



Guide 10 Green buildings

Blue Dot

Municipal Toolkit
Building a Low-Carbon Future



Blue Dot Municipal Toolkit

People in Canada take pride in this country's natural landscapes, rich ecosystems and wildlife. But Canada's Constitution doesn't mention environmental rights and responsibilities. Municipalities across the country are recognizing and supporting their residents' right to a healthy environment. By adopting the Blue Dot declaration, more than 150 municipal governments now support the right to clean air and water, safe food, a stable climate and a say in decisions that affect our health and well-being.

For some municipalities, adopting the Blue Dot declaration is a clear statement about environmental initiatives already underway. For others, it's a significant first step. Either way, after passing a declaration, many ask "What happens next?"

This toolkit provides practical ideas for next steps. Its introduction and 13 downloadable guides cover topics related to human health, green communities and a low-carbon future. Written for policy-makers, each guide shares examples of policies and projects undertaken in communities in Canada and around the world. The goal is to inform, inspire and share good ideas and great practices that will lead to healthier, more sustainable communities now and in the future.

The following guides are available:

Introduction to the Blue Dot Municipal Toolkit

Protecting Human Health

- Guide 1: Air quality
- Guide 2: Clean water
- Guide 3: Non-toxic environment
- Guide 4: Healthy food

Creating Green Communities

- Guide 5: Access to green space
- Guide 6: Protecting and restoring biodiversity
- Guide 7: Waste

Building a Low Carbon-Future

- Guide 8: Transitioning to 100% renewable energy
- Guide 9: Green buildings
- Guide 10: Sustainable transportation
- Guide 11: Green economy
- Guide 12: Climate change adaptation
- Guide 13: Ecological footprint and land-use planning

To read more about municipal actions for environmental rights, and to access all the Blue Dot toolkit guides, visit <http://bluedot.ca/municipal-toolkits/>. To read more about the Blue Dot movement and work at the local, provincial and federal levels, visit www.bluedot.ca.

Ensuring a healthy environment requires action in communities of all sizes and at all levels of government. This toolkit helps municipalities continue to take the lead.

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David
Suzuki
Foundation

Fondation
David
Suzuki

Building a Low-Carbon Future

Guide 10: Green buildings

After transportation, buildings are the next major source of municipal greenhouse gas emissions.¹ In a study by McGraw Hill Construction for the Canada Green Building Council, 32 per cent of Canadian green building experts said municipal and federal green building policies among the top three triggers for increasing green building involvement.² Although municipal building bylaws differ across municipalities, green building policies can compel developers and property owners to adhere to better energy and water-efficiency standards for new buildings and to retrofit existing buildings to increase energy and material efficiency. Some municipalities, such as Vancouver, can adopt their own building bylaws, while others may need to work with provinces to adopt additional standards. Municipalities can also show leadership by adopting policies to upgrade their own buildings, partnering in joint ventures to support green building innovation, offering retrofit incentives, providing green building education, and using planning tools and permitting to encourage green development.³

Canadian examples of good practices

a. Vancouver's building bylaw and Energy Retrofit Strategy

- i. **Background:** Vancouver is unique in B.C. in being able to adopt its own building code bylaw. The majority of Vancouver's GHGs (55 per cent) are from buildings through electricity and natural gas. The city has a goal to reduce energy use and GHG emissions in existing buildings by 20 per cent from 2007 levels by 2020.
- ii. **Initiative:** Vancouver developed a new building bylaw in 2014 with stricter sustainability requirements than the provincial building code. The bylaw requires all buildings constructed on or after 2020 to be carbon neutral in operations. The new building bylaw for homes (single- to dual-family occupancy) includes:
 1. Maximum thermal conductance for windows
 2. Limitations on proportion of lights accepting halogen or incandescent bulbs
 3. Insulation of hot water tanks and pipes
 4. Dual flush toilets
 5. Heat recovery ventilator
 6. Must have EnerGuide rating

The Energy Retrofit Strategy introduced in 2014 focuses on detached houses, multiunit residential buildings, large commercial and large industry. This strategy focuses on the four areas where the city could have the biggest GHG reduction impact. For the industrial sector,

1 Federation of Canadian Municipalities, *Act Locally: The Municipal Role in Fighting Climate Change*.

2 McGraw Hill Construction, *Canada Green Building Trends: Benefits Driving the New and Retrofit Market*, 2014, <http://www.cagbc.org/Content/NavigationMenu/Resources/GreenBuildingMarketResearch2014/default.htm>.

3 Susan Rutherford, *The Green Buildings Guide* (West Coast Environmental Law, 2006), www.wcel.org/sites/default/files/publications/TheGreenBuildingsGuide.pdf.



the city promoted participation in FortisBC (gas utility) audits and use of retrofit incentives, and developed business cases for retrofitting. For the commercial sector, the city supported voluntary benchmarking by building owners by providing training, call centres and guidance. The Green Landlord program supported 21 city rental apartments through efficiency audits, business cases including BC Hydro and FortisBC incentives and low-flow toilet incentives. The city is currently seeking ways to legally require building benchmarking. Energy efficiency assessments, weather sealing and insulation are required for family homes applying for permits.⁴ The building bylaw requires electric vehicle charging outlets in new buildings; for example, 10 per cent of stalls in mixed-use and commercial buildings must be ready for electric vehicles.⁵ The city also has a rezoning policy that requires new buildings on rezoned land to be 22 per cent more efficient than required by the building bylaw.⁶

iii. Results: Since 2007, total CO₂ equivalent emissions from buildings have been reduced by five per cent.⁷

b. Toronto green standard and green roof program

- i. Initiative:** The Toronto green standard is a two-tiered standard for all new building construction. All new buildings must meet Tier 1 standards, which include a 15 per cent energy efficiency improvement over the Ontario Building Code. Buildings that meet Tier 2 must show a 25 per cent energy efficiency improvement over the Ontario Building Code and may be eligible for a development charge refund.⁸ The green roof bylaw requires a green roof on all new commercial, institutional and residential developments with a minimum gross floor area of 2,000 square metres.⁹ All existing buildings, new buildings not required to have a green roof under the green roof bylaw, and new schools are eligible for an eco-roof incentive program, which provides financial incentives for building a cool roof or a green roof.¹⁰
- ii. Results:** Since 2009, the Toronto green building standard has been applied to over 650 applications. Between 2010 and 2012, the Toronto green standard is estimated to have saved 593,200 MWh of energy and 102,500 tonnes of annual GHG emissions.¹¹

4 City of Vancouver, "Energy Retrofit Strategy for Existing Buildings."

5 City of Vancouver, By-Law No. 10908, A By-Law to Regulate the Construction of Buildings and Related Matters and to Adopt the British Columbia Building Code, 2014, <http://former.vancouver.ca/biStorage/10908.PDF>.

6 City of Vancouver, "Green Buildings," Greenest City Action Plan, 2015, <http://vancouver.ca/green-vancouver/green-buildings.aspx>.

7 Ibid.

8 City of Toronto, "Toronto Green Standard."

9 City of Toronto, "Green Roof Bylaw," 2010, <http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=83520621f3161410VgnVCM10000071d60f89RCRD&vgnextchannel=3a7a036318061410VgnVCM10000071d60f89RCRD>.

10 City of Toronto, "Eco-Roof Incentive Program," accessed October 9, 2015, <http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=e08354ae91cda510VgnVCM10000071d60f89RCRD>.

11 City of Toronto, Toronto Green Standard Review and Update, 2013, <http://www.toronto.ca/legdocs/mmis/2013/pg/bgrd/backgroundfile-59341.pdf>.



c. Other interesting ideas

- i. Calgary was the first municipality in Canada to introduce a sustainable building policy. This policy requires all new city-owned or -funded buildings bigger than 500 square metres to meet or exceed LEED gold-level construction. Major renovations must meet or exceed certified LEED new construction or silver LEED commercial interiors.¹²
- ii. Saanich: All District of Saanich building projects must meet a LEED silver standard for new construction and additions over 500 square metres. The district requires sustainability statements to be submitted with rezoning and development permit applications, which allows council to assess the proposed development's contribution to sustainability.¹³ The district adopted a green building policy, which commits Saanich to using a suite of techniques to encourage green building practices, including fast-tracking green building applications, profiling green builders in city advertising, encouraging green building in the private sector through an award program, seeking out green building incentives, and offering advice to the province to develop a provincial green building code.¹⁴
- iii. Dockside Green, Victoria is a sustainable development led by the City of Victoria, which incorporated sustainability requirements in the request for proposal. The development has let local businesses showcase green technology and used the FCM Green Municipal Fund to conduct feasibility studies and field tests. It was remediated from a brownfield site to a highly sustainable development that includes a layout for energy efficiency, metering systems and water- and energy-efficient fixtures to reduce infrastructure costs.¹⁵

International examples of good practices

d. Berlin

- i. **Initiative:** The Berlin Energy Saving Partnership uses private energy saving companies to improve the energy efficiency of public or commercial buildings with a minimum energy bill of €250,000. The energy savings company pays for the building upgrade and is paid back by the building owner over an agreed period (between eight and 12 years) as energy savings are realized. Energy savings companies must apply to tenders with a plan to retrofit the building to reduce energy costs by at least 26 per cent.¹⁶
- ii. **Results:** From 1996 to 2011, the energy savings program resulted in 1,300 buildings being upgraded, €44 million of energy saving company investment, and 64,000 tonnes of CO₂ emissions saved per year.¹⁷ In addition to the Energy Savings Partnership, the city refurbished

¹² City of Calgary, Sustainable Building Policy, 2004, <http://www.calgary.ca/CA/city-clerks/Documents/Council-policy-library/cs005-Sustainable-Building-Policy.pdf>.

¹³ District of Saanich, Sustainability Statement Guidelines, 2010, <http://www.saanich.ca/assets/Local-Government/Documents/sustainabilityguidelines.pdf>.

¹⁴ District of Saanich, Green Building Policy: Private Sector, 2007, <http://www.saanich.ca/assets/Local-Government/Documents/Bylaws-and-Policies/green-building-policy.pdf>.

¹⁵ Federation of Canadian Municipalities and CH2M Hill, Sustainable Community Awards: 2009-Brownfields, 2009, https://www.fcm.ca/Documents/case-studies/GMF/2009/Dockside_Green_Phase_One_EN.pdf.

¹⁶ C40 Cities, "Case Study: Energy Saving Partnership Berlin (ESP)."



65 per cent of 273,000 apartments and upgraded the other 35 per cent at an average cost of €20,000 per apartment using cost-efficient measures such as increased insulation, airtight windows and renovating building heating systems.¹⁸ Berlin ranked first in the building category of the European Green City Index by achieving an average residential building energy consumption of 520 MJ/m² compared to the European average of 857 MJ/m².¹⁹

e. San Francisco

- i. **Initiatives:** San Francisco has a high proportion of LEED certified buildings and requires both private and public buildings to adhere to strict energy standards. Owners of commercial buildings larger than 10,000 square feet (930 square meters) have to track and publish energy consumption data every year and complete energy audits every five years.²⁰ All new buildings must meet the San Francisco green building code, which includes waste diversion, energy and water efficiency, transportation accessibility and health requirements.²¹ For existing buildings not being renovated, the city also released ordinances for commercial lighting, water conservation and energy audit requirements. Incentives such as priority permitting for LEED gold or higher projects and energy rebates further encourage increased sustainable building design.

The GreenFinanceSF Commercial PACE program enables property owners wanting to increase their home efficiency through renovations to get 100 per cent financing from an investor of their choosing and repay the upgrade cost through a line item on their property tax bill over time. The city is using federal grant funds to cover administrative costs of the PACE program.²²

- ii. **Results:** San Francisco has achieved 87-million square feet (8.08-million square meters) of Energy Star-rated building space and 101.5-million square feet (9.43-million square meters) of LEED-rated building space as of March 2016.²³ The California green building code, which was adopted after the development of the San Francisco green building code, now supports a state policy that all residential buildings built after 2020 and all commercial buildings built after 2030 will have net zero emissions.

17 Ibid.

18 Economist Intelligence Unit, European Green City Index https://www.siemens.com/entry/cc/features/greencityindex_international/all/en/pdf/report_en.pdf.

19 Economist Intelligence Unit, Berlin: German Green City Index, 2011, http://www.siemens.com/entry/cc/features/greencityindex_international/all/en/pdf/Berlin_ger.pdf.

20 SF Environment, "Benchmarking Overview," 2014, <http://www.sfenvironment.org/article/benchmarking/benchmarking-overview>.

21 SF Environment, "San Francisco Green Building Code," 2013, <http://www.sfenvironment.org/article/new-construction-and-major-renovations/green-building-ordinance-san-francisco-building-code>.

22 SF Environment, "GreenFinanceSF: Commercial PACE Program," accessed October 9, 2015, <http://www.sfenvironment.org/article/financing/greenfinancesf-commercial-pace-program>.

23 SF Environment, "Commercial," 2012, <http://www.sfenvironment.org/article/metricsdashboard/commercial>.



f. **Tokyo: First urban cap and trade system for buildings**

- i. **Initiative:** Tokyo developed a cap and trade system for energy efficiency upgrades to existing government, commercial and industrial buildings over a certain size. Emissions had to be reduced by six per cent between 2010 and 2014 and by 15 per cent between 2015 and 2019. Buildings that reduced their emissions by more could sell their credits to buildings where upgrades might be more difficult.
- ii. **Results:** As of 2012, more than 70 per cent of buildings had surpassed 2019 targets and had reduced emissions by 23 per cent.²⁴

Good practices documents and links

- o **California energy efficiency standards** to achieve zero net energy in new residential buildings by 2020 and new commercial buildings by 2030.
- o **Best Practices for Green Buildings (FCM)**
- o **Best practices and resources from B.C. government**
- o **The Green Buildings Guide – West Coast Environmental Law**

²⁴ C40 Cities, "Tokyo Climate Close-Up," City Climate Leadership Awards, 2013, <http://www.c40.org/2013-close-up/tokyo-closeup.pdf>.





Advisory services

The **Natural Step Canada (TNSC)** is a national charity whose mission is to tackle climate change and accelerate the transition to a truly sustainable society that thrives within nature's limits. Its academy, advisory services and Sustainability Transition Labs use best-in-class science, systems thinking and facilitation to help individuals and organizations collaborate, solve complex problems, foster innovation, optimize performance and drive systems change.

TNS Canada offers a **Service Cycle for Sustainable Communities** to help municipal governments plan for long-term sustainability and resiliency, embed sustainability into their culture and operations, and engage community stakeholders in their sustainability plans.

To learn more go to: <http://naturalstep.ca/>

The **Whistler Centre for Sustainability (WCS)** is a non-profit organization with the mission to "inspire and facilitate effective planning and meaningful conversations for a better world." WCS provides innovative community engagement, planning and implementation services to local governments across Canada, drawing on its expertise and experience in more than 40 communities. The Centre's work is rooted in future-focused social, environmental and economic values, so that final deliverables embed sustainability throughout.

To learn more go to: <http://whistlercentre.ca>