



International Advances in Green Building

**Buildings in Balance
Cascadia Chapter
May 3, 2007
Vancouver, BC**

Welcome to the new climate

Melting icecaps in Greenland



Monster wildfires in Australia



January golfers in PTZ



Ruined fruit crops in California



Snowless ski runs in Switzerland



Starving polar bears in the North



Devastated trees in Stanley Park



Source: Natural Resources
Canada (February 2005)

BC

Alberta

SMITHERS

PRINCE GEORGE

WILLIAMS LAKE

KAMLOOPS

NELSON


VANCOUVER

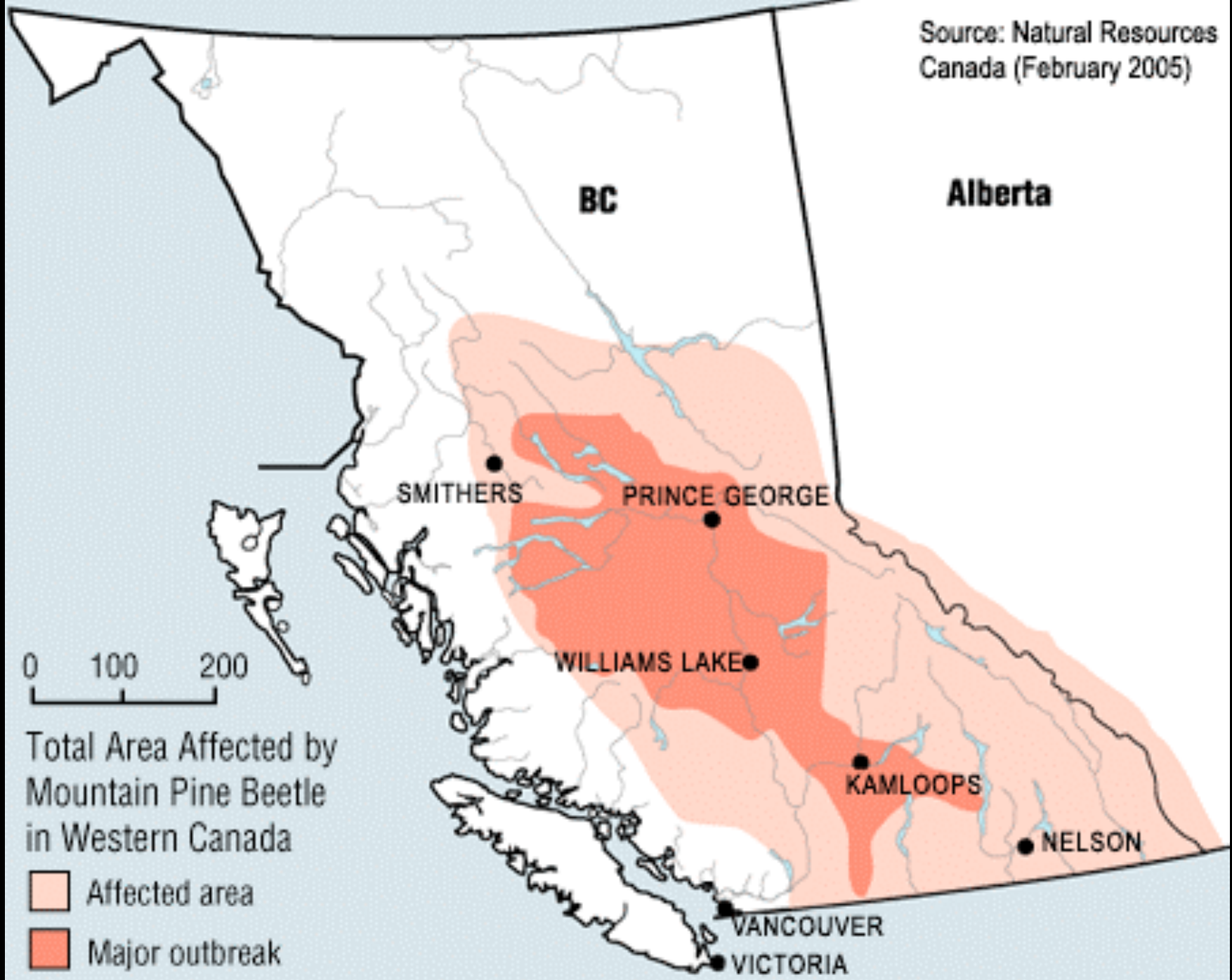
VICTORIA

0 100 200

Total Area Affected by
Mountain Pine Beetle
in Western Canada

 Affected area

 Major outbreak

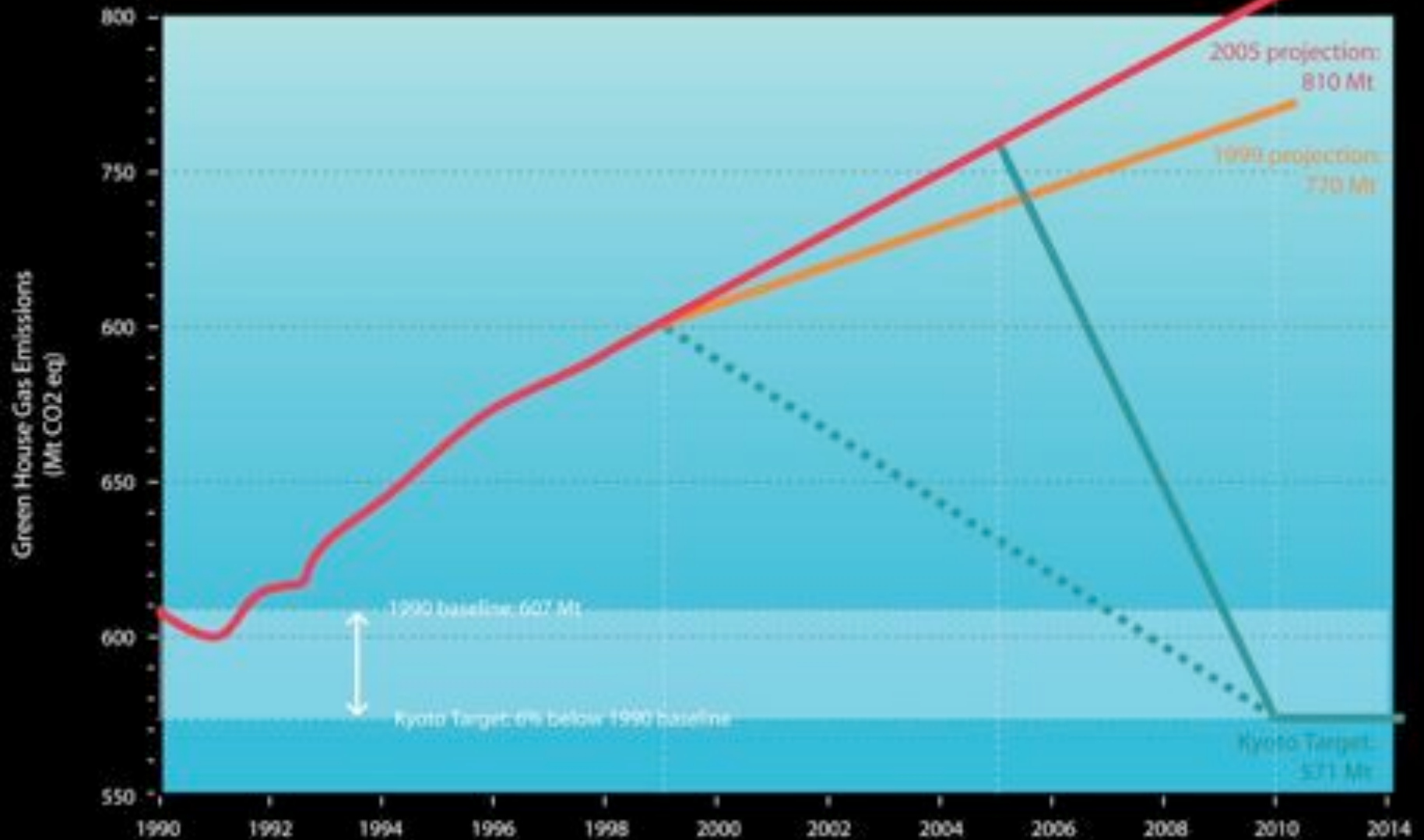


Most Expensive Global Weather Catastrophes

Region/year	Event	Death Toll	Est. damages in Mio US \$
USA 2005	Hurricane Katrina	1,300	125,000
China 1998	Flooding	4,100	30,700
USA/Florida 1992	Hurricane Andrew	60	26,500
China 1996	Flooding	3,000	24,000
USA/Caribbean 2004	Hurricane Ivan	120	23,000
USA 1993	Flooding	50	21,000
Mexico/USA 2005	Hurricane Wilma	40	20,000
USA/Caribbean 2004	Hurricane Charlie	40	18,000
Europe 2002	Flooding	40	16,500
USA 2005	Hurricane Rita	10	16,000

Munich Re, 2006;

Canada's GHG emissions



CaGBC Goals

- **Short & long-term goals**
- **100,000 buildings & 1 million homes certified by 2012**
- **Zero impact from buildings and communities by 2025**

LEED Canada Registrations & Certifications

	2005	2006	2007		2012		
	Total projects/ units	Total projects/ units	Total projects/ units	Growth	Total projects	Est. CO ₂ savings t/CO ₂ e	Est. Energy savings GJ
Registered NC Projects	204	363	583	+220			
Certified NC Projects	27	46	106	+60	100,000	10,300,000	109,900,000
Registered NC Homes Projects ¹		70/ 15,000					
Certified NC Homes Projects		2/ 444			1,000,000	4,100,000	47,800,000

¹ 70 registered projects of multi-unit residential buildings & mixed use projects with on average of 200 units per building;



AIA

Architects and Climate Change



GRAPHIC 1: Combining the annual energy required to operate residential, commercial, and industrial buildings along with the embodied energy of industry-produced building materials like carpet, tile, glass, and concrete exposes buildings as the largest energy consuming and greenhouse gas emitting sector.



GRAPHIC 4: 76% of all power plant generated electricity is used just to operate buildings.

Green House Gas Reduction Potential

- New & existing buildings

	2003 Actual	2005 reduction vs. BAU Growth	Target 2012 Reduction from 2003		Target Use in 2012	% progress towards Kyoto
	MT	MT	%	MT	MT	%
Residential	90	92.2	50%	45	45	26.8%
Personal Transport	120					
Commercial/ Institutional	84	38.0	50%	42	42	25.0%
Freight Transport	96					
Gen. Manufacturing	36					
Energy-Intensive Manufacturing	84					
Oil & Gas Export	90					
Non-Energy Emiss.	140					
Total	740					51.8%
Kyoto Target	572					

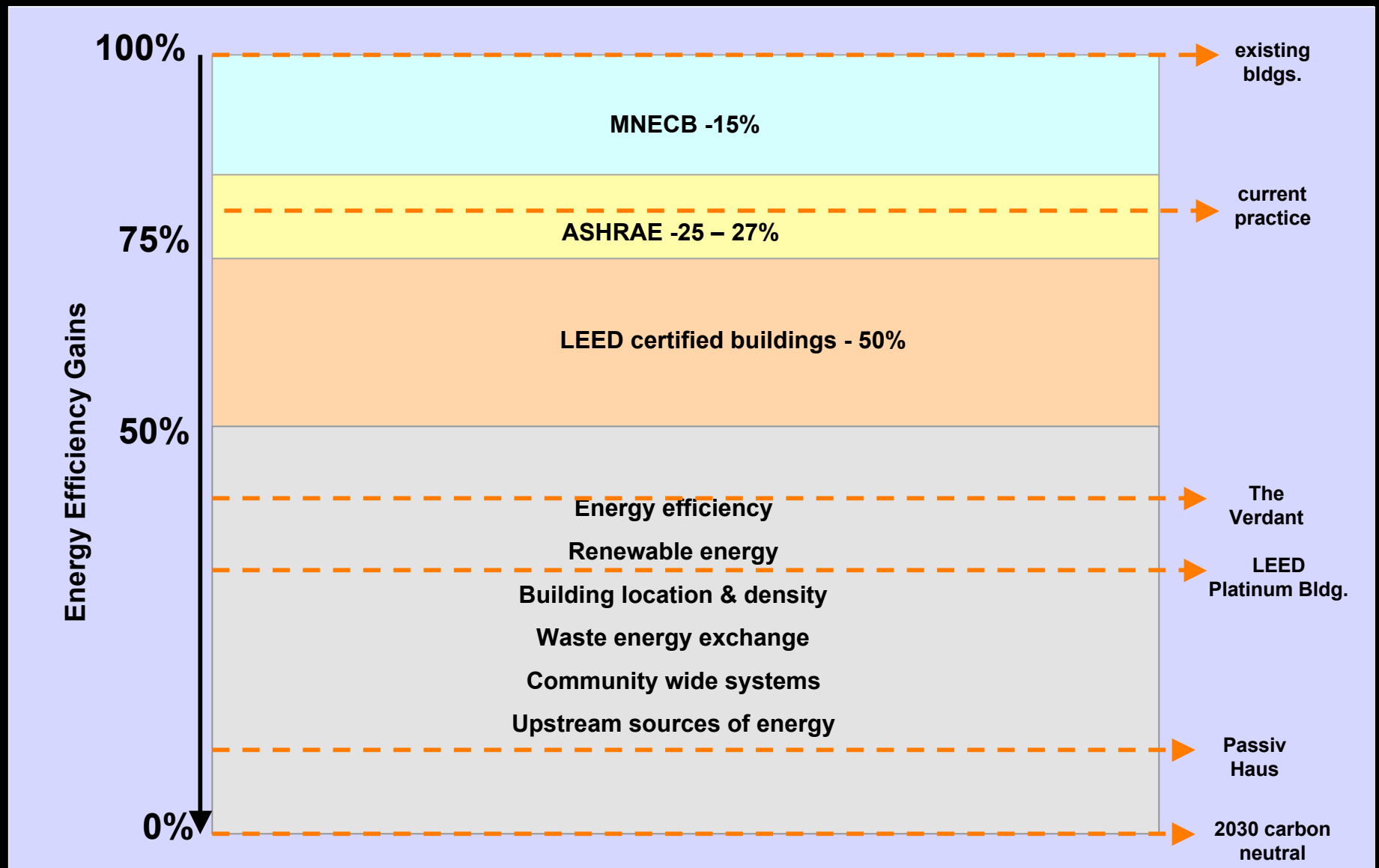
Green House Gas Reduction Potential

- New & existing buildings

	1990 Actual	2004 actual	Target 2012 Reduction from 2004		Target Use in 2012	% progress towards Kyoto
	MT	MT	%	MT	MT	%
Residential	70.0	77.0	50%	38.5	38.5	22.9%
Commercial/ Institutional	48.0	68.0	50%	34.0	34.0	20.2%
Industrial	142	170.0	-	-	170.0	-
Transportation	135	176.0	-	-	176.0	-
Agriculture	14.0	15.0	-	-	15.0	-
Total	409	506			72.5	43.2%
Kyoto Target	572					

NRCan, Energy Efficiency Trends in Canada Report, August 2006

Raising the Bar in Building Energy Efficiency



Guiding Principles

- **operational**
- **CaGBC as a Catalyst among collaborators**
- **Speed, scale, standards**
- **Self-certification**
- **Measurable performance**
- **Dynamic benchmarking**
- **Protect the LEED brand**
- **Grassroots engagement & enablement**
- **Advocacy & outreach**

Challenges

Opportunities

Refined business case & actual post-occupancy performance

Climate change has become a defining issue politically; public awareness on the rise

Other providers: Green Globes, Built Green, Energy Star

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**Federal government climate change policy not well defined;
CBIP canceled;**

Independence, speed & flexibility for LEED in Canada

New LEED tools processes to appeal to the mass market (ND, Homes, Complete)

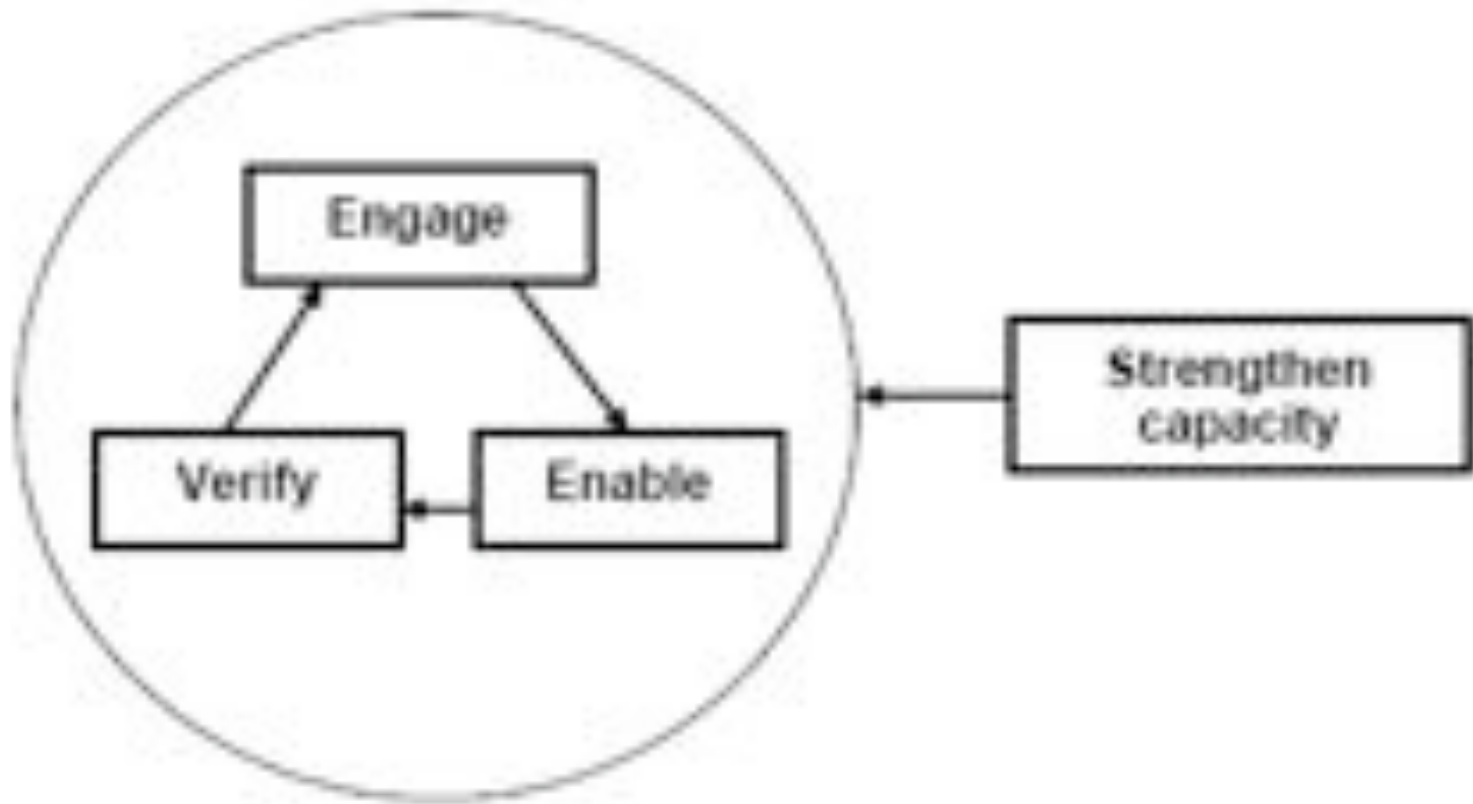
Push to move faster in providing green building solutions

Increase performance of existing buildings/BOMA Canada

Partnerships with influential organizations

Setting the Stage for Change

- Framework



Engage Market Players

- **Work with large owner organizations & key influencers to adopt green building policies & programs**
 - School districts, health care, universities, federal & prov. govt., spec developers
- **Advocacy with policy makers & regulators to accelerate green building implementation**
 - Municipalities; federal & prov. govt.
 - National/prov. performance standards & codes
- **Hold first National Green Building Conference in spring 2008**

Municipal Green Building Toolkit

Canada Green Building Council



- Tool 1: The Context of Green Buildings
- Tool 2: Opportunities and Challenges
- Tool 3: The Business Case for Green Buildings
- Tool 4: Training and Education
- Tool 5: Creating Municipal Buildings
- Tool 6: Creating Private Developments
- Tool 7: Measuring and Verifying Green Buildings
- Tool 8: Policies and Technologies

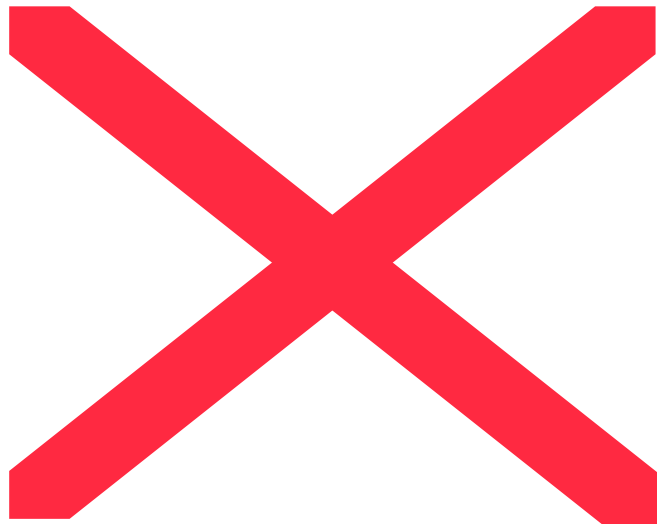


Government Roles in Advancing Green Building



Municipal Green Building

- Overview



Implementation

- **Strategies**

- 1. Policies for city-owned buildings – new & existing**
- 2. Guidelines for developments on city-owned land**
- 3. Incentives or requirements for private sector developments**

Implementation

• Approaches, Tools & Technologies

Policy	green building policy
Planning	official community plan
Pricing	local improvement charge, development cost charge
Incentives	density bonus, floor area calculations, fast tracking, facilitating equivalencies
Regulations	building performance bylaws, permit requirements, rezoning, statutory building schemes, integrated approvals
Education & Training	staff, owners, practitioners
Measurement & Verification	post occupancy evaluation, performance indicators, dynamic benchmarking
Practices & Technologies	water efficiency, green roofs, permeable surfaces, construction waste, passive design, day-lighting, passive ventilation

CaGBC Programs & Initiatives

- **Implementation support**

- LEED technical workshops (NC,CI)
- LEED professional accreditation
- Project certification
- Municipal green building workshops
- Public sector green building training
- LEED for Contractors
- Integrated HVAC Design

Enable Large-Scale Certification

- **New tools & processes to transform large building portfolios**
 - LEED ND, LEED Homes, LEED Complete
- **streamlined certification process (self-assessment, accredited providers)**
 - Less cost & time but rigour!
- **building capacity through partnerships in education & outreach**
 - Industry, chapters, post-secondary institutions

LEED ND

Neighbourhood Developments

- **Overview**

- **Emphasis on integration of land use , infrastructure and buildings**
- **Tool to certify best examples of communities designed to smart growth, new urbanism & green building principles**
- **No minimum or maximum size of project to certify under LEED ND**
- **Applies to whole, fractions of or multiple neighbourhoods, infill projects & mixed use developments**

LEED for Neighbourhood Developments

- Performance areas & points

Smart Location & Linkages	30 pts (28%)
Neighbourhood Pattern & Design	39 pts (37%)
Green Construction & Technology	31 pts (29%)
Innovation	6 pts (6%)
Prerequisites (9)	
Total	106



LEED Complete Cycle: STAGES



LEED Complete ESSENTIAL IDEAS

- **Focus on lowering GHG emissions and adaptation to climate change**
- Effect rapid meaningful change
- LEED as Added Value
- K.I.S.S.
- Collaboration
- "Best" Technical Basis
- "No-Regrets" Prerequisites
- Staged reviews of design prediction
- Certification of measured performance
- Performance metrics are learning tools
- Flexible Framework
 - Scalable, adaptable
- Easier, Faster, Cheaper Certification "*Ebay*"



Important Next Steps

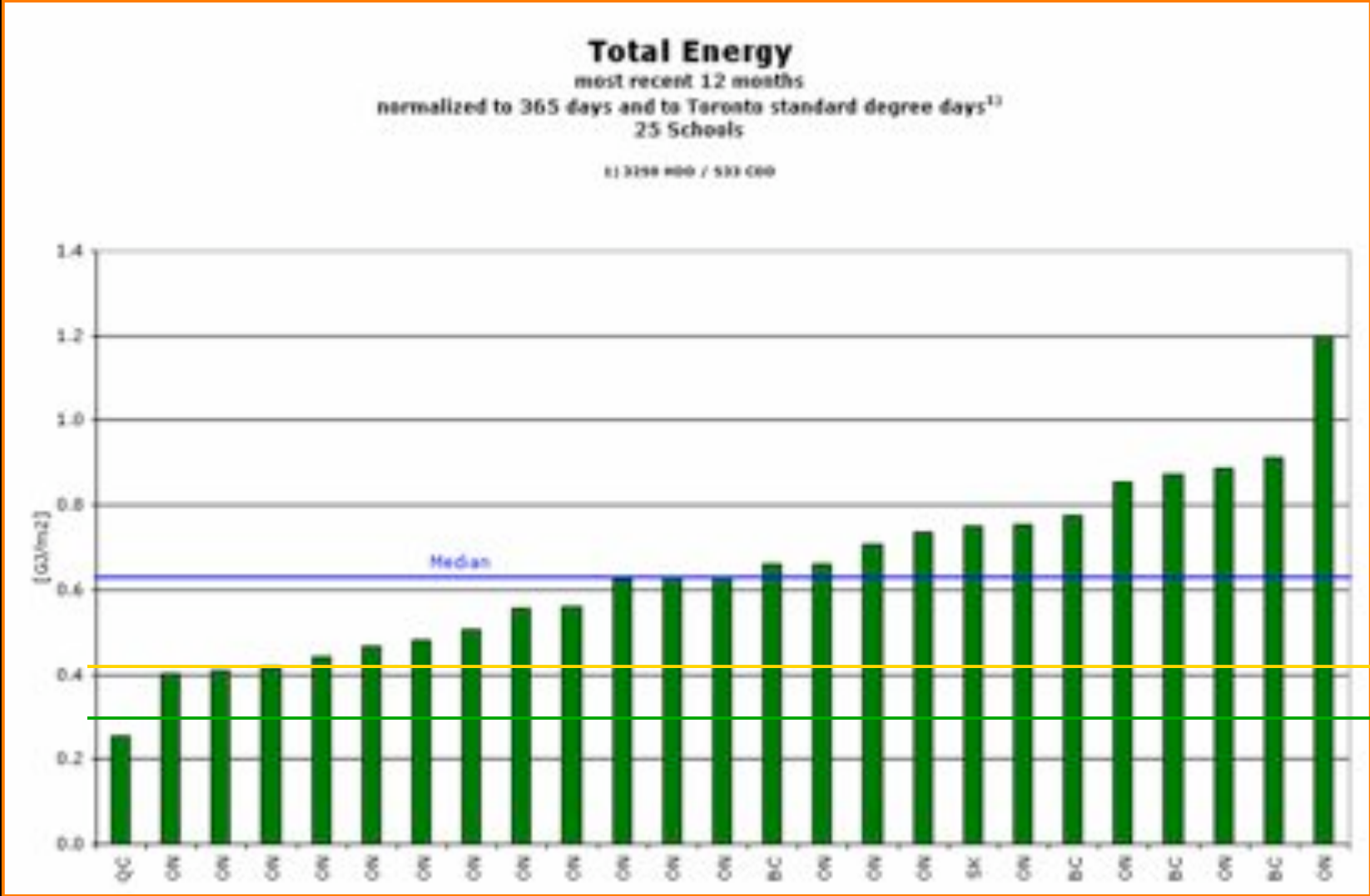
- **Develop LEED Complete framework**
- **Revise certification process**
- **Develop performance indicators, benchmarks & verification process**
- **Establish a Building Design & Technology Roadmap towards 2030**

Verify Performance, Cost & Environmental Impacts

- **Set building performance for new & existing green buildings**
 - Performance indicators
 - Best practice & leading edge standards
 - Dynamic benchmarking
- **Data analysis, evaluation & reporting**
 - Documented savings on costs, resources, environmental impacts
 - On-line reporting
 - Build cost and performance reporting into certification process
- **Market penetration reporting**

Sustainable Schools

- Energy Performance Improvement Potential



good
best

Partner to Strengthen Capacity

- **Chapters as integrated partners in local market development**
 - Performance-based revenue sharing on memberships, education delivery, LEED training, advocacy
 - Increased profiling for Chapters, communications & media tools
 - Annual strategic planning process with Chapter leaders
 - Active involvement in regional conferences
- **Strengthened relationship with USGBC**
 - LEED Canada foundations document
 - LEED Complete & LEED v. 3

Partner to Strengthen Capacity

- **Develop IT infrastructure**
 - **Integrate Council operations & create a web-based platform**
 - **E-tool to facilitate information sharing**
 - **Web-based collaborative tools for product committees**

Partner to Strengthen Capacity

- Value-added partnerships for program delivery

2007 Partner Organizations & Initiatives

Organization	Initiative
ASHRAE, CSA, NRC	Standards development, research
BOMA Canada & local associations	Education, building certification, performance evaluation
Fed, prov, local govt. agencies	Regulation & policy development
Industry associations	Technical continuing education
Municipalities & municipal associations	Education, regulations, incentives for private sector
Universities, technical institutes & colleges	Technical education, LEED training, curriculum development
USGBC	LEED v.3, LEED Complete, certification process

BC Cancer Research Centre Vancouver, B.C.

- LEED Gold certified



- Largest free-standing cancer research facility in Canada
- will house 8 research departments for 200 types of cancer
- heat recovery from chiller & lab exhaust air
- Chilled slab flooring
- \$6 million below budget (\$95 million)

BC Cancer Research Centre

- Performance

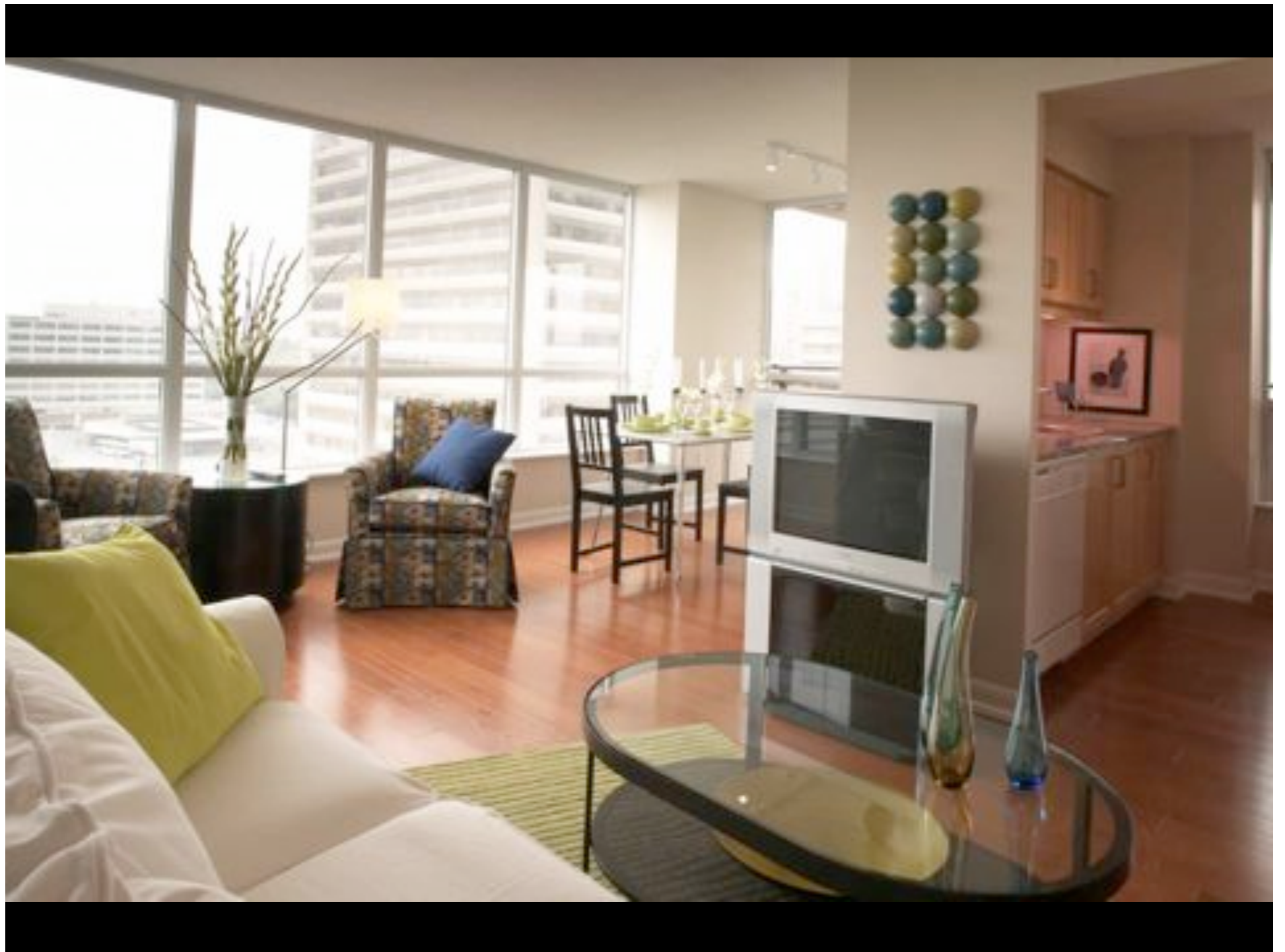
- Annual estimated energy savings to be \$381,000
- 50% energy savings compared to MNEC
- 23% energy savings on lighting compared to MNEC
- 43% water savings (dual flush toilets & waterless urinals)
- 29% use of recycled materials
- 98.5% construction materials diverted



Radiance @ Minto Gardens Toronto, ON

- LEED Silver





Gulf Island Park Reserve Admin. Building Saanich, BC

- LEED Platinum



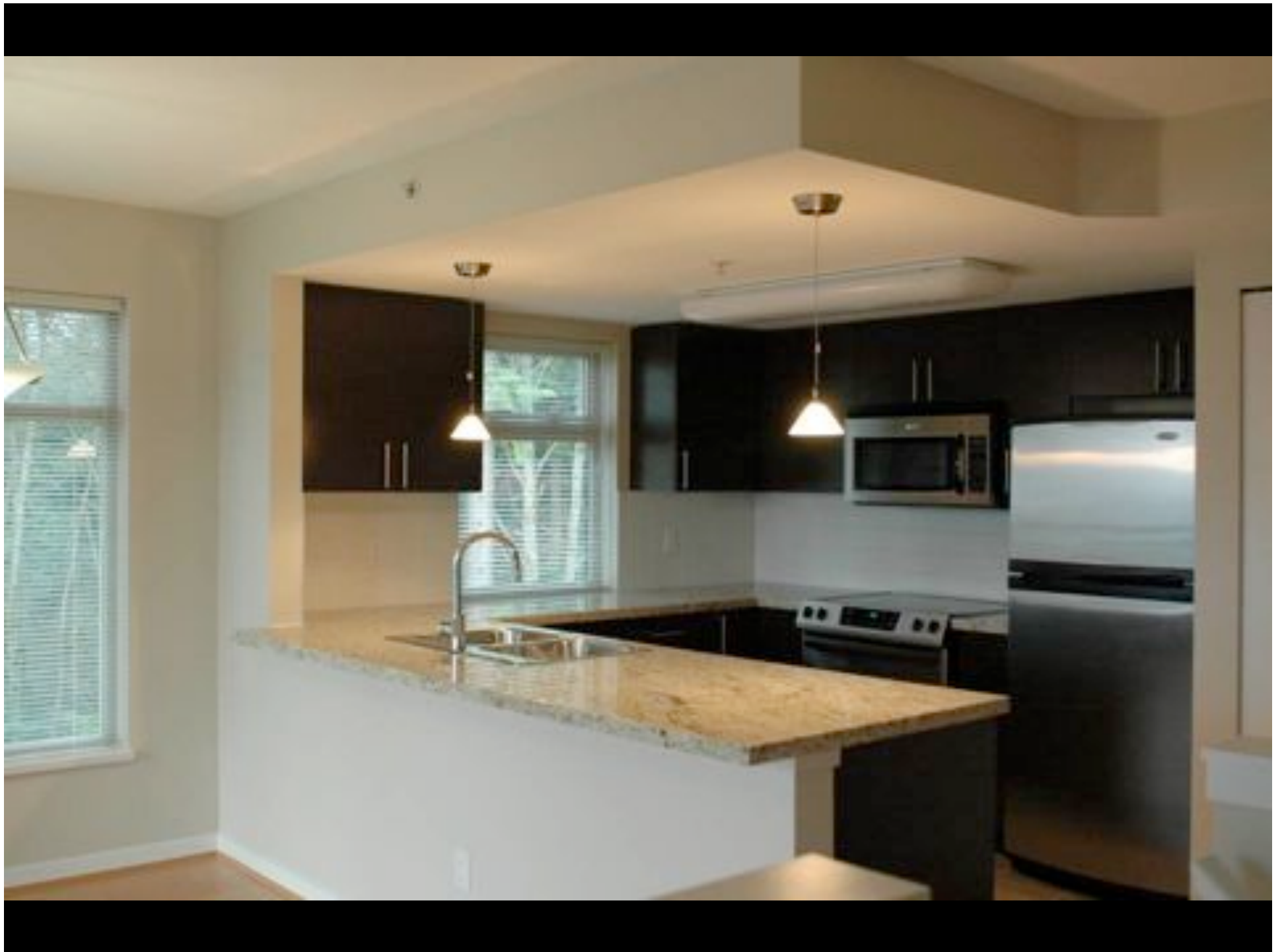






The Verdant





Le Tohu, Montreal, PQ

- LEED Gold







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