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March 5, 2009

CITY OF VANCOUVER

ADMINISTRATIVE REPORT

Report Date:	February 25, 2009
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Meeting Date:	March 5, 2009

TO: Standing Committee on City Services and Budgets

FROM: General Manager of Business Planning and Services and the General Manager of Engineering Services

SUBJECT: Neighbourhood Energy Utility ("NEU") – Operating Plan and Customer Rates

RECOMMENDATIONS

A. THAT Council approve the amendments to the *Energy Utility System By-law*, generally as set out Appendix A, including the establishment of 2009 customer rates and fees, the implementation of an extension policy to serve potential customers outside of Southeast False Creek ("SEFC"), and various housekeeping amendments.

AND THAT Council instruct the Director of Legal Services to bring the By-law amendment, generally as set out in Appendix A, forward for enactment.

B. THAT Council instruct the General Manager of Business Planning and Services and the General Manager of Engineering Services to report back to Council annually on adjustments to the Neighbourhood Energy Utility rates, and to bring a comprehensive NEU rate review to Council every five years.

C. THAT Council instruct the Director of Finance to create and oversee a Neighbourhood Energy Utility (NEU) Rate Stabilisation Reserve, to a maximum balance of $8 million, with the source of funds to be the Capital Financing Fund, and the terms and conditions to be consistent with those described in this report.

COUNCIL POLICY

On March 2, 2006, Council approved in principle the creation of the False Creek Neighbourhood Energy Utility (NEU), to provide space heating and domestic hot water to multi-family residential, commercial, institutional and industrial buildings in SEFC.

Approved Ownership and Operating Model

On December 14, 2006, Council assessed various ownership and operating options for the NEU, and approved the continued ownership and operation of the NEU by the City, with the following conditions:

- That the NEU be integrated into the Engineering Services Department.
- That the ongoing governance, operational and financial responsibilities related to the NEU be shared by the General Manager of Engineering Services and the Director of Finance.
- That the merits of continued ownership be reviewed before any significant expansion of the NEU, and, in any event, within three years of the commencement of commercial operations.

Approved Governance Principles

At that same time, Council approved the following governance principles for the NEU:

1. That the NEU will seek to minimise greenhouse gas emissions, consistent with the directions established in the Community Climate Change Action Plan.
2. That the NEU will be operated to ensure long-term financial viability based on a commercial model.
3. That the NEU will strive to establish and maintain customer rates that are competitive with the long-term capital and operating costs of other heating options available to customers.
4. That the City, where feasible, will support the development and demonstration of flexible, innovative and local technologies through the NEU.
5. That the City will consider and evaluate the potential to expand the NEU to other neighbourhoods and developments, with the merits and feasibility of each expansion phase to be determined separately.

Approved Rate-Setting Principles

Council also adopted the following eight principles, to be applied to setting rates and terms of service for NEU customer:

1. That NEU rates are structured so as to recover the following costs incurred by the City, based on forecasted costs:
    i. all direct operating costs associated with the NEU,

ii. all debt service and repayment costs associated with the NEU,

iii. the share of City administrative overheads that are attributable to the NEU,

iv. property taxes and/or payments-in-lieu of property taxes, as appropriate,

v. a reserve fund for NEU rate stabilization,

vi. an appropriate level of compensation for the risks and liabilities assumed by the City associated with the ownership and operation of the NEU, and

vii. credits for any benefits provided by the NEU to City taxpayers (e.g., contribution to corporate GHG reductions goals), as determined by Council.

2. That NEU rates fairly apportion the aforementioned costs among customers of the NEU.

3. That NEU rates be understandable to customers, practical and cost-effective to implement.

4. That at least two separate rate classes (commercial and residential) be established to distinguish different types of NEU customers, with rates reflecting each class's proportional contribution to total costs.

5. That, where feasible, NEU rates provide price signals that encourage energy conservation by NEU customers.

6. That the methodology for calculating NEU rates provide year-to-year rate stability for NEU customers to the greatest extent possible.

7. That the methodology for calculating NEU rates provide year-to-year revenue stability for the City to the greatest extent possible, and include the use of a rate stabilisation reserve similar to that used by the City for other utility operations.

8. That rates be updated by Council annually based on forecasted costs, and adjusted to reflect any deviation from target levels of reserves, with annual rate changes requiring review and approval by Council followed by enactment of the necessary amendments to the NEU bylaw.

On November 15, 2007, Council approved the creation of the *Energy Utility System Bylaw*. On October 28, 2008 Council approved an amendment to this bylaw, primarily in order to enable the NEU to recover costs associated with the supply of pre-occupancy heat services to the Olympic Village, and to base the monthly levy on floor area.

PURPOSE

This report responds to Council's December 14, 2006 instruction to the General Manager of Engineering Services to report back on the following items, in consultation with the Director of Legal Services and the Director of Financial Planning and Treasury (now the General Manager of Business Planning and Services):

- A long-term financing strategy for the NEU.
- A recommended operating plan for the NEU that includes a budget.
- Staffing and supporting utility rates.

This report also recommends a number of amendments to the *Energy Utility System Bylaw*.

BACKGROUND

On March 2, 2006, Council approved in principle the creation of the NEU to provide space heating and domestic hot water services to Southeast False Creek (SEFC) buildings. Council's decision was based on a business case that was developed with consulting support from experts in district energy and utility economics.

Benefits of the SEFC NEU

The NEU is designed to provide the following environmental, economic and social benefits:

- *Environmental*: The NEU has economies of scale and flexible infrastructure that can adapt to using a wide variety of renewable "waste energy" options that would otherwise not be available to an individual building heating system. Through its high system efficiencies and by using sewage heat recovery to supply approximately 70% of the annual energy demand, the NEU will produce 50% less greenhouse gas emissions, compared to conventional energy sources. In addition, the LEED™ buildings connected to the NEU will further minimise energy demand and greenhouse gas emissions using high quality building envelope design and hot water radiant heating systems. Furthermore, the NEU will utilize surplus energy generated by solar thermal modules located on the roof tops of three Olympic Village buildings.
- *Social*: Through the NEU's use of renewable energy sources and flexibility to adapt to future energy technologies, it is anticipated that NEU customers will enjoy rate stability that outperforms conventional options. Also, the NEU supports the use of radiant hot water heating systems in buildings that provide customers with a higher level of comfort at a lower energy use, as compared to conventional space heating options. In addition, the centralization of thermal energy production eliminates the need in customer buildings for basement and rooftop heating equipment, including stacks and boiler systems. Roofs can be better optimized for public amenities and green roofs.
- *Economic*: The NEU is a self-funded utility that will provide an appropriate return on investment to the City, while at the same time providing competitive rates to NEU customers. The NEU helps building developers meet the energy efficiency and green building requirements for SEFC more cost effectively as compared to the use of distributed stand-alone green energy options, such as geo-exchange.

The SEFC NEU Technology

The primary energy source for the NEU is sewer waste heat recovery, in which sewage waste heat will be captured and used to heat water at the Community Energy Centre (referred to in this report as the Energy Centre). This facility, located under the south end of the Cambie Street Bridge, at 1890 Spyglass Place, also includes an integrated sewage pump station. While the Energy Centre will derive most of its energy from sewage heat recovery, natural gas boilers will be used for back-up purposes, and to provide supplemental energy on the coldest days of the year.

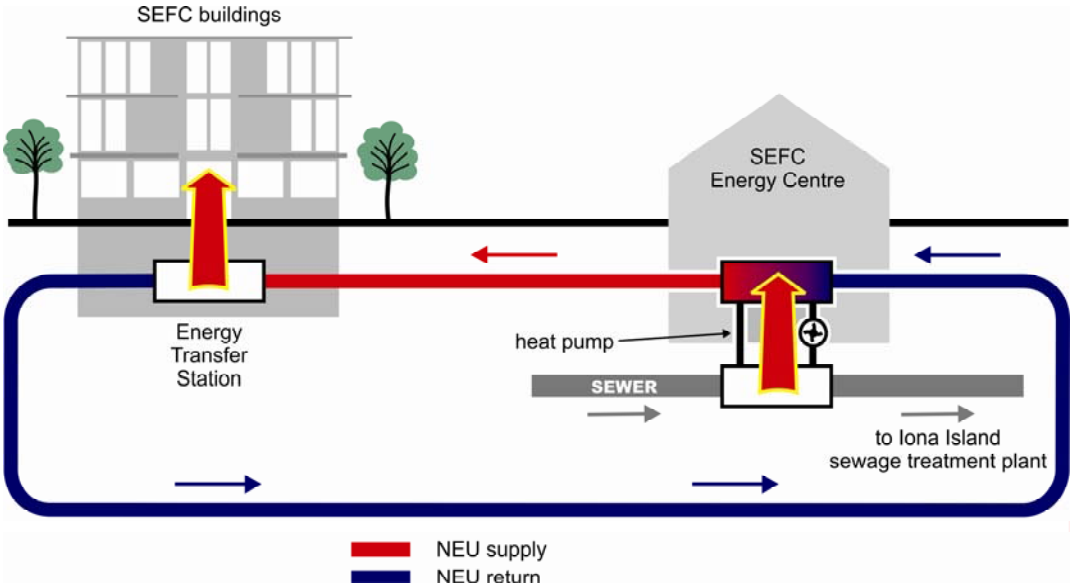
From the Energy Centre, a network of underground pipes will deliver the heated water to SEFC buildings (termed the "Distribution Pipe System," or DPS). Energy Transfer Stations (ETS) located within each connected building will control space heating and domestic hot water for distribution by the (customer owned) building mechanical system.

Metering will be incorporated in the ETS's for energy measurement and billing purposes. Three of the ETS's will also enable customer-generated solar thermal energy to be distributed to the wider neighbourhood.

In summary, there are four components to the NEU's infrastructure, illustrated in Figure 1 below.

- *SEFC Energy Centre*: Generates hot water through sewer waste heat recovery and natural gas boilers. Owned and operated by the SEFC NEU.
- *Distribution Pipe System* (DPS): A set of underground pipes that deliver hot water to connected buildings. Owned and operated by the SEFC NEU.
- *Energy Transfer Stations (ETS):* Heat exchangers within each connected building that use hot water delivered to the building via the DPS to generate heat and domestic hot water for individual consumers and building common spaces. Owned and operated by the SEFC NEU.
- *Building Mechanical Systems:* All infrastructure within a building (except for the ETS) that comprises the system that delivers heat and hot water to individual consumers and building common spaces. Owned and operated by the building owner(s).

FIGURE 1. NEU CONCEPT DIAGRAM



Legislative Authority & Governance

The Province of British Columbia amended the Vancouver Charter in the spring of 2007 to provide the City with authority to provide energy utility services. Subsequent to this, the City enacted the *Energy Utility System By-law* ("By-law"). Beyond basic provisions required to regulate energy services, the By-law makes connection to the NEU mandatory for all new buildings within the SEFC Official Development Plan area (which is generally bounded by Cambie Street, Main Street, 2nd Avenue and the False Creek waterfront).

In the fall of 2008, the By-law was amended to enable the recovery of costs associated with a temporary boiler system that is currently supplying pre-occupancy heat to Olympic Village buildings and the Polygon development at 300 West 1st Avenue.

As with the City's Water, Sanitary Sewer and Solid Waste utilities, City Council is the regulatory body for the NEU; municipal utilities are not regulated by the BC Utilities Commission.

The Southeast False Creek Opportunity

Southeast False Creek is well suited to implementation of the NEU, because the size and timing of the neighbourhood development provides an adequate customer base to make the project economically feasible. Cost savings have been achieved through coordinating NEU distribution pipe installation activities with the construction of SEFC roads and utilities. And, as well, the new buildings in the SEFC have, from the outset, been designed to integrate with the NEU.

The NEU's service area extends to all of the SEFC Official Development Plan area, which at build-out is projected to contain approximately 6 million square feet of development. The first phase of NEU development will serve the Olympic Athlete's Village, plus a number of

SEFC privately-held land developments. Phase 1 comprises approximately 20% of the total SEFC land area.

Project Status

Construction of the Energy Centre began in September 2008, and is expected to be completed in October 2009. Construction of the NEU distribution pipes and energy transfer stations is nearing completion.

The NEU is now transitioning from a capital project into an operating utility service. The NEU will soon provide post-occupancy heat services to the first SEFC residents at the Polygon development at 300 West 1st Avenue, scheduled for occupancy in March 2009.

Establishing the customer rates is an important next step in the progress of this project, and is the primary subject of this report.

DISCUSSION

A. CAPITAL BUDGET AND FINANCING

Until the NEU becomes operational, all costs associated with the project are considered capital costs. The capital budget for the project to date is shown in Table 1A. The capital work to date is on schedule and within the approved budget of $29.3 million. At the time of this report, this project is exposed to a normal level of construction risk. As all major construction and purchasing contracts have been awarded, there is no significant exposure to contracting risks.

Council has approved internal interim financing from the Capital Financing Fund, to a maximum of $33 million. Once the capital project is completed (the target date is the fourth quarter of 2009), this interim financing will be replaced with long-term financing, comprised of:

- a $5.0 million low-interest loan from the Federation of Canadian Municipalities Green Municipal Fund,
- an $8.5 million grant from the Union of BC Municipalities Innovations Fund, and
- approximately $16.0 million in debenture financing.

The $5.0 million FCM loan will be available to the City one year after commencement of the NEU's commercial operations. The debentures associated with the NEU will be issued after the project is operational. As part of the City's general debt obligation, these debentures will have the same terms as other City debentures.

The NEU's business model calls for all debt to be repaid through the NEU Operating Budget, and therefore not to have any impact the City's tax-supported Operating Budget. The long-term financing plan is summarised in Table 1B.

TABLE 1A. CITY OF VANCOUVER NEIGHBOURHOOD SEFC ENERGY UTILITY PHASE 1 CAPITAL BUDGET TO DATE ($000s)

	PROJECT BUDGET TO END 2010	COSTS INCURRED TO JANUARY 2009	BUDGET REMAINING @ JANUARY 2009
PROJECTED EXPENDITURES			
Community Energy Centre, including Commissioning	$21,959	$20,247	$1,712
Pipeline	$4,446	$3,346	$1,100
Energy Transfer Stations	$2,334	$1,629	$705
Data Network	$90	$0	$90
Project Management & Business Planning	$544	$511	$33
Total Expenditures, Before Capital Grants	**$29,373**	**$25,733**	**$3,640**

TABLE 1B. CITY OF VANCOUVER NEIGHBOURHOOD ENERGY UTILITY LONG-TERM FINANCING PLAN

SOURCE	DESCRIPTION	AMOUNT
Federation of Canadian Municipalities Loan	Low-interest loan from the FCM Green Municipal Fund. Already approved and available to the NEU one year after the NEU becomes operational. Subject to the NEU meeting a number of operating conditions.	$5.0 m
Union of BC Municipalities Grant	Grant awarded to the NEU project by the UBCM Innovations Fund. At the time of this report, the formal funding announcement has not yet been scheduled.	$8.5 m
Debenture Financing	The City will fund the balance of the NEU financing requirements through a debenture issue .	~ $16.0 m
Estimated Total Financing		**~ $29.5 m**

NOTE TO TABLE

1. Projected expenditures do not include the following costs: temporary heat, VPD relocation, financing and working capital.

B. NEU RATES

The City staff NEU Steering Team, with the support of Compass Resource Management, has developed a set of customer rates that meet all of the rate-setting principles previously approved by Council. This section describes the methodology used to calculate these rates, and the basis for comparing these rates to other local energy providers.

It is noted that the NEU's full costs, including a reasonable return on the City's investment in this project, are to be recovered by NEU customer charges. The NEU is unlike the City's

water, solid waste and sanitary sewer utilities, in that its services are available to a relatively small subset of Vancouver taxpayers, and it competes with existing private-sector energy providers. For this reason, per Council's direction, it is to be operated as a standalone commercial business, without subsidy from City taxpayers.

Levelised Rate Approach

The operations of the NEU are characteristic of any utility business, which involves significant initial outlays of cash expenditures, coupled with the gradual building of a customer base, and associated operating revenues. For this reason, in the early years of operation, the NEU will be in a negative cash position, and will use an internal Rate Stabilisation Reserve to balance its annual budget (discussed later in this report).

If rates were set on a strict year-to-year cost recovery basis, they would be very high in the early years of the NEU's operation, and would decrease over time, as the NEU generated more sales revenues. In order to avoid this, and to provide both rate stability for NEU customers and revenue stability for the City, staff is recommending to Council a "levelised rate" approach.

This approach, as described below, sets rates to under-recover full costs in the early years of the NEU's operations, and then build rates gradually over time, so that over a twenty-five year time horizon, all the NEU's costs are fully recovered via NEU sales revenues.

- *Step 1 – 25-Year Pro Forma*: The starting point is a twenty-five year projected expenditure budget for the NEU (see Appendix B).
- *Step 2 – Calibrate Starting Rates to BC Hydro Rates*: 2010 NEU rates are calculated to be roughly equivalent to forecasted 2010 BC Hydro electricity rates, plus a 10% increment. The 2010 NEU rates are then discounted by approximately 6% to arrive at 2009 starting rates.
- *Step 3 – Determine Annual Levelised Rate Escalation Factor*: The Annual Levelised Rate Escalation Factor required to achieve the present value of all future revenue requirements over twenty-five years is determined; this is the amount by which NEU rates increase over an annual inflationary increase. *(It is noted that it is critical to the financial sustainability of the NEU that annual rate adjustments include this escalation over regular inflationary increases.)*

Using a levelised rate approach will ensure that the initial customers of the NEU do not pay more than their share of the upfront capital infrastructure costs of the NEU, that will eventually serve all of the SEFC lands once build-out is completed. This approach includes the cost of capital associated with deferred costs, and does not affect the long-term rate of return on the project.

The City has also chosen this approach because it is a recognised means of calculating customer rates in utility businesses. For example, levelised rates for Victoria's Dockside Green district energy system were recently approved by the BC Utilities Commission.

Recommended 2009 NEU Customer Rates

The *Energy Utility System Bylaw* allows for two components to customer rates:

- *A Capacity Charge*: This monthly charge is based on floor area, which is measured in square metres, and indicated in building permits (termed the "Levy" in the Bylaw). The NEU's fixed costs are recovered via the Capacity Charge, and this charge does not vary with a customer's energy use. This industry practice serves two important purposes:

  (i) it recognises that customers benefit from the heat and hot water infrastructure of the NEU, regardless of whether they are using energy at any given point in time, and

  (ii) it creates some amount of long-term revenue stability for the City, thereby resulting in better rate stability for customers.

  It is noted that customers will be charged this monthly amount, regardless of their energy use levels. The levy is based on floor area for simplicity, and because buildings are not expected to vary significantly in their capacity requirements per square metre. The rate structures of both Victoria's Dockside Green and Lonsdale Energy Corporation include the same type of capacity charges. BC Hydro and Terasen rates include capacity charges for their commercial customers.

- *An Energy Use Charge*: This monthly charge is based on amount of energy consumed (measured in megawatt-hours, or MW.h), and varies with energy use accordingly (termed the "Charge" in the Bylaw).The NEU's variable cost of energy will be recovered via the Energy Use charge, and through this, a property will be charged for the amount of energy consumed in each billing period.

Table 2 shows the recommended 2009 NEU customer rates, as well as indicated 2010 rates. These rates have been developed using the levelised approach described above. It is important that these initial levelised rates for the NEU be established carefully. While it is not appropriate for rates to be too high relative to competitors, if rates are too low relative to the NEU's actual operating costs, Council may have to increase rates substantially at some later date, and/or the NEU may not be financially sustainable over the long term.

As with all other City utility fees, these rates will be adjusted regularly by Council to incorporate annual inflationary increases and other changes in operating costs. In addition to regular inflationary increases, the NEU rates will be adjusted annually by the Annual Levelised Rate Escalation Factor required to ensure NEU revenues match NEU costs over twenty-five years. Every five years, a comprehensive rate review will be undertaken by the General Manager of Business Planning and Services and the General Manager of Engineering Services, and reported to Council.

TABLE 2. CITY OF VANCOUVER SEFC NEIGHBOURHOOD ENERGY UTILITY RECOMMENDED 2009 CUSTOMER RATES

	RECOMMENDED 2009 RATE	INDICATED 2010 RATE	ESTIMATED ANNUAL LEVELISED RATE ESCALATION FACTOR FROM 2011, (ABOVE INFLATION)
Capacity Charge	$0.41 per square metre per month	~ $0.44 per square metre per month	~ 1.15%
Energy Use Charge	$35 per MW.h	~ $37 per MW.h	~ 1.15%

NOTES TO TABLE

1. In order to maintain consistency between NEU and BC Hydro rates, from 2009 to 2010, Capacity Charge escalation is 7.3%, and Energy Use Charge escalation is 5.7%. Based on the projections in Appendix B, after 2010, rates need to be increased annually by approximately 1.15% over inflation, in order for the NEU to recover all costs over a twenty-five year period. This Annual Levelised Rate Escalation Factor may be adjusted over time, depending on whether sufficient revenues are being generated by the NEU to ensure the City's return on capital, and as well on how the NEU effective rates compare to those of BC Hydro and other providers of energy for heat and hot water.

Comparing Recommended Rates to Other Energy Providers

One of Council's approved governance principles is that *"... the utility will strive to establish and maintain customer rates that are competitive with the long-term capital and operating costs of other heating options available to customers."*

To test the competitiveness of the NEU, staff compared what a NEU typical customer would pay using the recommended customer rates, compared to four local energy providers: Central Heat Distribution Ltd. (in downtown Vancouver), Dockside Green community energy system (Victoria, BC), Lonsdale Energy Corporation (North Vancouver), and BC Hydro residential rates.

Because the rate structures of these energy providers vary, an "effective rate" is calculated for the purposes of comparison. This rate illustrates what customers will pay per megawatt-hour for heating, based on a set of consistent assumptions. Based on the recommended rates shown in Table 2, the 2009 effective rate for heating provided by the City of Vancouver NEU is calculated to be approximately $78 per MW.h., and the indicated 2010 effective rate is expected to be $85 per MW.h.

Table 3 shows that the NEU's recommended 2009 rate and indicated 2010 rate are both within 10% of those of BC Hydro, Dockside Green, Lonsdale Energy Corporation and Central Heat Distribution.

TABLE 3. COMPARISON OF EFFECTIVE RATES, SEFC NEU VERSUS OTHER PROVIDERS

	ESTIMATED 2009 EFFECTIVE RATES	ESTIMATED 2010 EFFECTIVE RATES
SEFC NEU	$78 per MW.h	$85 per MW.h
BC Hydro	$73 per MW.h	$77 per MW.h
Other Providers (Note 2)	$79 - $86 per MW.h	

NOTES TO TABLE

1. Effective rates are calculated assuming customer is purchasing heating services for a 100 square meter condominium, and that 40% of the owner's BC Hydro bill is spent on heating.
2. Other providers: Central Heat Distribution Ltd (downtown Vancouver), Dockside Green community energy system (Victoria, BC), Lonsdale Energy Corporation (North Vancouver).
3. BC Hydro 2009 rate is calculated using existing residential rates. The estimated 2010 rates are based on proposed 2010 BC Hydro rates currently before the B.C. Utilities Commission.

Caution must be exercised when comparing customer rates among different energy providers. For the following reasons, these comparisons should be used only as a guideline in establishing the relative competitiveness of utility rates.

- Services offered, sales volumes and rate structures vary significantly among utilities, as do delivery efficiencies. One example of these disparities is that the NEU's billing will include both space heat and domestic hot water, while BC Hydro's billing will typically not include domestic hot water and space heat is combined with other consumer electricity demands. Another is that BC Hydro rates are based on a two-tier structure (a lower unit charge for consumption below a certain amount, and a higher charge for consumption beyond that), while the proposed NEU rates do not vary with consumption levels.
- Some utilities may offer subsidised services to some or all of their customers.
- The radiant hot water heating system services provided by the NEU are a higher quality than a standard electrical baseboard heating system. Hot water radiant heat requires less energy consumption because it provides customers with a comparatively higher thermal comfort at lower space room temperatures than convection-based electric baseboard systems. This benefit is not taken into consideration in the comparison with electric baseboard heating.
- Due to efficient building design and the NEU's radiant hot water heating system in Southeast False Creek, it is likely that NEU residential customers will use less energy than in other residential buildings, with associated cost savings.

Annual Levelised Rate Escalation Factor and Indicated 2010 NEU Customer Rates

The NEU business model relies on Council increasing NEU rates by an Annual Levelised Rate Escalation Factor, which is currently forecasted to be approximately 1.15% per year above inflation (referred to in this report as the "Escalation Factor"). If rates are increased at inflation, without consideration of this Escalation Factor, the NEU's long-term financial viability will be compromised. It is noted that the NEU's forecasted Escalation Factor is well below forecasted BC Hydro and natural gas rate increases.

The 1.15% Escalation Factor shown in Table 2 is intended to be an approximation; there may be years in which the required Escalation Factor is greater or less than this amount. This will depend on a number of factors, including the relationship between NEU rates and the rates of BC Hydro and other providers of energy for heat and hot water, and how quickly NEU revenues grow over time.

It is projected that BC Hydro electricity residential rates will be increasing substantially in 2010, based on BC Hydro's Revenue Requirements Application that is currently before the BC Utilities Commission. Based on current indications, the 2010 NEU rates should be in the range of $0.44 per square metre per month, and $37 per MW.h., to remain consistent with BC Hydro rates. Because at the time of this report, BC Hydro's proposed rate increases have not been approved by the BC Utilities Commission, it would be premature to use the higher 2010 rates as the starting point in the development of 2009 NEU rates. Therefore, staff will bring to Council recalibrated NEU rates in 2010, using BC Hydro's 2010 rates as the guideline.

C. THE RATE STABILISATION RESERVE

The recommended NEU Rate Stabilisation Reserve will serve as an "internal line of credit" that the NEU can draw on, to serve two purposes:

1. to finance the NEU's operating shortfall in its early years of operation, that will result from the levelised rate approach, and

2. to finance relatively small year-to-year fluctuations in NEU revenues due to uncontrollable circumstances such as weather, in order to ensure rate stability for the NEU customers.

This second function of this Reserve (year-to-year rate stability) is the same as that of the other rate stabilisation reserves the City has in place, for the Water, Sewer and Solid Waste Utilities. This function is expected to continue in perpetuity. Once the City has had experience with several years of operating patterns for the NEU, the Director of Finance will report back on policy target levels for this Reserve.

The following are the terms and conditions of the NEU Rate Stabilisation Reserve:

- the Capital Financing Fund (CFF), which is used as a source of internal financing for City projects, will provide the funding for the Reserve,

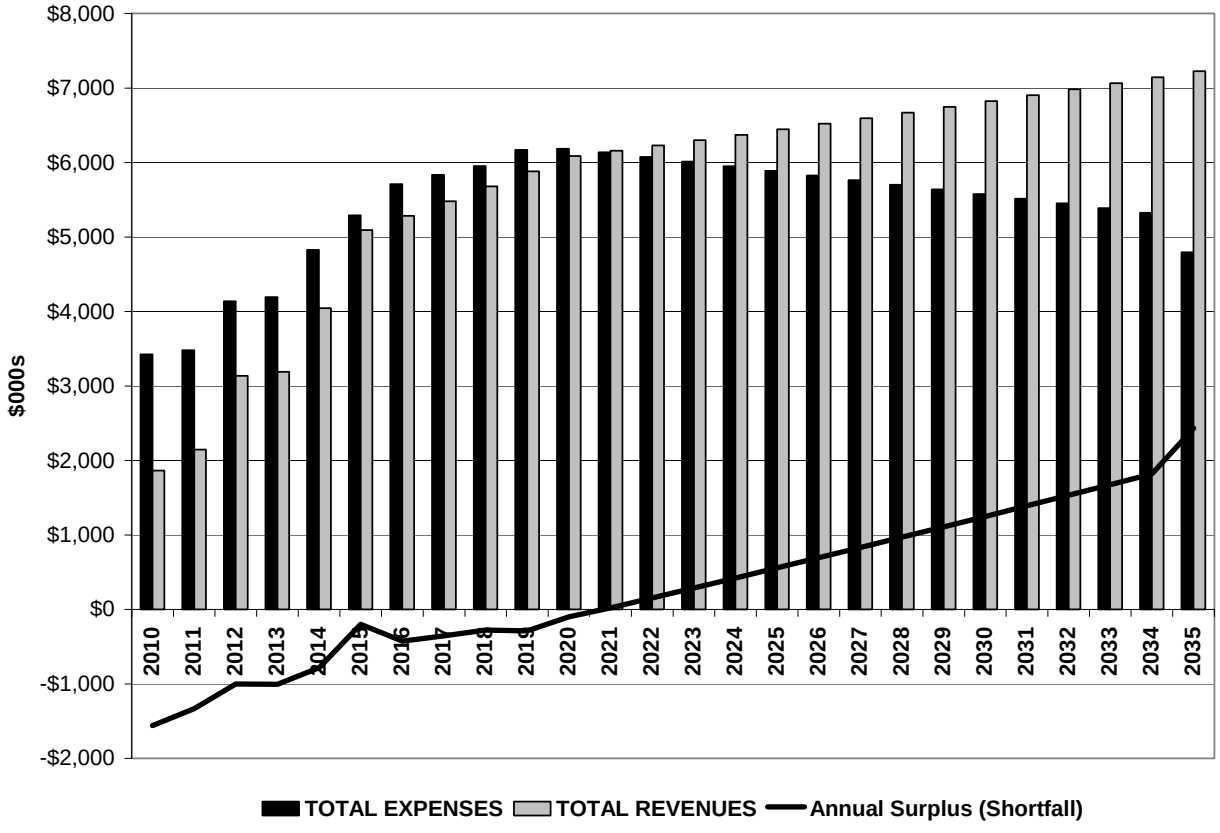
- the NEU will be charged interest on funds borrowed from the Reserve at the internal lending rate that is established annually by the Director of Finance (currently 5.0%), and
- once the NEU begins to generate an operating surplus (anticipated to be in approximately Year 12), the full amount of the surplus will be dedicated to repaying the Capital Financing Fund (principal and interest).

Based on the projections shown in Appendix B, the NEU will require approximately $1.6 million in rate stabilisation funds in its first year of operations. This figure is expected to decrease annually over approximately the first twelve years of NEU operations, at which point NEU surpluses are expected to begin replenishing the Rate Stabilisation Reserve. It is anticipated that the NEU Rate Stabilisation Reserve draw will grow to approximately $7.3 million before it is paid down by the annual surpluses generated by the NEU.

D. LONG-TERM OPERATING PLAN AND BUDGET

Twenty-five year financial projections for the NEU, based on the rates and Rate Escalation Factor recommended in this report, are shown graphically in the following figure, and are detailed in Appendix B.

FIGURE 2. CITY OF VANCOUVER SEFC NEIGHHOURHOOD ENERGY UTILITY
25-YEAR FINANCIAL PROJECTIONS, ASSUMING RECOMMENDED CUSTOMER RATES



NOTES TO FIGURE

1. Forecasts include regular life cycle capital maintenance and capital reinvestment.
2. 2010 costs and revenues include 4th Quarter of 2009.

Based on the NEU rates recommended in this report, the projected demand assumptions, and the associated operating budget:

- It is estimated that the NEU will begin generating a cash surplus around Year 12 of operations.
- The Rate Stabilisation Reserve requirements will peak in Year 11 at an estimated $7.3 million.
- The Rate Stabilisation Reserve will no longer be required for rate levelisation in approximately Year 22 of operations (but will still be required to provide rate stabilisation, to avoid having to increase rates due to small year-over-year revenue fluctuations).
- Over a twenty-five year time horizon, the NEU will generate a 5.8% real internal rate of return. (Consistent with the Council direction that the NEU be operated based on a commercial model, these forecasts include a reasonable return to the City for the funds invested in this project.)

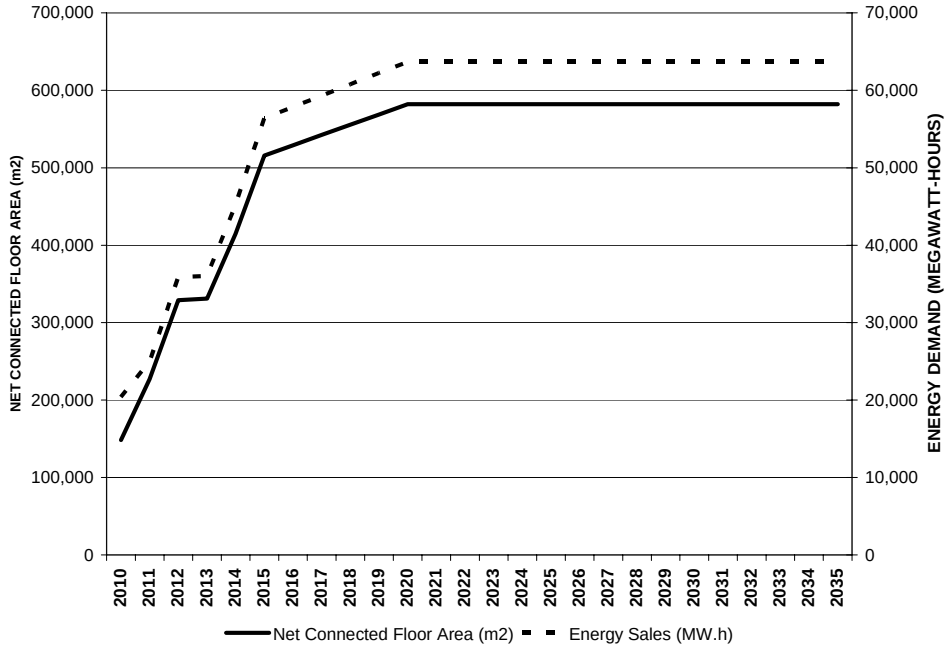
E. KEY ASSUMPTIONS AND SENSITIVITY ANALYSIS

The NEU's recommended rate structure has been developed based on the twenty-five year pro forma financial projection, contained in Appendix B. Building a financial forecast for this period of time necessarily involves a number of assumptions. Staff has worked closely with the City's consultants on this project to develop the most reasonable set of assumptions possible. Each is discussed in turn below, followed by a sensitivity analysis which explores how changes to any of these key assumptions impact on financial projections for the NEU.

Key Assumptions Underlying Projected Revenues

Figure 3 shows the assumptions for both the amount of floor area belonging to NEU customers (square metres), and the amount of energy used by NEU customers (MW.h). These are the two externally controlled variables that determine the NEU's annual sales revenues (customer rates also drive revenues, but these are determined by Council). It is primarily the rate of increase in demand shown in Figure 3 (both connected floor area and energy use) that drives the NEU's revenues, return on investment, and payback period.

FIGURE 3. CITY OF VANCOUVER SEFC NEIGHBOURHOOD ENERGY UTILITY DEMAND ASSUMPTIONS



Key Assumptions Underlying Projected Expenditures

There are a number of variables that determine the NEU's annual expenditures. It is noted that the NEU's cost of fuel (electricity and natural gas), representing 30% - 50% of total annual costs once the utility has been running for three years, will be recovered via the Energy Use Charge. Of the non-fuel costs, staffing and financing costs are the two largest components of the operating budget.

Following are the assumptions underlying these projected expenditures; actual circumstances may vary from these assumptions over the twenty-five year period. As part of the regular rate reviews, staff will compare actual figures to these assumptions, and recommend rate adjustments accordingly.

- *Financing rates & return on investment*: The financial forecasts upon which NEU rates are established are based on 100% debt financing at 6.0%. If the NEU were a privately-held utility, some of this would be equity financing, with higher associated rates of return. In order to ensure that the City earns the same return on investment as an owner of a private utility, this additional premium is captured in the rate calculations.

- *Depreciation*: The capital assets of the NEU are depreciated at an average of 3.3% per year, using standard rates of depreciation.

- *Staffing*: The staffing costs shown in Appendix B reflect the assumption that the NEU employs four full-time employees for the first five years of operations, and this increases to six employees in Year Six, when the system is projected to expand to

meet growing demand. These staffing costs will be subject to regular increases per labour agreements.

- *Payments-in-lieu of property taxes*: Because it is owned by the City, the NEU will not pay property taxes. In order to ensure the City's taxpayers do not subsidise the NEU, an equivalent payment-in-lieu of taxes (PILTs) is included in the pro forma. PILTs for the Energy Centre are based on a $4 million taxable value, at the current-year Class 6 (business) tax rate. Property taxes on the distribution pipe system (DPS) are based on 1.25% of the NEU's gross revenues, paid on the same basis as Central Heat Distribution Ltd.

- *Overheads*: Administrative overheads are assumed to be equal to 5.0% of the NEU's operating costs, excluding fuel costs, interest, ROE and depreciation. This overhead charge pays for those City costs associated with the NEU that are not captured directly through specific line items in the pro forma, e.g., management time, office space, etc. The 5.0% figure has been chosen based on experience with the other City utilities.

- *Land rent*: The pro forma includes a line item for land rent, which reflects the cost associated with the Energy Centre occupying City-owned land. The total land value is estimated to be $150,000 for these purposes, and the annual cost of land rent to the NEU is assumed to be equal to 4.0% of this value. This land value reflects the fact that the Energy Centre is on industrial land beneath the Cambie Bridge, and has a relatively small footprint.

F. SENSITIVITY ANALYSIS

To the extent sales revenues are lower than projected, or expenditures are higher than projected, it would take longer for the NEU to attain a positive cashflow (and generate the City's target return on equity). In such a case, Council would have a number of options for managing this, including further draws on the Rate Stabilisation Reserve, and/or escalating rates by an amount greater than the initial recommended 1.15% Annual Levelised Rate Escalation Factor over inflation.

NEU Revenue Drivers

- *Customer Rates*: Customer rates and the annual escalation factor are established annually by Council.

- *Demand*: Fixed Capacity Charge revenues are driven by the total floor area belonging to NEU customers (measured in square metres), and variable Energy Use Charge revenues are driven by the amount of energy used by NEU customers (measured in MW.h). While there are a number of elements that drive demand, it is the number of connected buildings which is the most important to the financial viability of the NEU. The recommended rate structure mitigates three of the four financial risks associated with reduced energy demand, as described below:

- *Weather*: Projections are based on average weather assumptions. It is anticipated that energy demand will vary with the weather each year. However, higher or lower revenues resulting from abnormal weather would be offset by corresponding higher or lower variable energy costs to the NEU. Therefore, it is not expected that weather variability will have a significant net financial impact, and is therefore not included in the sensitivity analysis.
- *Building efficiencies*: There are certain assumptions around the efficiencies of the SEFC buildings that underlie the energy demand forecasts. To the extent the buildings are more efficient, energy demand may be lower than forecasted. It is not expected that this would have a significant impact on revenues, as the variable Energy Use Charge will be designed to recover the NEU's variable energy costs.
- *Building occupancy*: The NEU rate structure is designed to recover fixed costs via the fixed Capacity Charge, which means that once a building is a customer of the NEU, unit owners will pay this charge, whether they are using energy or not. For this reason, variations in occupancy rates are not expected to significantly impact on the NEU's net revenues.
- *Number of Connected Buildings*: The number of buildings connected to the NEU, and the rate at which they connect, is termed "uptake." This is the most important revenue driver for the NEU. Under the NEU bylaw, connection within SEFC is mandatory, but there is market uncertainty surrounding the rate of completion of buildings that will ultimately be serviced by the NEU. This factor is quantified in the sensitivity analysis reported below.

NEU Cost Drivers

- *Energy Costs*: The cost of energy to the NEU is to be recovered via the variable Energy Use Charge, so it is not anticipated that the City will have significant exposure to energy costs.
- *Fixed Operating Costs*: If the fixed operating costs of the NEU are substantially higher than anticipated, this will impact on the level of the NEU's annual operating surplus or deficit. Debt service and staffing costs are the two most significant fixed operating costs associated with the NEU. Debt service costs are expected to be stable; higher-than-anticipated staffing costs would be the most likely contributor to higher fixed operating costs.

Sensitivity Analysis

In order to understand the impact of different assumptions on the financial forecasts for the NEU, the following four scenarios are compared, all using the customer rates recommended in this report.

A. *Base case*: Forecasts based on cost and demand assumptions deemed most reasonable by City staff and expert consultants (shown in Appendix B).

B. *Higher operating costs*: Assumes all non-capital and non-fuel operating costs are increased by 10% over the Base Case.

C. *Delayed demand*: Assumes demand for NEU services does not grow as quickly as anticipated, and it takes six additional years to get to forecasted 2012 demand levels. The Annual Levelised Rate Escalation Factor is increased from 1.15% to 2.0% annually. (This is considered a plausible negative outlook scenario.)

D. *Capped demand*: Assumes demand for NEU services is capped at 2010 levels, which means no new buildings connect to the NEU past 2010. The Annual Levelised Rate Escalation Factor is increased from 1.15% to 2.0% annually. (It is noted that this is a drastic worst-case scenario; because the *Energy Utility System Bylaw* mandates that all new buildings in SEFC use the NEU, this scenario would only manifest if either the Bylaw requirement were to be revised, and/or all building development in SEFC were to be discontinued.)

The results of this sensitivity analysis are summarised in Table 4 and Figure 4, below.

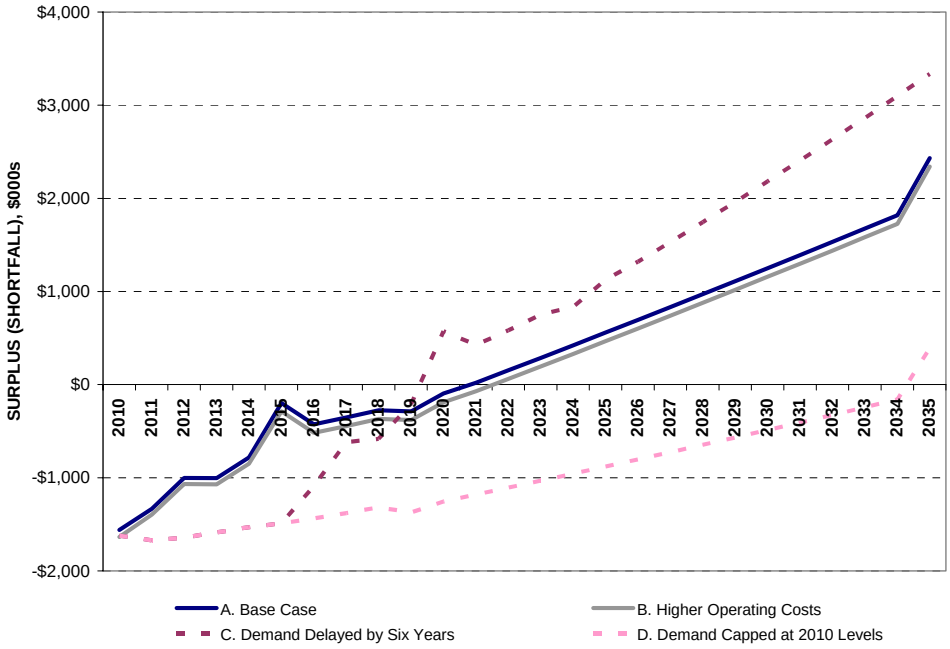
TABLE 4. CITY OF VANCOUVER SEFC NEIGHBOURHOOD ENERGY UTILITY SENSITIVITY ANALYSIS – ESTIMATED PROJECTIONS

SCENARO	ESTIMATED REAL IRR	ESTIMATED PEAK STABILISATION RESERVE REQUIREMENTS	ESTIMATED FIRST CASH-POSITIVE YEAR	ESTIMATED YEAR RATE STABLISATION RESERVE NO LONGER NEEDED FOR LEVELISATION
A. Base Case	5.8%	$7.3 million	Year 12	Year 22
B. Higher Operating Costs	4.8%	$8.3 million	Year 13	Year 24
C. Demand Delayed by Six Years	6.4%	$12.1 million	Year 11	Year 21
D. Demand Capped at 2010 Levels	n/a	$25.8 million	Year 26	> Year 25

NOTES TO TABLE

1. The reason Scenario C shows similar results to the Base Case in this sensitivity analysis is that under Scenario C, significant capital expenditures are deferred (because of lower demand), and also, higher rates are charged over time, due to a higher Annual Levelised Rate Escalation Factor applied to compensate for the lower demand.

FIGURE 4. CITY OF VANCOUVER SEFC NEIGHBOURHOOD ENERGY UTILITY SENSITIVITY ANALYSIS – ANNUAL SURPLUS (SHORTFALL)



In summary, under the sensitivity scenarios evaluated, the NEU remains financially viable, with the exception of the unlikely scenario under which no new buildings connect to the NEU past 2010 (Scenario D). If this were to occur, the business model for the SEFC NEU would have to be revisited.

G. PROPOSED BYLAW AMENDMENTS

The proposed amendments to the *Energy Utility System Bylaw* are attached as Appendix A. Included in the amendments are:

a) Implementation of a Levy and Charge for occupied buildings, as described above.

b) Implementation of an extension policy for potential customers outside of the NEU Service Area. This policy provides building owners with an opportunity to connect to the NEU system in such cases where their building is outside of the NEU Service Area (the SEFC ODP area). For the buildings beyond the NEU service area, an economic test would be applied to determine whether the costs associated with the pipeline extension would be recovered fully through NEU fees charged to customers. In cases where the economic test is positive, no extension fee would be required. If the economic test results indicate a negative net present value for connecting the building, the pipeline extension may proceed provided that the shortfall in revenue is

eliminated by contributions-in-aid-of-construction by the developer or owner of building.

c) Implementation of an Excess Demand Fee. This fee would be applied at the time of building permit to owners or developers of buildings who request peak heat capacity that exceeds the norm. The purpose of this fee is to serve as an added incentive to developers to build energy efficient buildings and to offset additional NEU costs to serve the higher energy demand of less efficient buildings.

d) Credit for customer building supplied energy. Some SEFC buildings will include solar thermal energy modules, which will primarily supplement the energy requirements of the building. However, during times of high sun intensity and low building demand, excess energy will be returned to the NEU system to be shared with other SEFC buildings. In such cases, building owners would receive a credit to be applied to their bill for NEU services.

e) Updates to the schedule of application fees, to include:

- application fee for voluntary use of the NEU system. This fee would be applied to owners of buildings who apply to connect to the NEU system and are outside of the NEU Service Area. Previously, this fee was $0, but it is recommended that the fee be increased to $100 per application to discourage frivolous applications that could consume staff resources.

- application for a meter test has been increased from $0 to $200. This charge is intended to recover the City's cost of unscheduled meter tests, and would be refunded to the applicant in cases where the meter test identifies a malfunctioning meter.

- service during normal business hours has been increased from $0 to $50 to cover the City's costs associated with customer service requests and limit the frequency of frivolous requests. The service call for times outside normal business hours has increased to $200, to cover the cost of bringing a staff person in after hours.

- application fee for requests to relocate or alter NEU infrastructure has increased to $500, to help cover the City's costs of assessing such requests. This fee would not be used to recover the costs associated with the City's costs of relocating facilities.

f) Minor housekeeping items.

FINANCIAL IMPLICATIONS

In its start-up phase, the NEU is funded and accounted for as a capital project. To date, this work has been funded through internal financing. It is anticipated that the financial operations of the NEU will transition to the NEU's Operating Budget in the fourth quarter of 2009.

None of the recommendations in this report impact the City's tax-supported Operating Budget, because all costs associated with the NEU will be funded by the NEU's Operating Budget. This is analogous to the costs of the water, solid waste and sanitary sewer utilities, which also are internally self-sufficient. To the extent there is a shortfall generated in the early years of NEU operations, this will be funded by an internal Rate Stabilisation Reserve.

The recommendations in this report therefore have the following financial implications:

- *2009 NEU Rates (Recommendation A*): Establishing the 2009 NEU customer rates sets the foundation for the NEU's annual rates, which are an important factor in driving annual NEU revenues. While the recommended rates apply to 2009 only, they do have multi-year implications for the City, since they serve as a starting point from which to establish rates in future years.

- *Levelised Rate Approach (Recommendation A):* Opting for a levelised rate approach will mean that for the first several years of operations, the NEU will require a Rate Stabilisation Reserve, which is projected to grow for the first eleven years of operation, and to peak at approximately $7.3 million. This will not impact the City's tax-supported Operating Budget, as described below.

- *Rate Stabilisation Reserve (Recommendation C):* The source of funds for this Reserve will be the Capital Financing Fund. The NEU's financing costs associated with drawing on this reserve will be funded through the NEU Operating Budget, and therefore have no impact on the City's tax-supported Operating Budget.

TABLE 5. CITY OF VANCOUVER SEFC NEIGHBOURHOOD ENERGY UTILITY PRO FORMA FINANCIALS, FIRST FIVE YEAR OF OPERATIONS ($000s)

	Q4/2009 & 2010	2011	2012	2013	2014
Expenses					
Fixed Expenses	$2,666	$2,550	$2,644	$2,676	$2,717
Variable Expenses	$758	$929	$1,493	$1,517	$2,110
Total	$3,423	$3,479	$4,137	$4,193	$4,827
Revenues					
Fixed Capacity Charge Revenues	$947	$1,213	$1,776	$1,809	$2,292
Variable Energy Use Revenues	$917	$934	$1,359	$1,379	$1,752
Total Revenues	$1,864	$2,147	$3,135	$3,188	$4,044
Net Operating Surplus (Shortfall)	($1,559)	($1,332)	($1,002)	($1,004)	($783)
Cumulative Net Operating Surplus (Shortfall)	($1,559)	($2,892)	($3,894)	($4,898)	($5,680)
Capital Expenditures, Net of Grants	$22,238	$1,407	$1,005	$402	$1,075

NOTES TO TABLE

1. The Operating Shortfall will be funded by the Rate Stabilisation Reserve, and will not impact the City's tax-supported Operating Budget. The NEU is expected to begin

generating an operating surplus in its 12th year of operations, and to recover all costs and a return on investment over 25 years of operations.

2. Fixed expenses include four full-time equivalent positions to manage and operate the NEU.
3. Capital expenditures are shown net of an $8.5 million capital grant, and associated financing costs are reflected in the Fixed Expenses line item.
4. The NEU is targeted to transition from a capital project to a City utility in the forth quarter of 2009. Q4/2009 and 2010 revenues and expenses are combined in this table.

CONCLUSION

This report provides Council with a forecasted operating budget for the NEU, as well as recommended customer rates, a long-term financing strategy for the NEU, and an updated capital budget. Based on the proposed rates and assumptions stated in this report, it is expected that over the twenty-five years beginning in 2010, the City will recover all NEU costs, including the City's cost of capital associated with this project, as well as an appropriate rate of return. In addition to these economic benefits, the NEU will achieve significant environmental and social benefits, both for its customers and for the City overall.

* * * * *

APPENDIX A
AMENDMENTS TO THE CITY OF VANCOUVER *ENERGY UTILITY SYSTEM BYLAW*

BY-LAW NO. _____

A By-law to amend Energy Utility System By-law No. 9552 regarding miscellaneous amendments

THE COUNCIL OF THE CITY OF VANCOUVER, in public meeting, enacts as follows:

1. This By-law amends the indicated provisions and schedules of the Energy Utility System By-law.

2. Council repeals the definition of "heat energy" in section 1.2, and substitutes:

' " heat energy" means heat distributed or delivered by water including space heating, domestic hot water, and heat for ventilation make-up air;'.

3. Council repeals section 2.2, and substitutes:

"2.2 An owner outside the boundaries, but in the vicinity, of Southeast False Creek may apply to the City Engineer to make use of the energy utility system, and if:

(a) the City Engineer is of the opinion that the energy utility system is capable of servicing the building that is the subject of the application;

(b) the City Engineer is of the opinion that servicing the building is necessary or desirable; and

(c) the owner enters into an agreement with the city, in form and substance satisfactory to the City Engineer and Director of Legal Services, promising to make a cash contribution to the capital cost of extending the system outside the boundaries to the owner's property in an amount and at a time determined by the City Engineer;

the City Engineer may approve the application, in which case the owner must make use of the energy utility system in accordance with the terms and conditions of this By-law."

4. From section 3.1, Council strikes out ", including all space heating, domestic hot water, and heat for ventilation make-up air".

5. Council repeals section 4.1, and substitutes:

"4.1 A person who applies, under the Building By-law, for a permit that is to authorize the installation or alteration of a building mechanical system must include in, or submit with, the application:

(a) an acknowledgment signed by the owner that the building is a designated building;

(b) a certificate, signed by the registered professional who is responsible for design of the building mechanical system, estimating the:

(i) peak heat energy demand for space heating,

(ii) peak heat energy demand for domestic hot water,

(iii) combined peak heat energy demand for any uses other than space heating and domestic hot water,

(iv) annual average heat energy demand for space heating,

(v) annual average heat energy demand for domestic hot water, and

(vi) annual average heat energy demand for any uses other than space heating and domestic hot water;

(c) a cheque in the amount of the excess demand fee referred to in section 8.1;

(d) the proposed location of the energy transfer station;

(e) the proposed location of the distribution system extension;

(f) the proposed location of the distribution system extension entry points;

(g) the proposed schedule for installation or alteration of the building mechanical system;

(h) the proposed commencement date for the delivery of heat energy by the city to the energy transfer station; and

(i) such other information as the Chief Building Official or City Engineer may require."

6. In section 5.3, Council:

(a) from the end of subsection (e), strikes out "and";

(b) from the end of subsection (f), strikes out the period, and substitutes "; and"; and

(c) after subsection (f), adds:

"(g) the system must require an energy utility supply temperature of no greater than 65°C when the outdoor ambient temperature is equal to or greater than 0°C."

7. Council re-numbers sections 8.1 to 8.9 as 8.2 to 8.10.

8. Before the new section 8.2, Council adds:

"**Excess demand fee**

8.1 Pursuant to section 4.1(c), a building permit applicant must pay the city the excess demand fee set out in Part 1 of Schedule C."

9. From the new section 8.2, Council strikes out "Part 1", and substitutes "Part 2".

10. Council repeals the new section 8.3, and substitutes:

"8.3 From and after the date upon which service to a designated building begins, the owner must pay the city the charge set out in Part 3 of Schedule C less the credit set out in Part 4 of Schedule C."

11. Council repeals the new section 8.4, and substitutes:

"8.4 The Collector is to send a bill for the amount of each levy or charge to each owner according to the frequency set out in Part 5 of Schedule C, and the bill is to include:

(a) the date when payment of the amount of each levy or charge is due and payable;

(b) the number of megawatt hours of heat energy supplied to the energy transfer station; and

(c) the number of megawatt hours of heat energy returned from the energy transfer station."

12. Council repeals the new section 8.5, and substitutes:

"8.5 The owner of a designated building must pay the city the amount of each levy or charge on or before the due date set out in each bill referred to in section 8.4.

13. After section 9.2, Council adds:

"**Returned cheques**

9.3 If a person's cheque is returned to the city due to insufficient funds, that person must pay to the city on demand the amount set out in Schedule D."

14. Council re-numbers sections 10.1 to 10.5 as sections 10.2 to 10.6 respectively.

15. Immediately before the new section 10.2, Council adds:

"**Termination of service**

10.1 Without limiting the city's other rights or remedies under this By-law, if an owner fails to pay to the city any levy, charge, fee, or cost for more than 30 days after the due date:

(a) the Collector may serve notice upon the owner; and

(b) such notice is to:

(i) set out the amount owing,

(ii) demand payment of that amount within 10 days from the date of such notice,

(iii) notify the owner that failure to pay that amount within such 10 days will result in the city ceasing service to the owner's building, and

(iv) notify the owner that the city will not restore such service until the owner has paid to the city the amount owing together with any additional costs incurred by the city in connection with such cessation and restoration of service."

16. Council repeals Schedule C, and substitutes:

"**SCHEDULE C**

LEVIES AND CHARGES

PART 1 – Excess demand fee

Excess demand fee for each 1 W per m^2 of the aggregate of the estimated peak heat energy demand referred to in section 5.3(b) (i), (ii), and (iii) that exceeds 65 W per m^2	$1.50

PART 2 – Levy

Monthly levy prior to date of issue of occupancy permit for the building	$0.30 per m^2
Monthly levy from and after date of issue of occupancy permit for the building	$0.41 per m^2

PART 3 – Charge

Monthly charge prior to date of issue of occupancy permit for the building	$58.00 per MW per hour
Monthly charge from and after date of issue of occupancy permit for the building	$35.00 per MW per hour

PART 4 – Credit

Credit for heat energy returned to energy transfer station	$37.00 per each MW per hour divided by 50%

PART 5 – Billing frequency particulars

Each of the levy and charge is billable monthly."

17. Council repeals Schedule D, and substitutes:

"SCHEDULE D

APPLICATION AND MISCELLANEOUS FEES

Section	Application	Fee
2.2	Application for voluntary use of energy utility system	$100.00
4.1	Building permit application that includes building mechanical system in addition to building permit application fee under Building By-law	$0.00
7.6	Application for service to designated building	$0.00
7.7	Application for meter test	$200.00
7.10	Service call during city's normal business hours	$50.00
7.10	Service call outside city's normal business hours	$200.00
7.11	Application to remove, relocate, or alter energy transfer station or distribution system extension servicing	$500.00
9.3	Cheque returned for insufficient funds	$35.00

"

18. A decision by a court that any part of this By-law is illegal, void, or unenforceable severs that part from this By-law, and is not to affect the balance of this By-law.

19. This By-law is to come into force and take effect on the date of its enactment.

ENACTED by Council this day of , 2009

_____

Mayor

_____

City Clerk

APPENDIX B

25-YEAR FINANCIAL PROJECTIONS
CITY OF VANCOUVER NEIGHBOURHOOD ENERGY UTILITY

NOTES TO NEU PRO FORMA FINANCIAL FORECAST

1. Operating costs and revenues for 2009 are included in this pro forma; all costs and revenues prorated for three months (October - December 2009) and added to 2010 values.
2. Internal Rate of Return (IRR) includes $6.7 million terminal value of assets in 2035.
3. Pro forma assumes a straight-line Annual Levelised Rate Escalation. In actuality, the City will regularly compare rates to those of BC Hydro for comparability. Therefore, in a given year, actual escalation may be more or less than that assumed in this pro forma.
4. All values in pro forma are in real 2008 dollars, which means that inflation has been factored out of this forecast.

APPENDIX B
CITY OF VANCOUVER NEIGHBOURHOOD ENERGY UTILITY FINANCIAL FORECAST - BASE CASE SCENARIO
($000s · $2008 · INFLATION NOT INCLUDED)

	1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016
EXPENSES (REVENUE REQUIREMENTS)							
Fixed costs							
DPS/ETS Maintenance	$90	$86	$96	$101	$105	$117	$119
Management and Staff	$542	$434	$434	$434	$434	$635	$635
GHG Offsets	$0	$0	$0	$0	$0	$0	$0
Insurance (Property and Liability)	$76	$64	$66	$67	$69	$81	$82
Sub-meter Reading	$0	$0	$0	$0	$0	$0	$0
Property Taxes	$104	$84	$84	$84	$84	$84	$84
Other Taxes and Credits	$0	$0	$0	$0	$0	$0	$0
Municipal Access Fees	$0	$0	$0	$0	$0	$0	$0
Customer Service and Billing	$0	$0	$0	$0	$0	$0	$0
Debt Interest	$715	$701	$728	$737	$729	$765	$948
Carrying Cost on Working Capital	$0	$0	$1	$1	$1	$1	$1
Return on Equity (Premium)	$322	$311	$321	$323	$317	$320	$396
Depreciation	$729	$779	$815	$829	$868	$1,097	$1,108
Land rent	$6	$6	$6	$6	$6	$6	$6
Corporate Overheads	$38	$41	$43	$44	$45	$59	$60
Total Fixed Requirement	**$2,624**	**$2,507**	**$2,593**	**$2,624**	**$2,657**	**$3,165**	**$3,440**
Variable costs							
Heating Plants - Fuel	$643	$813	$1,349	$1,373	$1,951	$1,862	$2,000
Heating Plants - Non-fuel	$114	$117	$143	$144	$159	$197	$200
GHG Credits	$0	$0	$0	$0	$0	$0	$0
Total Variable Requirement	**$758**	**$929**	**$1,493**	**$1,517**	**$2,110**	**$2,059**	**$2,200**
Sub-Total	**$3,381**	**$3,436**	**$4,086**	**$4,141**	**$4,767**	**$5,225**	**$5,640**
Payment in Lieu of Property Taxes on DPS	$42	$43	$51	$52	$60	$65	$70
TOTAL EXPENSES	**$3,423**	**$3,479**	**$4,137**	**$4,193**	**$4,827**	**$5,290**	**$5,710**
REVENUES							
Fixed Capacity Charges	$784	$1,213	$1,776	$1,809	$2,292	$2,883	$2,991
Variable Energy Use Charges	$754	$934	$1,359	$1,379	$1,752	$2,209	$2,292
Q4/2009 Revenues	$326	$0	$0	$0	$0	$0	$0
TOTAL REVENUES	**$1,864**	**$2,147**	**$3,135**	**$3,188**	**$4,044**	**$5,093**	**$5,284**
SURPLUS (SHORTFALL)							
Annual Surplus (Shortfall)	**-$1,559**	**-$1,332**	**-$1,002**	**-$1,004**	**-$783**	**-$198**	**-$426**
Cumulative Surplus (Shortfall)	-$1,559	-$2,892	-$3,894	-$4,898	-$5,680	-$5,878	-$6,305
Internal Rate of Return (IRR)	5.8%						
ASSUMPTIONS							
A. SALES DEMAND							
Net Connected Floor Area (m2)	148,569	227,083	328,821	331,134	414,726	515,827	529,071
Energy Sales (MW.h)	20,380	24,961	35,898	36,023	45,241	56,389	57,849
B. PROPOSED RATES (BEFORE PST & GST)							
Fixed Fee ($/m2/month), not $000s	$0.440	$0.445	$0.450	$0.455	$0.461	$0.466	$0.471
Levelised Rate Escalation Factor	7.30%	1.15%	1.15%	1.15%	1.15%	1.15%	1.15%
Variable Fee ($/MW.h), not $000s	$37.00	$37.43	$37.86	$38.29	$38.73	$39.18	$39.63
Levelised Rate Escalation Factor	5.7%	1.2%	1.15%	1.15%	1.15%	1.15%	1.15%
C. CAPITAL EXPENDITURES							
Energy Centre	$23,471	$0	$0	$0	$673	$5,140	$0
DPS	$4,809	$420	$300	$120	$120	$360	$0
ETS	$2,427	$987	$705	$282	$282	$846	$282
Sub-Total, Capital Expenditures	$30,708	$1,407	$1,005	$402	$1,075	$6,346	$282
Less: Capital Grants	$8,470	$0	$0	$0	$0	$0	$0
Total Capital Expenditures, Net of Grants	$22,238	$1,407	$1,005	$402	$1,075	$6,346	$282

APPENDIX B
CITY OF VANCOUVER NEIGHBOURHOOD ENERGY UTILITY FINANCIAL FORECAST - BASE CASE SCENARIO
($000s · $2008 · INFLATION NOT INCLUDED)

	8	9	10	11	12	13	14
	2017	2018	2019	2020	2021	2022	2023
EXPENSES (REVENUE REQUIREMENTS)							
Fixed costs							
DPS/ETS Maintenance	$128	$131	$134	$137	$137	$137	$137
Management and Staff	$635	$635	$635	$635	$635	$635	$635
GHG Offsets	$0	$0	$0	$0	$0	$0	$0
Insurance (Property and Liability)	$84	$85	$85	$86	$86	$86	$86
Sub-meter Reading	$0	$0	$0	$0	$0	$0	$0
Property Taxes	$84	$84	$84	$84	$84	$84	$84
Other Taxes and Credits	$0	$0	$0	$0	$0	$0	$0
Municipal Access Fees	$0	$0	$0	$0	$0	$0	$0
Customer Service and Billing	$0	$0	$0	$0	$0	$0	$0
Debt Interest	$923	$917	$1,027	$992	$956	$909	$862
Carrying Cost on Working Capital	$1	$1	$1	$1	$1	$1	$1
Return on Equity (Premium)	$384	$380	$372	$359	$346	$329	$312
Depreciation	$1,135	$1,156	$1,167	$1,179	$1,179	$1,179	$1,179
Land rent	$6	$6	$6	$6	$6	$6	$6
Corporate Overheads	$61	$61	$62	$60	$60	$60	$60
Total Fixed Requirement	**$3,441**	**$3,456**	**$3,573**	**$3,538**	**$3,489**	**$3,425**	**$3,361**
Variable costs							
Heating Plants - Fuel	$2,117	$2,219	$2,311	$2,404	$2,406	$2,409	$2,411
Heating Plants - Non-fuel	$202	$205	$207	$166	$166	$166	$166
GHG Credits	$0	$0	$0	$0	$0	$0	$0
Total Variable Requirement	**$2,320**	**$2,424**	**$2,519**	**$2,569**	**$2,572**	**$2,574**	**$2,577**
Sub-Total	**$5,760**	**$5,880**	**$6,092**	**$6,107**	**$6,061**	**$5,999**	**$5,938**
Payment in Lieu of Property Taxes on DPS	$72	$74	$76	$76	$76	$75	$74
TOTAL EXPENSES	**$5,832**	**$5,954**	**$6,168**	**$6,184**	**$6,137**	**$6,074**	**$6,012**
REVENUES							
Fixed Capacity Charges	$3,102	$3,214	$3,328	$3,445	$3,485	$3,525	$3,565
Variable Energy Use Charges	$2,377	$2,464	$2,552	$2,642	$2,672	$2,703	$2,734
Q4/2009 Revenues	$0	$0	$0	$0	$0	$0	$0
TOTAL REVENUES	**$5,479**	**$5,678**	**$5,880**	**$6,087**	**$6,157**	**$6,228**	**$6,299**
SURPLUS (SHORTFALL)							
Annual Surplus (Shortfall)	**-$353**	**-$276**	**-$288**	**-$97**	**$20**	**$153**	**$288**
Cumulative Surplus (Shortfall)	-$6,658	-$6,934	-$7,221	-$7,318	-$7,298	-$7,145	-$6,857
Internal Rate of Return (IRR)							
ASSUMPTIONS							
A. SALES DEMAND							
Net Connected Floor Area (m2)	542,314	555,558	568,801	582,044	582,044	582,044	582,044
Energy Sales (MW.h)	59,310	60,770	62,230	63,691	63,691	63,691	63,691
B. PROPOSED RATES (BEFORE PST &							
Fixed Fee ($/m2/month), not $000s	$0.477	$0.482	$0.488	$0.493	$0.499	$0.505	$0.510
Levelised Rate Escalation Factor	1.15%	1.15%	1.15%	1.15%	1.15%	1.15%	1.15%
Variable Fee ($/MW.h), not $000s	$40.08	$40.54	$41.01	$41.48	$41.96	$42.44	$42.93
Levelised Rate Escalation Factor	1.15%	1.15%	1.15%	1.15%	1.15%	1.15%	1.15%
C. CAPITAL EXPENDITURES							
Energy Centre	$0	$280	$0	$0	$0	$0	$0
DPS	$600	$0	$0	$0	$0	$0	$0
ETS	$282	$282	$282	$282	$0	$0	$0
Sub-Total, Capital Expenditures	$882	$562	$282	$282	$0	$0	$0
Less: Capital Grants	$0	$0	$0	$0	$0	$0	$0
Total Capital Expenditures, Net of Grants	$882	$562	$282	$282	$0	$0	$0

APPENDIX B
CITY OF VANCOUVER NEIGHBOURHOOD ENERGY UTILITY FINANCIAL FORECAST - BASE CASE SCENARIO
($000s · $2008 · INFLATION NOT INCLUDED)

	15	16	17	18	19	20	21
	2024	2025	2026	2027	2028	2029	2030
EXPENSES (REVENUE REQUIREMENTS)							
Fixed costs							
DPS/ETS Maintenance	$137	$137	$137	$137	$137	$137	$137
Management and Staff	$635	$635	$635	$635	$635	$635	$635
GHG Offsets	$0	$0	$0	$0	$0	$0	$0
Insurance (Property and Liability)	$86	$86	$86	$86	$86	$86	$86
Sub-meter Reading	$0	$0	$0	$0	$0	$0	$0
Property Taxes	$84	$84	$84	$84	$84	$84	$84
Other Taxes and Credits	$0	$0	$0	$0	$0	$0	$0
Municipal Access Fees	$0	$0	$0	$0	$0	$0	$0
Customer Service and Billing	$0	$0	$0	$0	$0	$0	$0
Debt Interest	$815	$767	$720	$673	$626	$579	$532
Carrying Cost on Working Capital	$1	$1	$1	$1	$1	$1	$1
Return on Equity (Premium)	$295	$278	$261	$244	$227	$210	$192
Depreciation	$1,179	$1,179	$1,179	$1,179	$1,179	$1,179	$1,179
Land rent	$6	$6	$6	$6	$6	$6	$6
Corporate Overheads	$60	$60	$60	$60	$60	$60	$60
Total Fixed Requirement	**$3,297**	**$3,232**	**$3,168**	**$3,104**	**$3,040**	**$2,975**	**$2,911**
Variable costs							
Heating Plants - Fuel	$2,414	$2,416	$2,419	$2,422	$2,424	$2,427	$2,429
Heating Plants - Non-fuel	$166	$166	$166	$166	$166	$166	$166
GHG Credits	$0	$0	$0	$0	$0	$0	$0
Total Variable Requirement	**$2,579**	**$2,582**	**$2,584**	**$2,587**	**$2,590**	**$2,592**	**$2,595**
Sub-Total	**$5,876**	**$5,814**	**$5,753**	**$5,691**	**$5,629**	**$5,568**	**$5,506**
Payment in Lieu of Property Taxes on DPS	$73	$73	$72	$71	$70	$70	$69
TOTAL EXPENSES	**$5,949**	**$5,887**	**$5,824**	**$5,762**	**$5,700**	**$5,637**	**$5,575**
REVENUES							
Fixed Capacity Charges	$3,606	$3,648	$3,690	$3,732	$3,775	$3,818	$3,862
Variable Energy Use Charges	$2,766	$2,797	$2,830	$2,862	$2,895	$2,928	$2,962
Q4/2009 Revenues	$0	$0	$0	$0	$0	$0	$0
TOTAL REVENUES	**$6,372**	**$6,445**	**$6,519**	**$6,594**	**$6,670**	**$6,747**	**$6,824**
SURPLUS (SHORTFALL)							
Annual Surplus (Shortfall)	**$422**	**$558**	**$695**	**$832**	**$970**	**$1,110**	**$1,249**
Cumulative Surplus (Shortfall)	-$6,435	-$5,876	-$5,182	-$4,349	-$3,379	-$2,270	-$1,020
Internal Rate of Return (IRR)							
ASSUMPTIONS							
A. SALES DEMAND							
Net Connected Floor Area (m2)	582,044	582,044	582,044	582,044	582,044	582,044	582,044
Energy Sales (MW.h)	63,691	63,691	63,691	63,691	63,691	63,691	63,691
B. PROPOSED RATES (BEFORE PST &							
Fixed Fee ($/m2/month), not $000s	$0.516	$0.522	$0.528	$0.534	$0.540	$0.547	$0.553
Levelised Rate Escalation Factor	1.15%	1.15%	1.15%	1.15%	1.15%	1.15%	1.15%
Variable Fee ($/MW.h), not $000s	$43.42	$43.92	$44.43	$44.94	$45.46	$45.98	$46.51
Levelised Rate Escalation Factor	1.15%	1.15%	1.15%	1.15%	1.15%	1.15%	1.15%
C. CAPITAL EXPENDITURES							
Energy Centre	$0	$0	$0	$0	$0	$0	$0
DPS	$0	$0	$0	$0	$0	$0	$0
ETS	$0	$0	$0	$0	$0	$0	$0
Sub-Total, Capital Expenditures	$0	$0	$0	$0	$0	$0	$0
Less: Capital Grants	$0	$0	$0	$0	$0	$0	$0
Total Capital Expenditures, Net of Grants	$0	$0	$0	$0	$0	$0	$0

APPENDIX B
CITY OF VANCOUVER NEIGHBOURHOOD ENERGY UTILITY FINANCIAL FORECAST - BASE CASE SCENARIO
($000s · $2008 · INFLATION NOT INCLUDED)

	22	23	24	25	26
	2031	2032	2033	2034	2035
EXPENSES (REVENUE REQUIREMENTS)					
Fixed costs					
DPS/ETS Maintenance	$137	$137	$137	$137	$137
Management and Staff	$635	$635	$635	$635	$635
GHG Offsets	$0	$0	$0	$0	$0
Insurance (Property and Liability)	$86	$86	$86	$86	$86
Sub-meter Reading	$0	$0	$0	$0	$0
Property Taxes	$84	$84	$84	$84	$84
Other Taxes and Credits	$0	$0	$0	$0	$0
Municipal Access Fees	$0	$0	$0	$0	$0
Customer Service and Billing	$0	$0	$0	$0	$0
Debt Interest	$484	$437	$390	$343	$296
Carrying Cost on Working Capital	$1	$1	$1	$1	$1
Return on Equity (Premium)	$175	$158	$141	$124	$107
Depreciation	$1,179	$1,179	$1,179	$1,179	$716
Land rent	$6	$6	$6	$6	$6
Corporate Overheads	$60	$60	$60	$60	$60
Total Fixed Requirement	**$2,847**	**$2,783**	**$2,719**	**$2,654**	**$2,128**
Variable costs					
Heating Plants - Fuel	$2,432	$2,435	$2,437	$2,440	$2,442
Heating Plants - Non-fuel	$166	$166	$166	$166	$166
GHG Credits	$0	$0	$0	$0	$0
Total Variable Requirement	**$2,597**	**$2,600**	**$2,603**	**$2,605**	**$2,608**
Sub-Total	**$5,444**	**$5,383**	**$5,321**	**$5,260**	**$4,736**
Payment in Lieu of Property Taxes on DPS	$68	$67	$67	$66	$59
TOTAL EXPENSES	**$5,512**	**$5,450**	**$5,388**	**$5,325**	**$4,795**
REVENUES					
Fixed Capacity Charges	$3,907	$3,952	$3,997	$4,043	$4,089
Variable Energy Use Charges	$2,996	$3,031	$3,065	$3,101	$3,136
Q4/2009 Revenues	$0	$0	$0	$0	$0
TOTAL REVENUES	**$6,903**	**$6,982**	**$7,062**	**$7,144**	**$7,226**
SURPLUS (SHORTFALL)					
Annual Surplus (Shortfall)	**$1,390**	**$1,532**	**$1,675**	**$1,818**	**$2,431**
Cumulative Surplus (Shortfall)	$370	$1,902	$3,577	$5,395	$7,826
Internal Rate of Return (IRR)					
ASSUMPTIONS					
A. SALES DEMAND					
Net Connected Floor Area (m2)	582,044	582,044	582,044	582,044	582,044
Energy Sales (MW.h)	63,691	63,691	63,691	63,691	63,691
B. PROPOSED RATES (BEFORE PST &					
Fixed Fee ($/m2/month), not $000s	$0.559	$0.566	$0.572	$0.579	$0.586
Levelised Rate Escalation Factor	1.15%	1.15%	1.15%	1.15%	1.15%
Variable Fee ($/MW.h), not $000s	$47.04	$47.58	$48.13	$48.68	$49.24
Levelised Rate Escalation Factor	1.15%	1.15%	1.15%	1.15%	1.15%
C. CAPITAL EXPENDITURES					
Energy Centre	$0	$0	$0	$0	$0
DPS	$0	$0	$0	$0	$0
ETS	$0	$0	$0	$0	$0
Sub-Total, Capital Expenditures	$0	$0	$0	$0	$0
Less: Capital Grants	$0	$0	$0	$0	$0
Total Capital Expenditures, Net of Grants	$0	$0	$0	$0	$0