



**To:** Public Works and Transportation Committee  
**From:** John Irving, P.Eng, MPA  
Director, Engineering and Public Works  
**Re:** **2013 Corporate Energy Management Update**

**Date:** November 1, 2013  
**File:** 10-6000-01/2013-Vol  
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**Staff Recommendation**

That the staff report titled “2013 Corporate Energy Management Program Update Report” from the Director of Engineering and Public Works, dated November 1, 2013 be received for information.

John Irving, P.Eng, MPA  
Director, Engineering  
(604-276-4140)

Att. 2

<b>REPORT CONCURRENCE</b>	
<b>CONCURRENCE OF GENERAL MANAGER</b>  _____	
<b>REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE</b>	<b>INITIALS:</b>  
<b>APPROVED BY CAO</b>  _____	

## Staff Report

### Origin

The Corporate Energy Management Program (EMP) supports the following Council Term Goal;

Council Term Goal #8.1: *“Continued implementation and significant progress towards achieving the City’s Sustainability Framework, and associated targets.”*

The EMP is a key contributing program towards achieving the Sustainability Framework Goals of a Sustainable Resource Use-Energy Smart City and Climate Prepared City.

This report summarizes the recent achievements of the Corporate EMP and highlights upcoming initiatives. The report information is also summarized in an attached brochure, to further illustrate key information and highlights of recent City energy projects and initiatives (**Attachment 1**).

### Energy Management Program – Overview

The City has been following three corporate strategies, as adopted by Council in the Energy Sustainability Strategic Program, to guide the transition towards more sustainable energy use and lower greenhouse gas (GHG) emissions;

1. **Empower** – building awareness and capacity
2. **Reduce** – reduce overall energy consumption through conservation and efficiency
3. **Renew and Localize** – accelerate transition to locally supplied renewable and clean energy

To put these strategies into actions, the corporate EMP has been focused on three main areas;

1. **Energy conservation** - reduce the overall demand for an energy service (e.g., increased corporate energy use awareness and improved operational control to reduce waste)
2. **Energy efficiency** - reduce the energy required to provide an equivalent energy service (e.g. lighting retrofits to more efficient technologies)
3. **Renewable and clean energy** – increase the use of renewable energy sources and reduce the carbon intensity of emissions resulting from an energy service (e.g. installation of solar thermal energy systems at existing facilities)

The Energy Management Program, through these strategies and actions, is a major component of the Towards Carbon Neutrality Implementation Strategy. An overview of key energy management initiatives connected with the Towards Carbon Neutrality Implementation Framework is provided in the report to council titled Towards Carbon Neutrality: Implementation Strategy.

In addition to the Sustainability Framework and Carbon Neutral goals and targets, the City of Richmond, in collaboration with BC Hydro, agreed to a reduction target of approximately 1.3% or 650,000 kWh in corporate electrical use by April 2014 from 2012 levels, which is equal to the energy used by approximately 20 homes in BC per year. The City of Richmond is presently on-pace to better this target by early 2014. This target and the continued collaboration with BC

Hydro helps to maximize the incentive funding from BC Hydro (one of our key EMP external funding partners), and allows for the continued development and delivery of projects.

### ***EMP Achievements – 2007-2011 EMP Highlights***

Based on the continuing corporate emphasis on increased energy use efficiency, the City of Richmond remains the only municipality in BC to achieve the Leadership Excellence Award recognition from BC Hydro, which is the highest level of recognition BC Hydro awards for energy efficiency and conservation work. New excellence awards will be issued for energy efficiency and conservation work in the fall of 2014.

Energy conservation work at the City and energy related projects have saved approximately 28.4 GWh of energy (equal to the energy consumption in 790 BC homes per year) since 2007, which amounts to approximately \$1,500,000 in total operational cost avoidance and over 5,000 tonnes of greenhouse gas emissions (equal to emissions from 1500 Richmond cars). During that time the City received approximately \$1,000,000 in external funding to help support its EMP, which has been used to proceed with additional and expanded Energy Management projects, increase the repayment of capital funding to the corporate Enterprise Fund for projects related to Energy Management, and develop energy related projects.

### **Findings of Fact**

#### ***Corporate Energy Use Overview - 2012***

The corporate energy manager actively manages or coordinates energy use reporting, inventory, and reduction programs, for all civic buildings, lighting, and water/wastewater services, and in addition reports on energy use at the Richmond Oval.

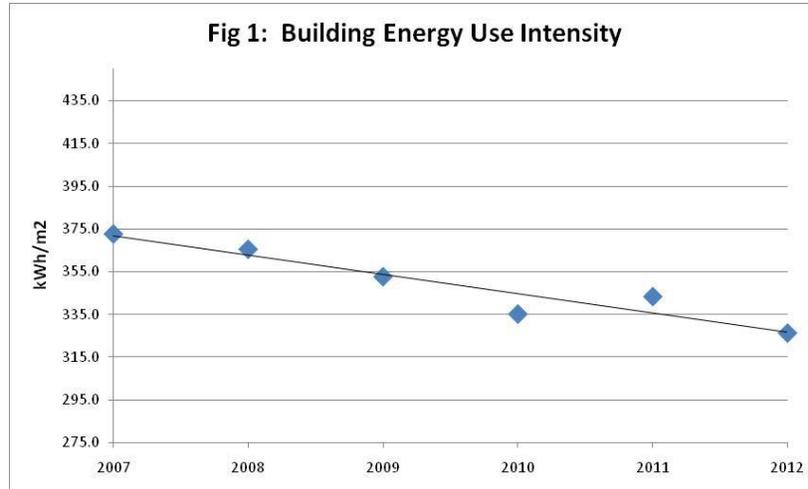
In 2012 City assets under the EMP consumed approximately \$6.0 million dollars of conventional energy<sup>1</sup> (electricity and natural gas), which equals 80.6 GWh (this is equivalent to the amount of energy used on average each year by approximately 2,300 homes in BC). This total does not include the energy used in our corporate fleet operations. Compared to 2011 the corporate energy consumption for buildings, water/wastewater services, and lighting has remained stable, at the same time that corporate asset inventory has increased.

Energy use at civic buildings accounts for a majority (approximately 82%) of total reported corporate energy use<sup>2</sup>. As shown in the following Figure 1, civic building energy use intensity has decreased from approximately 373 kWh/m<sup>2</sup> in 2007 to 326 kWh/m<sup>2</sup> in 2012. Decreasing energy use intensity in civic buildings (improving energy use efficiency) demonstrates that corporate energy management is effective.

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<sup>1</sup> There are civic buildings that have renewable energy systems (e.g. solar thermal hot water heating at Minoru Aquatic Centre), which obtain “free” solar energy that is not accounted for in our total corporate energy use/cost amount.

<sup>2</sup> This total corporate energy use does not include Fleet services.



### ***EMP Achievements - 2012/2013 EMP Highlights***

With the commitment of Council and staff to increased corporate energy use efficiency, it is anticipated that by early 2014 the City will achieve a reduction of approximately 1.4 GWh of electrical and natural gas energy use (approximately 1.8% of current corporate use) from a variety of 2012/2013 energy related projects. This reduction represents approximately \$100,000 in operational cost avoidance savings and a reduction of approximately 170 tonnes of CO<sub>2</sub>e (equal to removing approximately 50 Richmond cars from our roads each year).

Other select highlights of the City's energy management program and other energy related corporate activities from 2012 and 2013 include:

- **External Funding:** Secured over \$100,000 of external funding to support the Corporate Energy Management Program and Sustainability Unit.
- **Employee Engagement:** Completed Year 3 of a 4-year corporate energy awareness program, branded "Because Energy Awareness Matters (BEAM)" with support of BC Hydro and staff Energy Champions, to promote energy conservation measures with staff.
- **Showcase projects:** Achieved higher than anticipated energy conservation results for two projects, a heat recovery installation at Minoru Arena and a lighting retrofit at Burkeville tennis courts.
- **Policy Review:** On-going facilitation of a working group to update the Corporate High Performance Building Policy, with emphasis on space functionality, and operational and energy efficiency.
- **New Technology:** Continued feasibility work on the integration of new high efficient light-emitting diode (LED) street lighting fixtures into the City's street lighting system to displace higher energy using high pressure sodium fixtures.

Further summary of EMP projects highlights in 2012 and 2013 are provided in **Attachment 2**.

In addition to corporate initiatives listed above, the City, the Engineering Department, and the District Energy Management Program are working on the establishment of new district energy centre locations powered by renewable energy, namely River Green and City Centre. The

development and connecting of renewable energy to new corporate facilities, would allow the City of Richmond to further reduce its corporate greenhouse gas emissions, by displacing more conventional heating and cooling energy sources.

### ***Future EMP Vision and Goals***

In continuation from the Vision and Goals from last year's Energy Update Report, the following main focus areas remain in place for the EMP for 2014;

- Increase energy use awareness within the organization and community
- Pursue external funding and partnerships with outside agencies
- Maintain a leadership role in terms of municipal energy systems and policy
- Improve the “usability” of our energy use data at key facilities, to allow for more detailed analysis and the increased optimization of our energy use
- Incorporate a more systematic approach to building energy use performance analysis and benchmarking of our civic facilities, to allow for the continued improvement of our facilities, and the extension of their usefulness
- Continue to ensure that energy use and GHG emission accounting (in relation to reduction goals) is a high priority during the designing of new facilities and developments

The funding strategy for these programs will be brought forward as part of the operating budget process for consideration by Council.

### ***Planned Upcoming Capital Projects***

There are numerous proposed energy initiatives for 2014, as part of the EMP capital submissions as well as longer term projects, which in summary includes the following key actions items.

- Retro-commissioning of select high consuming buildings
- Completion of building automation system upgrades at several civic facilities
- Lighting retrofits at various facilities, including Minoru Park tennis courts
- Pool heating system optimization at Steveston and South Arm facilities

### **Financial Impact**

There is no financial impact as a result of this report. Capital projects related to energy management are reviewed and approved by Council as part of the capital budget process.

### **Conclusion**

Through Council's continued commitment to corporate energy efficiency and the collaborative staff effort between departments, energy efficiency awareness is becoming more embedded into the City's corporate culture and decision making processes every year. Cumulatively since 2007, energy conservation projects in buildings at the City have saved approximately 28.4 GWh of energy (equal to the energy consumption in 790 BC homes per year), which amounts to

approximately \$1,500,000 in total operational cost avoidance and over 5,000 tonnes of greenhouse gas emissions reduced (equal to emissions from 1,500 Richmond cars). These efforts have allowed the City to bring on new facilities and infrastructure, without significantly increasing our overall energy use.

Further work and initiatives to increase the effectiveness of the corporate EMP, will focus on maximizing energy efficiency opportunities for new capital projects and replacement equipment, increasing operational efficiencies through building automation systems, and continuing to retrofit existing buildings for improved energy performance. The EMP will also investigate the feasibility of district energy connectivity for replacement of facilities at Minoru Park and other areas of the community where district energy is being implemented.

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Attachment 1	Energy Report Summary – 2012	REDMS# 4026277
Attachment 2	City Energy Management Program 2011/2012 Key Initiatives	REDMS# 4021018