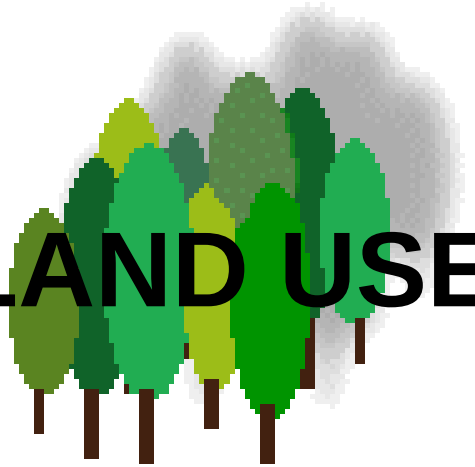
Green Building Standards

TABLE 1: Sources for Green Building Criteria

LEED Canada	Certification system developed by the Canada Green Building Council.
LEED U.S.	Certification system developed by the U.S. Green Building Council for new construction and major renovations.
R-2000	Government of Canada energy and water efficiency certification system for new homes.
ASHRAE Standard 189	Draft standard for the design of high performance green buildings except low rise residential.
BREEAM	UK-developed rating system for single and multi-unit residential, retail, institutional, and commercial.
Built Green	Certification system for new single family residential – British Columbia and Alberta.
Chicago Standard	Certification system developed for municipal facilities based on LEED.
Code for Sustainable Homes	UK government rating system.
Toronto Green Development Standard	Municipal performance targets and guidelines for site and building design based on LEED.

Benchmarks



LAND USE

ENERGY

RESOURCES AND WASTE

WATER

HEALTH

OVERALL INTEGRATION

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Stakeholders Consultation

- UNIVERSITY OF TORONTO
- HALCROW YOLLES
- ENERVISION
- PROVINCE OF BRITISH COLUMBIA
- FRIENDS OF THE EARTH
- ARCHITECT LIMITED
- GREENSAVER
- CANADIANS ENERGY EFFICIENCY ALLIANCE
- UNIVERSITY OF WATERLOO
- HOWELL-MAYHEW ENGINEERING, INC.
- REVITALIZATION INSTITUTE AT SENECA COLLEGE
- ENERVISION
- UNIVERSITY OF TORONTO
- ENERMODAL ENGINEERING LIMITED
- ONTARIO REALTY CORPORATION
- PROVINCE OF MANITOBA
- SOCIAL HOUSING ADVOCACY NETWORKTORONTO HYDRO CORPORATION
- CANADIAN ENVIRONMENTAL LAW ASSOCIATION
- NATURAL RESOURCES CANADA
- PROVINCE OF NEW BRUNSWICK
- PROVINCE OF NEWFOUNDLAND/LABRADOR
- GOVERNMENT OF THE NORTHWEST TERRITORIES
- PROVINCE OF NOVA SCOTIA
- GOVERNMENT OF NUNAVUT
- PROVINCE OF ONTARIO
- EVOLVE BUILDERS GROUP
- PROVINCE OF PRINCE EDWARD ISLAND
- RYERSON UNIVERSITY
- PROVINCE OF SASKATCHEWAN
- TOWN OF EAST GWILLIMBURY
- TOWN OF OAKVILLE
- VELIKOV THUN ARCHITECTS
- THE SUSTAINABILITY ADVANTAGE
- AECOM
- GOVERNMENT OF YUKON

Land - *Land Use and Ecology*

1.1 Land Use Planning

Do instruments exist to ensure that land use directs development to minimize the impact on undeveloped greenspace?

1.2 Ecological value of site

Do instruments ensure the protection of the ecological function of the development site?

1.3 Site development

Do instruments exist to reduce or regulate environmental disturbances on the development site?

1.4 Infrastructure

Do instruments exist that promote sustainable use of existing infrastructure?

Water – *Use, Conservation and Runoff*

2.1 Water use performance

Do instruments exist to promote the overall water use performance of a building during the design, construction and operational stages?

2.2 Storm water

Do instruments exist that address stormwater runoff from site?

2.3 Fixtures

Do instruments exist that promote water efficiency in fixtures?

2.5 Appliances

Do instruments exist that promote water efficiency in appliances?

2.6 Irrigation

Do instruments exist that promote water efficiency in irrigation on development site?

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Resources and Waste – *Production and Recycling*

3.1 Construction waste

Do instruments exist to reduce waste generated from construction?

3.2 Resource use

Do Instruments exist to ensure the efficient use of resources?

3.3 Recycling

Do instruments exist to ensure proper waste management in operational phase?

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Health – *Air Quality and Living Space*

4.1 Air quality

Do instruments exist that establish minimum indoor air quality levels?

4.2 Low emitting materials

Do instruments exist that encourage better indoor air quality through the use of low emitting materials?

4.3 Drinking Water Quality

Are there instruments to ensure the quality of drinking water?

4.4 Indoor Environment Quality

Do instruments exist that address the quality of the indoor environment?

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Energy – *Pollution and Emissions*

5.1 Total Energy Use
Do instruments exist that address the total annual energy consumption of the building?

5.2 Building shell/Insulation
Do instruments exist that encourage energy efficiency through the building envelope?

5.3 Appliances
Do instruments exist that encourage the use of high efficiency appliances?

5.4 Lighting
Do instruments exist that encourage the use of high efficiency lighting?

5.5 Energy Generation
Do instruments exist to facilitate the implementation of on-site energy generation?

5.6 Construction Commissioning
Do instruments exist to ensure proper installation and commissioning of building systems?

5.7 Monitoring
Do instruments exist to ensure proper monitoring of systems throughout the lifecycle of the building?

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Overall Integration

6. Evidence of a coordinated, integrated and innovative approach.

Grading Methodology

Benchmark Score = [P + F + E + N + R + C] x M

P = Do instruments exist that partially satisfying the benchmark? Yes = 1 **point**
F = Do instruments exist that fully satisfying the benchmark? Yes = **1 point**
E = Do these instruments cover the entire jurisdiction**?** Yes = **1 point**
N = Does it apply to new buildings? Yes = **0.5 point**
R = Does it apply to building retrofits? Yes = **0.5 point**
C = Is it a mandatory measure? Yes = **1 point**
M = Multiplier (Based on stakeholder survey) x**1-2**

Category Grade = ∑ Benchmark Grades

Overall Grade = ∑ Category Grades + Additional Category (Overall Integration)

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Grades

Federal	56% (D)	**Nova Scotia**	59% (D+)
British Columbia	61% (C-)	**New Brunswick**	50% (D-)
Alberta	48% (F)	**Nfld + Labrador**	51% (D-)
Saskatchewan	51% (D-)	**Prince Edward Island**	60% (C-)
Manitoba	61% (C-)	**Northwest Territories**	44% (F)
Ontario	69% (C+)	**Nunavut**	40% (F)
Quebec	57% (D+)	**Yukon**	48% (F)

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Findings

1. **Land Use:**

   Only a few provinces/territories have strong policies/programs in place

   Examples: Ontario (Places to Grow), B.C. (Agricultural Land Reserve)

2. **Water:**

   Only a few provinces/territories have strong policies/programs in place other than federal requirements/programs

   Examples: B.C. (recent water efficiency changes to building code), Manitoba (Green Manitoba – working on community water efficiency programs)

3. **Resources and Waste:**

   Only a few provinces/territories have strong policies/programs in place

   Examples: provincial recycling programs (Manitoba, Ontario)

Findings

4. Health:

No strong policies/programs in place other than federal requirements/programs

Example: National Building Code (protection from damaging noise pollution)

5. Energy:

Most provinces/territories did well in this area

Building code requirements/policy:

Examples: Ontario (buildings to meet MNECB energy efficiency levels; houses to meet EnerGuide rating of 80),

Manitoba: Green Building Policy (LEED Silver for public buildings)

6. Overall Integration:

Only a few provinces/territories showed strong integration/coordination between departments for green buildings

Examples: Quebec (Agence de L'efficacite energetique), Nova Scotia (Sustainable Communities Initiative)

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Recommendations

1. All provinces must adopt the National Building Code of Canada.
2. The environment must be included as the fifth top-level objective in the National Building Code.
3. The plans to update the 1997 Model National Energy Code for Buildings should reflect new technologies and innovations. The 1997 Model National Energy Code for Houses must also be updated to reflect new technologies and innovations.
4. Energy and water efficiency programs must be targeted at new and existing buildings of all types, including single-family residential, multi-unit residential, institutional, commercial, industrial and for both owner-occupied buildings and tenants in private rental and social housing.
5. Programs must be developed that target low-income households to achieve reductions in energy and water use that are permanent, adequately funded, available at no cost to eligible participants and accessible nation-wide in all housing types.

Recommendations

6. Land Use

A. Provincial government instruments must be in place to ensure that building developments are being planned to conserve greenfields and protect lands with high ecological value, species habitat and wetlands. New developments should be encouraged to take advantage of existing infrastructure features, maintain minimum density requirements, preserve natural landscapes on the development site and redevelop brownfields and greyfields.

B. Building codes need to take into account the impact that buildings have on the ecological integrity of the development site. New building code objectives should be set to minimize disturbance to the site, including limiting the building footprint, controlling erosion and sediment during and after construction, and preventing the heat island effect by minimizing hardscapes and preserving the existing tree canopy.

Recommendations

7. Water

A. A performance-based criteria for the total designed water consumption of the building, depending on building type, use and geographic location, must be included as part of the building code. Both interior and exterior designed water use should be added, including regulations that improve the water efficiency of fixtures and appliances, and encourage appropriate landscaping maintenance.

B. The building code must contain performance-based criteria that limit the total increase in stormwater generation from the site. This should include provisions that limit the total area of non-permeable surfaces on the site and maintain the infiltration capacity of the site.

C. Rainwater collection and greywater re-use technologies should be included as acceptable solutions in the National Building Code.

D. Water metering on individual units must be mandatory for all new buildings, and programs must be initiated to ensure all existing building units are individually metered.

Recommendations

8. Energy

A. The Model National Energy Code for Homes and the Model National Energy Code for Buildings must be incorporated as mandatory elements of the National Building Code.

B. Performance-based criteria for the total designed energy consumption must be included in the building code depending on building type, use, and geographic location. These energy consumption performance criteria should gradually strengthen over time as technologies and building techniques advance. Acceptable solutions toward this objective should include optimizing solar orientation, increasing the effectiveness of the building envelope and improving building elements such as insulation, windows and doors.

C. All new appliances and lighting installed in new buildings must be Energy Star certified and instruments should be in place to encourage existing buildings to upgrade to Energy Star appliances and lighting.

Recommendations

8. Energy

D. Federal and provincial government instruments must be implemented that facilitate the expansion of alternative energy generation technologies through the elimination of prohibitive measures in building codes and local zoning measures, while increasing direct financial support for implementation of these technologies.

E. Energy metering on individual units must be mandatory on all new buildings, and programs must be initiated to ensure all existing building units are individually metered.

F. The National Building Code must expand its objective for properly installing building elements to include procedures for testing the overall consumption of energy and water of the building (building commissioning). Instruments must be in place to monitor building systems to ensure their continued performance and minimum consumption of energy and water.

Recommendations

9. Resources and Waste

A. Provinces must develop policies that ensure that construction waste management plans exist that encourage conservation, divert construction waste from landfills, encourage the reuse of materials on site and encourage the use of building materials that are locally sourced.

B. The building code must include measures for single- and multi-unit dwellings to include recycling and waste management facilities on site.

10. Health

Stricter national regulations are required for materials that emit chemicals within buildings, including paints, adhesives, insulation and particle board.

Our Common Interest - Preservation

Conservation - Preservation or restoration from loss, damage, or neglect:

Environmental Protection

Policies and procedures aimed at conserving the natural resources, preserving the current state of natural environment and, where possible, reversing its degradation.

Heritage Canada Foundation Mandate

"…encourage the preservation and demonstration of the nationally significant historic, architectural, natural and scenic heritage of Canada..."

Ontario Heritage Trust

"…dedicated to identifying, preserving, protecting and promoting Ontario's rich and varied heritage for the benefit of present and future generations."

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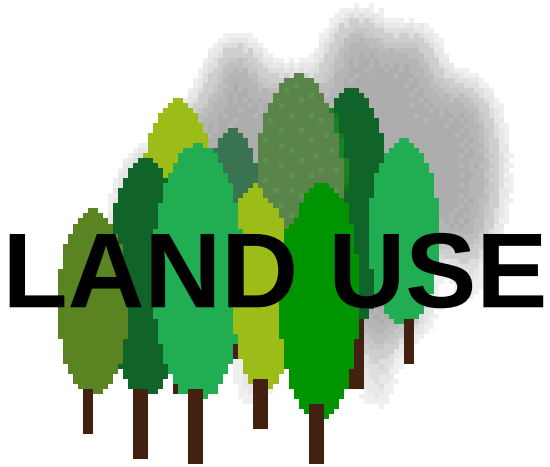
Benchmarks and Heritage Buildings



1.1 Land Use Planning

1.2 Ecological value of site

1.3 Site development

1.4 Infrastructure

- Maintaining undeveloped land surrounding site
- Restoring habitat
- Integrate habitat into existing facilities

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Benchmarks and Heritage Buildings

2.1 Water use performance

2.2 Storm water

2.3 Fixtures

2.5 Appliances

2.6 Irrigation

- Improve water efficiency of building
- High efficiency fixtures
  - 50% plus reductions in toilets
- High efficiency appliances
  - ~40% reductions
- Maintain stormwater runoff on site
  - Rainwater capture, infiltration
- Irrigation – Xeriscape & drought tolerant plants
  - Water use for irrigation can be ZERO

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Benchmarks and Heritage Buildings

RESOURCES AND WASTE

3.1 Construction waste

3.2 Resource use

3.3 Recycling

- Preserve as much as possible
- Reclaiming/recycle resources
- Facilities Management

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Benchmarks and Heritage Buildings

4.1 Overall Air quality

4.2 Low emitting materials

4.3 Drinking Water Quality

4.4 Indoor Environment Quality

- Low emitting substances on new and refurbished surfaces
- Protect water quality
- Protect Indoor environmental quality

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Benchmarks and Heritage Buildings

ENERGY

5.1 Total Energy Use

5.2 Building shell/Insulation

5.3 Appliances

5.4 Lighting

5.5 Energy Generation

5.6 Construction Commissioning

5.7 Monitoring

- Replace fixtures & appliances
- Replace building shell/insulation/windows
- Install renewable energy generating technologies
- Monitoring building systems

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Benchmarks and Heritage Buildings

1.1 Land Use Planning

1.2 Ecological value of site

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5.5 Energy Generation

5.6 Construction Commissioning

5.7 Monitoring

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Building Bridges

- Shared values
  - Conservation/preservation
- Similar threats
  - Climate change, pollution, limited space
- Heritage buildings can be green buildings
- Benchmarks
  - Environmental standards and certification for building and management
- Models for cooperation
  - Sharing resources and space - Wychwood Barns, Evergreen Brickworks, Renewable Energy house – Brussels

Thank you!

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Report will be available October 2009 at www.environmentaldefence.ca

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