Supports Item No. 2
CS&B Committee Agenda
July 10, 2008

CITY OF **VANCOUVER**

ADMINISTRATIVE REPORT

CITY OF VANCOUVER

Report Date:	June 24, 2008
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TO: Standing Committee on City Services and Budgets

FROM: Director of Facilities Design and Management (Business Planning & Services) in consultation with the Director of Finance and the Manager of the Sustainability Group

SUBJECT: Green House Gas Reductions (Corporate Climate Change Action Plan): - Report Back on Phases 1&2 (Upgrade Work to City Hall and Park Board), and Award of contract for Phase 3 –Energy Performance Contract

RECOMMENDATION

A. THAT, subject to the conditions set out in Recommendations B and C, the Director of Facilities Design and Management be authorized to enter into a contract with Ameresco Canada Inc. for energy savings measures work on the Phase-3 facilities, as set out in Table-2 of Appendix "A", at a maximum total capital cost of $5.02 million plus GST; source of funding to be as follows:

- $140,000 from existing capital budget for HVAC upgrades (order # 30010081);
- $600,000 from the 2009-2011 Capital Plan for Archive HVAC upgrades, subject to Council approval of the Plan and subsequent annual Capital Budget allocations (if funding is not approved in whole or in part, the scope and upset cost of the project will be adjusted accordingly);
- $101,000 from BC Hydro power smart incentives; and
- $4.18 million from a loan from the Capital Financing Fund to be repaid with interest from energy cost savings generated from the energy saving measures, on terms to be established by the Director of Finance.

B. THAT the Director of Legal Services be authorized to execute and deliver on behalf of the City all legal documents required to implement Recommendation A.

C. THAT all such legal documents be on terms and conditions satisfactory to the Director of Legal Services, and further that no legal rights or obligations will be created or arise by Council's adoption of Recommendations A and B unless and until such legal documents are executed and delivered by the Director of Legal Services.

D. THAT the Director of Facilities Design and Management report back within one year of the completion of the upgrade work set out in the report and that said report include information about the Greenhouse Gas (GHG) reductions, the financial savings and the payback periods.

E. THAT Council receive for information the update on Phase 1 and 2 of the Energy Performance Program.

CITY MANAGER'S COMMENTS

The City Manager RECOMMENDS approval of A through E above, noting that this phase of the Energy Performance Contract is consistent with the City's climate strategy, supported by a positive business case, and a key initiative in enabling the City to achieve its green house reduction target.

COUNCIL POLICY

On April 23, 2002, Council adopted the Definition and Principles of Sustainability to guide, prioritize and improve the sustainability of City actions and operations.

On May 2, 2002, Council approved the motion proposed by the Federation of Canadian Municipalities to support the Canadian Government's ratification of the Kyoto Protocol.

On March 25, 2003, Council approved an emission reduction target of 20 percent from 1990 levels for the City of Vancouver, subject to evaluation of the implications of the target to ensure it is realistic. On this same date, Council created the Cool Vancouver Task Force and requested that it report back with a report on the components of a Greenhouse Gas Reduction (GHG) Action Plan for both the corporation and the community.

On June 24, 2003, Council received the Cool Vancouver Task Force's Discussion Paper on GHG Reduction Planning and approved a process to develop GHG Reduction Plans for both the City (Corporate) and the City (Community).

On December 2, 2003, Council:

- received and accepted the Corporate Climate Change Action Plan (CCAP) from the Cool Vancouver Task Force;
- affirmed and approved the 2010 target of a 20 percent reduction in Corporate GHG's;
- requested that Corporate Services and Engineering Services report back by January 2004 on the opportunities that Energy Performance Contracts may offer the City to reduce emissions from its building and facilities; and
- approved the hiring of an Energy Projects Coordinator to assist in developing and implementing energy performance contracts.

On February 24, 2004 Council directed staff to issue a Request for Proposals for energy performance contracting in order to achieve Council's mandated target of 20 percent reduction in GHG by 2010 for a report back on the selection of contractors. Subsequently, Ameresco Canada Inc. was selected to be the Energy Performance Contractor for City-owned and managed facilities. Staff directed Ameresco Canada Inc. to undertake an energy audit of City Hall Campus and to recommend energy-savings and GHG reduction measures.

On September 22, 2005 the City entered into a contract with Ameresco Canada Inc. for energy savings and GHG reduction measures work on City Hall Campus facilities. The total value of the contract is $1.82 million with a resulting GHG reduction of 320 tonnes CO2 or about 89% of the 360 tonne CO2 average target outlined in the policy adopted by Council on March 25, 2003.

On March 1st, 2007, Council approved Phase-2 of the Energy Performance Contract for selected Park Board facilities. The total value of the contract is $8.64 million with a resulting GHG reduction of 2,240 tonnes CO2 or about 102% for that phase of the target adopted by Council. This contract was executed on May 15, 2007.

In September 2007, Council adopted a carbon neutral target for City operations by 2012 under the British Columbia Climate Action Charter.

PURPOSE

The purpose of this report is to provide a status on Phase 1 & 2 and seek Council's approval for the City to enter into an energy performance contract with Ameresco Canada Inc., and to establish a source of interim financing for Phase 3 of this project, which will ultimately be paid for with the energy savings and external grants. The report recommends that the energy performance contract be comprised of thirty-two (32) energy-savings measures, which are to be implemented in the following four (4) facilities: Manitoba Works yard, National Works Yard, Museum/Archive and Library Square.

BACKGROUND

Historically, the City has undertaken capital upgrades and retrofitting of City-owned facilities on an as-needed basis, funded through annual capital budgets. Over the past fifteen years, many successful energy efficiency projects have been completed within City facilities, using a combination of internal funding and BC Hydro Power Smart rebates. While energy efficiency is one of the criteria used in justifying such work, this one-off approach does not necessarily maximize potential energy savings, nor will it allow the City to meet its GHG reduction goal.

Reducing greenhouse gas emissions from the City's own facilities is an important part of the City's commitment to reduce its own corporate greenhouse gas emissions by twenty percent of its 1990 levels by 2010 (a 9,000 tonne reduction). This will be achieved by undertaking capital upgrade projects that retrofit Civic facilities (including Park Board facilities) with more energy-efficient technologies, resulting in a more energy-efficient operation.

DISCUSSION

Energy Performance Contracts

An energy performance contract is an agreement that establishes a relationship between the owner of building facilities (in this case, the City) and an energy performance contractor (in

this case, Ameresco Canada Inc.) whereby the energy performance contractor is required to provide the following services for a fixed fee:

- Energy-savings assessment - Provide a list of proposed energy-saving measures, with an estimate of capital cost, GHG reduction, and a supporting business case including financial savings and financial payback.
- Project management - Act as a general contractor for the agreed to capital upgrades and retrofit work.
- Materials sourcing - Assist the City in procuring the most appropriate materials and technologies at the best possible price for the energy-savings measures that are implemented.
- Grant applications - Assist the City in applying for applicable grants for this work.
- Capital cost guarantee - Provide a guaranteed ceiling on the up-front capital cost for the work.
- Energy savings guarantee - Provide the City a guarantee of the ongoing annual energy savings associated with the retrofit work. This provides the City certainty regarding the payback periods and the business case for the capital work undertaken.

Energy Performance Projects

Phase 1: City Hall Campus – Progress Report

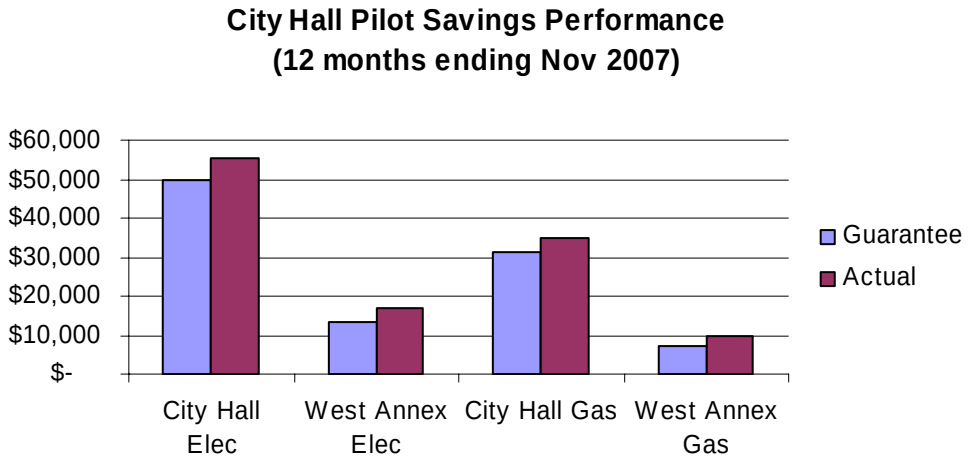
As directed by Council in February 2004, staff, through a request for proposals from Energy Performance Contractors, selected Ameresco Canada Inc. ("Ameresco Canada Inc.") to provide a detailed proposal to carry out work in the City facilities, comprised of:

Phase 1: City Hall Campus, which consists of the following facilities:
- City Hall Main Building - 453 West 12th Avenue,
- City Hall East Wing - 2675 Yukon Street, and
- City Hall West 10th Avenue Annex - 515 West 10th Avenue.

This work on Phase 1 of the GHG reduction program has been complete for over a year and staff have deemed this project a success based on the following parameters:

- **Financial** – energy savings are exceeding the guarantee by approximately 12% to date and initial loan payment made to funding source (PEF – Property Endowment Fund). Based on the projected savings, staff are confident that the loan will be paid back as scheduled.
- **Ergonomic Improvements** – staff, with a few exceptions, are appreciative of the new lighting system that is both energy efficient and intended to reduce glare on computer screens.
- **Infrastructure Renewal** – building systems have been replaced, upgraded or retrofitted to extend the life of aging building infrastructure.
- **Legal** – an acceptable contract has been negotiated and this can serve as a model for future phases of this work.
- **Environmental** (GHG Reductions) – based on actual energy savings to date, Natural gas savings are approximately 115% of original estimates which means the City Hall campus will be able to achieve 102% of the GHG reduction target of the 20% reduction below 1990 levels (as set by Council Policy).

- **Utility Savings** - the "Actual" Electrical and Natural Gas savings have exceeded the "Guaranteed" Savings as illustrated by the following chart:



Phase 2: Board of Parks and Recreation Facilities

The Phase-2 contract for 30 Park Board facilities is approximately 20% complete with significant work scheduled to be implemented this summer so that the project will be approximately 50% complete by the end of 2008. The project is expected to be 100% complete in early 2010.

Phase-3: Engineering Works Yards, Museum/Archive and Library Square

Ameresco Canada Inc. has submitted a feasibility report for the Phase 3 Energy Performance project in May 2008, a summary of which is attached as Appendix A. When implemented, the energy saving measures will achieve a 24% reduction in GHG emissions which will exceed the reduction target as set by Council Policy for these specific buildings. It is unlikely that every civic building can meet the 20% GHG reduction target, but staff are confident that this can be achieved on an average basis throughout the entire major building portfolio.

Table 1 of Appendix A summarizes Ameresco Canada Inc.'s analysis of potential energy-savings measures for the four (4) facilities, which are projected to result in energy savings in natural gas, electricity and water consumption.

The list in Table 5 of Appendix A is a subset of the measures listed in Table 1, made up of a building by building breakdown of the energy saving measures that Ameresco Canada Inc. is recommending that the City undertake at this time.

The business case developed by Ameresco Canada Inc. shows the benefits of:

(a) using a holistic approach and implementing the recommended retrofit measures as part of the contract in a cost-effective fashion and advancing the realization of ongoing annual savings; and

(b) avoiding the incremental cost of implementing each measure as separate one-off projects in an ad hoc fashion sometime in the future and delaying the realization of ongoing annual savings.

Ameresco Canada Inc. concluded that the recommended measures cumulatively:

- result in an annual savings of 698 tonnes of greenhouse gas emissions, which represents a reduction of 24% from current levels;
- represent a total investment by the City of $5.02 million, including existing Capital Budget, anticipated funding from the 2009-2011 Capital Plan, and grants from external agencies;
- generate annual savings of approximately $275,800 (based on current utility rates);
- result in a simple payback of 17.8 years (15.2 years on the amount borrowed); and
- have a strong business case justification, with a positive net present value of $523,000.

FINANCIAL IMPLICATIONS

The total capital cost for the Phase-3 Energy Performance Contract is estimated at $5.02 million with a payback period of 17.8 years and a net present value of $523,000.

The following sources of funding have been identified for the recommended measures as outlined in Appendix A:

- Existing Capital Budget of $140,000 for HVAC upgrades (Order#30010081);
- Anticipated funding of $600,000 from the 2009 – 2011 Capital Plan, subject to Council approval of the Plan and subsequent annual Capital Budget allocation. If funding is not approved in whole or in part, the project upset cost and scope will be adjusted accordingly;
- Grant from BC Hydro based on energy savings are estimated by Ameresco Canada Inc. to be $101,000 (if necessary, interim financing from internal sources will be arranged for this item); and
- Energy cost savings that result from implementing the energy savings measures can be utilized to support interim financing during the payback period. This includes savings from existing budgets and additional savings that result from avoided increases in energy costs in the future.

The measures that are being proposed have a range of payback periods, depending on the capital cost and savings generated by each. It is estimated that the financing will have a term of twenty years. The financial model anticipates that these energy costs will continue to increase over assumed levels, as the price of natural gas and electricity continues to increase in the future, increasing the savings and shortening the payback period with the possibility of the loan being fully repaid in less than 20 years.
In considering the terms for internal loans for capital projects, the Director of Finance normally considers the total value of the loan and the lifespan of the project. In most cases, internal loans are less than 10 years. However, in cases where there is the appropriate

business need, longer terms are recommended. In the case of the energy loans, normal practice would be to restrict the term to 10 years, however, as these projects meet other corporate objectives – namely the achievement of green house gas reductions – the proposed term of 20 years is acceptable. The justification of this longer term is that it allows the City to achieve a higher GHG reduction target than would otherwise be possible. Should Council approve the recommendations in this report, the source of the internal financing will be the Capital Financing Fund with repayment from energy savings over the term of the loan.

ENVIRONMENTAL IMPLICATIONS

The following are the anticipated annual improvements to the environment as a result of the phase 3 initiatives;

- GHG reduction of 698 tonnes
- Electrical energy savings of 1,269,212 kWh
- Natural Gas savings of 13,174 GJ
- Water savings of 5,761 m^3

CONCLUSION

This report recommends that the City enter into a Phase-3 Energy Performance Contract with Ameresco Canada Inc., which will involve energy-saving measures on the four noted facilities. A $5.02 million investment by the City will have a positive financial return (investment paid off within twenty years, with a positive overall net present value of $523,000), as well as annual GHG reduction 688 tonnes. Staff will report back on results of energy savings and GHG reductions.

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Appendix A
Phase-3 Emissions Reduction Project Summary
National Works Yard, Manitoba Works Yard
Museum/Archive, Library Square

Overview

The Phase-3 Emissions Reduction project proposed for the above noted facilities is aimed at achieving the objectives of the City's Corporate Climate Change Action Plan (CCAP) which requires that green house gas (GHG) emissions from corporate operations be reduced to 20% below 1990 levels by 2010.

The proposed project includes a wide range of individual efficiency projects or "measures" at each of the facilities. Measures were included in the final scope based on a number of criteria including emissions reductions, simple payback and financial business case as well as the overall project financial payback limitations. Table-1 below summarizes the major components of the project.

Measure	Measure Cost	Incentive	Net Cost	Savings					Simple Payback	Emissions Reduction
				kWh	GJ	CM	Operating	$		
Lighting	$ 978,673	$ 93,361	$ 885,312	787,293	-	-	15,932	$ 68,444	12.9	18
Direct Digital Control	$ 1,002,878	$ 7,737	$ 995,141	160,646	4,107	-	-	$ 63,160	15.8	209
Boilers	$ 1,060,652	$ -	$ 1,060,652	-	3,310	-	-	$ 42,263	25.1	165
HVAC & Mech	$ 1,653,180	$ -	$ 1,653,180	318,480	5,757	-	-	$ 94,766	17.4	295
Water	$ 50,470	$ -	$ 50,470	-	-	5,761	-	$ 4,421	11.4	-
Other	$ 138,120	$ -	$ 138,120	2,800	-	-	2,559	$ 2,746	50.3	0
Asbestos (by COV)	$ 75,000									
Professional Fees	$ 61,000									
Total Selected Measures	$ 5,019,973	$ 101,098	$ 4,918,874	1,269,219	13,174	5,761	18,491	$ 275,800	17.8	688

Highlights of the project include:

- The majority of the project can be financed from utility savings with a 19.8-year term loan at 6% interest.
- Additional funding includes $140,000 of previously approved capital for HVAC upgrades (order # 30010081), $600,000 anticipated from the 2009-2011 Capital Plan (subject to Council approval of the Plan and subsequent annual Capital Budget allocations), and an estimated $101,000 of incentives from B.C. Hydro Power Smart.
- Achieves 698 Tonnes of GHG emissions reduction which is equivalent to removing 135 cars from the road.
- Has a positive Net Present Value (NPV) of over $523,000.
- Includes the replacement of a significant amount of aging building systems which represents avoided future capital expenditures.
- Will result in improved occupant comfort and enhanced equipment standardization as well as facility operations efficiency improvements.
- Will result in a 16% reduction in utility costs for these facilities.

Financial Business Case

Many of the proposed measures involve replacing aging, inefficient equipment and systems and the ability to fund their replacement cost out of utility savings represents avoided future capital expenditures. For each Measure, and for the project as a whole, a cash flow analysis was performed which included the impact of any future avoided capital cost. The resultant Net Present Value (NPV) of these cash flows for the total project exceeds **$523,000**.

Financial Summary

Table-2 to the right summarizes the financial parameters of the project. After existing and pending capital contributions and the estimated incentives, the balance of the project costs can be financed over a 19.6 year term at an interest rate of 6%. The financing term, as well as the NPV calculations, assumes a 2.5% annual utility price escalation.

Total Project Cost	$ 5,019,973
Amount Financed	$ 4,178,874
Annual Savings	$ 275,800
Simple Payback	15.2
Financing Term (Years)	19.8
Emissions Reduction (Tonnes)	688
Emissions Reduction %	24%
Net Present Value (NPV)	$ 523,119

Annual Savings

The annual savings are broken down as per Table-3 on the right. The natural gas reductions generate the majority of the annual dollar savings. Water savings are included despite the lack of metering on some sites.

Savings Breakdown		
Electricity	$ 84,657	31%
Gas	$ 168,231	61%
Water	$ 5,127	2%
Operating	$ 18,491	7%

Table-4 on the right summarizes the utility reduction percentages with natural gas having the largest percent reduction.

Savings % Reduction		
Elec	Gas	$
9%	28%	16%

Emissions Reductions

The proposed measures achieve a 24% emissions reduction (698 Tonnes) for these specific facilities. The reductions are the equivalent of removing 132 cars from the road. The vast majority of the emissions reductions (96%) are the result of reduced natural gas consumption as opposed to electricity consumption. This is because of the relatively low carbon intensity of BC's electricity supply (which is calculated based on the average intensity as opposed to incremental, thermally generated supply). The low carbon intensity of BC's electricity makes achieving a 24% reduction in emissions much more difficult than in other jurisdictions.

Building Breakdowns

Table-5 below summarizes the cost, savings, business case and emissions reductions for each of the facilities included in this project.

Building Name	Measures Cost	Savings $	NPV	Emissions Reduction
Total	$ 4,883,973	$ 275,800	$ 523,119	688
Museum	$ 2,526,569	$ 138,744	$ 555,314	440
National Yard	$ 271,551	$ 21,566	$ 15,767	63
Manitoba Yard	$ 1,159,446	$ 64,320	-$ 114,559	171
Library	$ 926,407	$ 51,170	$ 66,597	14

General Measures Descriptions

The following section provides general descriptions of the types of measures being implemented in the facilities.

Lighting Measures

Existing lighting fixtures will be retrofit with new high efficiency equipment where viable. This will improve lighting quality and result in a standardization of lighting components for maintenance purposes. The predominant measure is the replacement of older T12 fluorescent fixtures with magnetic ballasts to T8 lamps and electronic ballasts.

Direct Digital Control (DDC) Measures

This measure involves the installation of computerized control systems or the upgrade and expansion of existing systems. Where there are existing systems, the DDC panels will be upgraded to the latest software versions and recommissioned to optimize efficiency. In addition to the resultant utility savings, this measure will improve occupant comfort and improve overall building operator efficiencies and response times.

Boiler Measures

This measure primarily involves the replacement of existing boiler plants with new high-efficiency plants. By reducing both combustion and standby losses, gas consumption (and GHG emissions) can be reduced significantly. This measure will result in a significant amount of avoided future capital costs when these boilers would have had to be replaced regardless while bringing forward the utility savings.

HVAC and Mechanical Measures

These measures include various efficiency improvements including adding additional dehumidification capacity for the Museum.

Water Conservation Measures

These measures include automatic controls for urinal flush tanks.

Other Measures

These measures include things like Vending Mizers to reduce the energy consumption of vending machines and additional fast-closing overhead doors for the Manitoba Works Yard Services Building.