



**To:** Public Works and Transportation Committee      **Date:** December 13, 2004  
**From:** Robert Gonzalez, P.Eng.  
Director, Engineering      **File:** 06-2045-00/Vol 01  
**Re:** Sustainable "High Performance" Building Policy – City Owned Facilities

**Staff Recommendations**

1. That the City's Energy Conservation Policy #2004 be rescinded.
2. That the City adopt the Sustainable High Performance Building Policy as per the attached Report from the Director, Engineering dated December 13, 2004.

Robert Gonzalez, P.Eng.  
Director, Engineering  
(4150)

Att. 4

FOR ORIGINATING DIVISION USE ONLY					
ROUTED TO:		CONCURRENCE		CONCURRENCE OF GENERAL MANAGER	
Policy Planning .....	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>	
Finance .....	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>	
<b>REVIEWED BY TAG</b>	YES	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>	<b>REVIEWED BY CAO</b>
					YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>

## Staff Report

### Origin

Buildings represent a significant investment, both in terms of financial and natural resources. The City of Richmond has undertaken numerous initiatives to promote and develop more sustainable forms of buildings that increase operational efficiency, reduce demands on natural resources, and minimize waste and pollution. However, the City's current policy pertaining to corporate facility management solely reflects the City's commitment towards encouraging energy efficiency. The City's policy also presently lacks a means by which to evaluate overall building performance and has not established specified management objectives.

This report identifies opportunities for strengthening current policy by:

- broadening the City commitment to include optimizing efficiencies in all resource areas (e.g., social, natural and financial)
- adopting LEED® rating standards by which to evaluate and assess building performance, and
- setting specified management objectives in accordance with the LEED certification system.

These attributes are presented in the attached proposed Sustainable High Performance Building Policy (Attachment 1).

### Background

#### *Current City Practices*

The City adopted Energy Conservation Policy #2004 in 1991 (Attachment 2). This Policy ensures that all new facilities incorporate energy efficient features and that the equipment within the buildings reflects energy efficient practices. Since that time, green and sustainable building practices have evolved substantially. As a result, when new civic facilities or major civic building renovations are contemplated, there is a discussion regarding the extent by which green and sustainable initiatives should be included in the building design. Generally the City's current practises towards green and sustainable initiatives are limited to what can be accommodated within the current project budget. A well thought out and comprehensive approach to green and sustainable civic buildings would enable staff to proactively develop the scope and respective budget for new buildings and major renovations, maximizing the value from Capital and long term Operating budgets.

#### *The Need for High Performance Buildings*

Past development and construction practices throughout North America are a main contributor to the depletion of natural resources and a major source of pollution. According to reports published by the United States Green Building Council (USGBC), buildings account for 17% of the world's fresh water withdrawals, 25% of the world's wood harvest, 35% of CO<sub>2</sub> emissions and 54% of energy consumption in North America.

Green buildings are considered to be *high performance* buildings which are designed, built and operated in a way to use natural resources (e.g., energy, materials, water and land) more efficiently, create healthier buildings, reduce landfill waste and pollution, reduce greenhouse gas loadings to the atmosphere and minimize facility maintenance costs over the long-term relative to current practice. While buildings may include certain high performance attributes and thus be considered to be “green buildings” as a whole, it is not necessary for every feature to be representative of a high performance attribute.

#### *Assessing Building Performance – the LEED Rating System*

The Leadership in Energy and Environmental Design rating system was developed by the US Green Building Council as a means to evaluate the degree by which buildings meet high performance standards (Attachment 3). The rating system is based on earning credits for various building attributes and includes four levels of certification: Certified, Silver, Gold and Platinum. Buildings are evaluated based on factors pertaining to site selection, water and energy efficiency, material use and indoor air quality. To achieve a specific level of certification, buildings must meet certain requirements (prerequisites) and gain a certain number of credits. The more attributes, the higher the credits and the higher the level of certification.

#### *Financial Considerations*

A main objective of high performance buildings is to be cost-effective and reduce overall management costs. Financial benefits of high performance buildings have been documented to include lower operation and maintenance costs due to substantial savings in resource demands (energy, water, materials). High performance buildings have also resulted healthier work environments, resulting in improved employee health and productivity. Staffing costs are generally significantly higher than capital and operating costs during a building lifecycle and improvements in attendance management through reduced sick days will further contribute to initial capital investment.

A recent study by the California Sustainable Building Task Force, California State Consumer Services Agency and the Alameda County Waste Management Authority on the costs and financial benefits of green buildings found that an additional front end investment of two percent of the capital cost typically yields lifecycle savings of over ten times the initial investment (Kats, 2003).

#### *Action being taken in other Municipalities*

Various municipalities and organizations have adopted high performance or Green Building policies and/or incorporated LEED standards in their projects (Attachment 4). LEED standards are one of several “measuring sticks” for green and sustainable building practise across North America.

**Analysis**

*Policy Options*

The potential Pros and Cons of alternative actions are identified below:

Alternative Strategy	Pros/Cons
1. Status Quo – No Formal Policy	<p>Pros - Most flexibility – buildings can be assessed on an individual basis to determine best mix of high performance attributes in consideration of immediate and long-term costs.</p> <p>Cons - Lack of guiding policy – least transparent management approach. Most subjective. No method for evaluating/reporting corporate performance. Reduced opportunity to demonstrate corporate commitment. Reduced overall building performance.</p>
2. Buildings > 2,000 sq.m to achieve LEED Gold Standard All other buildings meet Silver criteria <i>(recommended)</i>	<p>Pros - Creates a high performance building standard and a commitment to sustainable best practices. Provides clear process for reporting corporate performance. Capital cost offset through reduced lifecycle and maintenance costs. Proposes buildings of significant size and functions for Gold certification with flexibility to meet or exceed the Silver standard for smaller more conventional buildings.</p> <p>Cons – Marginal additional capital construction cost.</p>
3. All Buildings meet LEED Silver Standard	<p>Pros - Clear demonstration of corporate commitment. More costly than the recommended approach without discernable improvement in Corporate building performance levels.</p> <p>Cons – Marginal additional capital construction cost.</p>

*Summary of Proposed “High Performance” Building Policy*

The proposed policy recommends that the City adhere to two management objectives:

- That LEED Gold accreditation be set as the desired standard of building performance for new City buildings greater than 2000 m<sup>2</sup> (approximately 20,000 sq.ft).
- The City seek to meet the performance standards of LEED Silver certification as a minimum requirement for major renovations to existing facilities and new City Buildings smaller than 2000 m<sup>2</sup> (20,000 sq. ft), without necessarily seeking formal accreditation.

The goal of the proposed policy is to achieve the highest, most cost-effective building performance and ultimately best value for the City of Richmond. The objectives of the policy are to:

- demonstrate the City’s commitment to high performance buildings
- support the City’s financial sustainability goals by making wise upfront investments and yielding cost savings over the long-term
- provide healthy work environments for staff and visitors

- contribute to environmental sustainability through resource conservation, minimization of emissions and wastes, and minimization of local habitat degradation.

Key features of the proposed Policy include:

- broadened City commitment to optimize efficiencies in all natural resources areas (e.g., energy, water, land, materials, etc.) versus a sole focus on energy
- formal consideration of both immediate and long-term cost considerations in project decision-making
- establishment of measurement and performance objectives using the nationally recognized LEED rating system
- promotion of integrated, whole-building design practices
- consideration of new construction projects, renovations, retrofits and ongoing maintenance activities
- a cost-effective approach, which balances corporate leadership and sustainability objectives with immediate financial constraints.

These performance objectives are being recommended based on the following rationale:

- Being recognized as leaders, innovators and raising the standards throughout the region requires a commitment beyond the norm.
- Going for Gold is consistent with our vision of being the most appealing, livable, and well managed community in Canada. Furthermore, recent studies show that the additional capital cost in pursuing LEED Gold versus Silver is typically minimal, while the long term operational benefits are typically significant in comparison.
- Buildings that exceed 2,000 sq.m in overall size (e.g. community centres, libraries, etc.) provide a greater opportunity to implement newer technologies and thereby, represent a cost-effective approach for seeking LEED Gold certification.
- Buildings less than 2,000 sq.m reflecting fire halls, field houses, etc. are potentially hampered through budget, size and location to achieve either a Gold or sometimes even Silver accreditation. As previously discussed it is not necessary to achieve every feature of a high performance building however for these building the principals of high performance buildings can still be applied and an “unofficial” rating achieved.

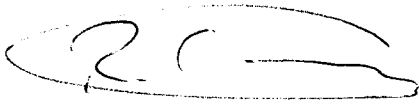
### **Financial Impact**


The proposed policy establishes corporate commitment towards undertaking comprehensive financial evaluation in the construction and operation of city-owned buildings. This approach endeavours to establish an effective balance between initial financial investment requirements with long-term life-cycle cost considerations.

The identified LEED standard objectives are established to provide a benchmark for encouraging corporate leadership and evaluating performance. However, actual realization of identified desired LEED standards for City buildings will continue be made on a case-by-case basis in accordance with available corporate budgets. The overall purpose of the policy is to support the City in meeting its financial and community sustainability goals by ensuring that wise investments are made today to result in reduced City cost over the long-term.

### Conclusion

High performance buildings provide an opportunity to make efficient use of natural and financial resources. The City of Richmond has been incorporating high performance characteristics into our corporate facilities for a number of years. The proposed Sustainable High Building Performance Policy for City owned facilities strives to strengthen current practice by formalizing corporate commitment to full-cost evaluation (e.g., short and long-term costs); establishing specific management objectives for guiding City decision-making and adopting nationally recognized standards by which to measure building performance and report corporate success. It is anticipated that the proposed Policy will serve as the foundation for more sustainable building construction for the City of Richmond and in the City realizing its vision of being the most appealing, livable, and well managed community in Canada.



  
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# City of Richmond

# Policy Manual

Page 1 of 2	Adopted by Council: xx / xx / 2004	POLICY 2004
File Ref:	<b>Sustainable High Performance” Buildings – City Owned Facilities</b>	

## POLICY 2004:

It is Council policy to:

### 1. Undertake Comprehensive Financial Consideration

Projects for new buildings and major renovations will be evaluated based on considerations of life-cycle costing and initial financial investment requirements.

### 2. Incorporate High Performance Attributes into Building Design and Construction to the Maximum Extent Possible

- LEED® BC will be used as the standard by which to assess building performance.
- That LEED Gold accreditation be set as the desired standard of building performance for new City buildings greater than 2000 sq.m (approximately 20,000 sq.ft).
- The City will seek to meet the performance standards of LEED Silver certification as a minimum requirement for major renovations to existing facilities and new City Buildings smaller than 2000 sq.m (20,000 sq.ft), but may not necessarily seek formal accreditation.

### 3. Pursue Continual Improvement Through Building Retrofit and Efficient Building Maintenance

Existing facilities and equipment will be upgraded to higher efficiencies as budgets and circumstances allow, and where the change offers a simple payback of no more than five years.

Equipment will be maintained to energy-efficient standards.

### 4. Foster Awareness and Innovation

A continuous education program in resource efficiency procedures and practices will be maintained.

All employees will be encouraged to suggest and initiate projects that will save energy and optimize efficiencies in other resource areas (natural and financial).

5. **Undertake Regular Monitoring and Reporting**

Corporate energy consumption and extent to which the City has met its LEED building objectives will be monitored and reported on a regular basis using existing City reporting tools.





# City of Richmond

# Policy Manual

Page 1 of 1	Adopted by Council: Feb. 25/91	<b>POLICY 2004</b>
File Ref: 6125-00	<b>ENERGY CONSERVATION</b>	

## **POLICY 2004:**

It is Council policy that:

The City of Richmond is committed to considering the efficient use of energy in the planning and operating of all the facilities under its jurisdiction.

Each member of management is responsible for the energy-efficient operation of his/her area of responsibility, and each employee has a vital role to play in supporting this policy.

To carry out this policy, the City of Richmond will:

1. Maintain an active and aggressive energy conservation awareness program among employees.
2. Consider life cycle costs when purchasing new equipment and when undertaking major repairs to equipment. (That is, products and systems with superior efficiency, which will pay for their premium costs within their usable life, will be preferred).
3. Provide, within reason, the best available energy-efficient system.
4. Upgrade existing facilities and equipment to higher efficiency as budgets and circumstances allow where the change offers a simple payback of no more than five years.
5. Maintain equipment to energy-efficient standards.
6. Maintain a continuous education program in energy efficiency procedures and practices.
7. Encourage all employees to suggest and initiate projects that will save energy.
8. Ask all employees to observe established energy conservation practices.
9. Monitor energy consumption so that energy efficiency goals can be established and performance measured and reviewed annually.

(Public Works Division)

LEED™ Points System



Version 2.1 Registered Project Checklist

Yes ? No

**Sustainable Sites 14 Points**

<input type="checkbox"/>	Prereq 1 <b>Erosion &amp; Sedimentation Control</b>	Required
<input type="checkbox"/>	Credit 1 <b>Site Selection</b>	1
<input type="checkbox"/>	Credit 2 <b>Urban Redevelopment</b>	1
<input type="checkbox"/>	Credit 3 <b>Brownfield Redevelopment</b>	1
<input type="checkbox"/>	Credit 4.1 <b>Alternative Transportation, Public Transportation Access</b>	1
<input type="checkbox"/>	Credit 4.2 <b>Alternative Transportation, Bicycle Storage &amp; Changing Rooms</b>	1
<input type="checkbox"/>	Credit 4.3 <b>Alternative Transportation, Alternative Fuel Vehicles</b>	1
<input type="checkbox"/>	Credit 4.4 <b>Alternative Transportation, Parking Capacity and Carpooling</b>	1
<input type="checkbox"/>	Credit 5.1 <b>Reduced Site Disturbance, Protect or Restore Open Space</b>	1
<input type="checkbox"/>	Credit 5.2 <b>Reduced Site Disturbance, Development Footprint</b>	1
<input type="checkbox"/>	Credit 6.1 <b>Stormwater Management, Rate and Quantity</b>	1
<input type="checkbox"/>	Credit 6.2 <b>Stormwater Management, Treatment</b>	1
<input type="checkbox"/>	Credit 7.1 <b>Landscape &amp; Exterior Design to Reduce Heat Islands, Non-Roof</b>	1
<input type="checkbox"/>	Credit 7.2 <b>Landscape &amp; Exterior Design to Reduce Heat Islands, Roof</b>	1
<input type="checkbox"/>	Credit 8 <b>Light Pollution Reduction</b>	1

Yes ? No

**Water Efficiency 5 Points**

<input type="checkbox"/>	Credit 1.1 <b>Water Efficient Landscaping, Reduce by 50%</b>	1
<input type="checkbox"/>	Credit 1.2 <b>Water Efficient Landscaping, No Potable Use or No Irrigation</b>	1
<input type="checkbox"/>	Credit 2 <b>Innovative Wastewater Technologies</b>	1
<input type="checkbox"/>	Credit 3.1 <b>Water Use Reduction, 20% Reduction</b>	1
<input type="checkbox"/>	Credit 3.2 <b>Water Use Reduction, 30% Reduction</b>	1

Yes ? No

**Energy & Atmosphere 17 Points**

<input type="checkbox"/>	Prereq 1 <b>Fundamental Building Systems Commissioning</b>	Required
<input type="checkbox"/>	Prereq 2 <b>Minimum Energy Performance</b>	Required
<input type="checkbox"/>	Prereq 3 <b>CFC Reduction in HVAC&amp;R Equipment</b>	Required
<input type="checkbox"/>	Credit 1 <b>Optimize Energy Performance</b>	1 to 10
<input type="checkbox"/>	Credit 2.1 <b>Renewable Energy, 5%</b>	1
<input type="checkbox"/>	Credit 2.2 <b>Renewable Energy, 10%</b>	1
<input type="checkbox"/>	Credit 2.3 <b>Renewable Energy, 20%</b>	1
<input type="checkbox"/>	Credit 3 <b>Additional Commissioning</b>	1
<input type="checkbox"/>	Credit 4 <b>Ozone Depletion</b>	1
<input type="checkbox"/>	Credit 5 <b>Measurement &amp; Verification</b>	1
<input type="checkbox"/>	Credit 6 <b>Green Power</b>	1

Yes ? No

**Materials & Resources 13 Points**

<b>Y</b>				Prereq 1 <b>Storage &amp; Collection of Recyclables</b>	Required
				Credit 1.1 <b>Building Reuse</b> , Maintain 75% of Existing Shell	1
				Credit 1.2 <b>Building Reuse</b> , Maintain 100% of Shell	1
				Credit 1.3 <b>Building Reuse</b> , Maintain 100% Shell & 50% Non-Shell	1
				Credit 2.1 <b>Construction Waste Management</b> , Divert 50%	1
				Credit 2.2 <b>Construction Waste Management</b> , Divert 75%	1
				Credit 3.1 <b>Resource Reuse</b> , Specify 5%	1
				Credit 3.2 <b>Resource Reuse</b> , Specify 10%	1
				Credit 4.1 <b>Recycled Content</b> , Specify 5% (post-consumer + ½ post-industrial)	1
				Credit 4.2 <b>Recycled Content</b> , Specify 10% (post-consumer + ½ post-industrial)	1
				Credit 5.1 <b>Local/Regional Materials</b> , 20% Manufactured Locally	1
				Credit 5.2 <b>Local/Regional Materials</b> , of 20% Above, 50% Harvested Locally	1
				Credit 6 <b>Rapidly Renewable Materials</b>	1
				Credit 7 <b>Certified Wood</b>	1
Yes	?	No			

**Indoor Environmental Quality 15 Points**

<b>Y</b>				Prereq 1 <b>Minimum IAQ Performance</b>	Required
<b>Y</b>				Prereq 2 <b>Environmental Tobacco Smoke (ETS) Control</b>	Required
				Credit 1 <b>Carbon Dioxide (CO<sub>2</sub>) Monitoring</b>	1
				Credit 2 <b>Ventilation Effectiveness</b>	1
				Credit 3.1 <b>Construction IAQ Management Plan</b> , During Construction	1
				Credit 3.2 <b>Construction IAQ Management Plan</b> , Before Occupancy	1
				Credit 4.1 <b>Low-Emitting Materials</b> , Adhesives & Sealants	1
				Credit 4.2 <b>Low-Emitting Materials</b> , Paints	1
				Credit 4.3 <b>Low-Emitting Materials</b> , Carpet	1
				Credit 4.4 <b>Low-Emitting Materials</b> , Composite Wood & Agrifiber	1
				Credit 5 <b>Indoor Chemical &amp; Pollutant Source Control</b>	1
				Credit 6.1 <b>Controllability of Systems</b> , Perimeter	1
				Credit 6.2 <b>Controllability of Systems</b> , Non-Perimeter	1
				Credit 7.1 <b>Thermal Comfort</b> , Comply with ASHRAE 55-1992	1
				Credit 7.2 <b>Thermal Comfort</b> , Permanent Monitoring System	1
				Credit 8.1 <b>Daylight &amp; Views</b> , Daylight 75% of Spaces	1
				Credit 8.2 <b>Daylight &amp; Views</b> , Views for 90% of Spaces	1
Yes	?	No			

**Innovation & Design Process 5 Points**

				Credit 1.1 <b>Innovation in Design: Provide Specific Title</b>	1
				Credit 1.2 <b>Innovation in Design: Provide Specific Title</b>	1
				Credit 1.3 <b>Innovation in Design: Provide Specific Title</b>	1
				Credit 1.4 <b>Innovation in Design: Provide Specific Title</b>	1
				Credit 2 <b>LEED™ Accredited Professional</b>	1
Yes	?	No			

**Project Totals (pre-certification estimates) 69 Points**

Certified 26-32 points Silver 33-38 points Gold 39-51 points Platinum 52-69 points

## Public Sector Organizations Developing or Implementing Green Building Policy

Organization	Policy	Results
<b>Municipalities</b>		
City of Vancouver	Adopted Gold Standard for buildings over 1,000m <sup>2</sup>	Vancouver constructed its first Gold Standard facility for the National Works Yard
White Rock	No formal policy in place, but OCP encourages sustainable development	Achieved Gold Standard on works yard redevelopment
Whistler	Official sustainability plan adopted in 2000 with high priority on buildings	New civic fire hall is targeting LEED® Gold and the Convention Centre is looking to Silver
Surrey	No formal policy in place, direction to follow LEED® program	Surrey has one certified LEED® building
City of Portland	Green Building policy embracing all civic buildings	LEED® Silver minimum
Seattle	Seattle was the first U.S. municipality to adopt a LEED® Silver requirement for its major construction projects (over 5000ft <sup>2</sup> )	As of 2003, the city has 11 LEED® registered projects.
Victoria	2004 -policy to adopt LEED® rating system to all new civic buildings	Expectation to adopt Silver Standard
Calgary	2004 - Policy to adopt LEED® rating system to all new civic buildings	Expectation to adopt Silver Standard
<b>Other Organizations</b>		
Architectural Institute of British Columbia	Adopted a policy to further the goals of sustainability	The AIBC endorses the use of building environment assessment tools such as the LEED® BC rating system and encourage their use as an integral part of architectural practice
Association of Professional Engineers and Geoscientists	1995- Adopted sustainability guidelines	APEGBC policy is committed to integrating sustainable principles and practices into engineering and geosciences professions
Government of Canada – Department of Public Works	2003 – Adopted LEED® Gold as the minimum standard for all project over \$10 million	Certified or Silver standard for all projects less than \$10 million
GVRD	2003 – Planning and Environment Committee adopted LEED® as primary tool in the region to promote green buildings	Recommends voluntary use of LEED® to member municipalities and LEED® for all new GVRD buildings
Vancouver 2010 Olympic Games Organization	No formal policy other than objectives outlined in Bid documents	Olympic Bid Book identifies LEED® Silver for all games buildings
Translink	No formal policy but follow LEED® principles	New Vancouver transit facility is targeting LEED® Certified /Silver

**References:**

G. Kats. 2003. The Costs and Financial Benefits of Green Buildings A Report to California's Sustainable Building Task Force.

<http://www.ciwmb.ca.gov/greenbuilding/Design/CostBenefit/Report.pdf>

Paladino and Company Inc.2004. Driving down the cost of LEED® - Driving up the Value of Your Building.

<http://www.paladinoandco.com>