



ADMINISTRATIVE REPORT

Report Date: November 25, 2011
Contact: Brian Crowe
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Meeting Date: December 13, 2011

TO: Vancouver City Council

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

SUBJECT: Southeast False Creek Neighbourhood Energy Utility (SEFC NEU) 2012 Customer Rates

RECOMMENDATION

- A. *THAT Council approve the amendments to the Energy Utility System By-law ("the By-law"), generally as set out in Appendix A, including the establishment of 2012 customer rates and fees, with a 3.22% increase over 2011 customer rates;*

FURTHER 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 the General Manager, Engineering Services, the General Manager, Financial Services and General Manager, Business Planning and Services collaboratively report back to Council in the second quarter of 2013 with recommendations concerning whether the City should continue to own and operate the SEFC NEU, based upon a comprehensive evaluation and analysis.*

COUNCIL POLICY

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

In December 2006, Council approved a set of governance and rate-setting principles for the SEFC NEU, including direction 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 (Appendix C).

In March 2009, Council instructed 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 SEFC NEU rates, and to bring a comprehensive rate review to Council every five years.

In July 2010, Council approved the establishment of a third-party Expert Rate Review Panel (referred to as the "Rate Review Panel" in this report) to advise staff and Council on future SEFC NEU rate adjustments. At this time, Council also approved the establishment of separate customer rate classes and rate formulas for residential and mixed-use residential buildings located outside SEFC, and for non-residential buildings both within and outside SEFC.

PURPOSE

This report seeks Council approval of the recommended 2012 NEU customer rates, which incorporates a 3.22% increase over 2011. The report also seeks Council approval to conduct a comprehensive evaluation of whether the City should continue to own and operate the NEU.

BACKGROUND

Strategic Objectives of the SEFC NEU

The fundamental goal of the SEFC NEU is to minimise GHG emissions via a financially self-sustaining, commercially operated utility that delivers competitively priced energy services. Through its high system efficiencies and by using sewage heat recovery to supply approximately 70% of the annual energy demand, it is anticipated that the NEU will produce at least 56% less greenhouse gas emissions compared to conventionally heated building development.

Operations

The SEFC NEU began pre-commercial operations in December 2008, providing heat and hot water to unoccupied buildings using a temporary natural gas boiler. In January 2010 the system became fully operational, delivering energy from its sewage heat recovery system. This utility currently serves all buildings in the Olympic Village, five developments in the SEFC private lands (two of which are still under construction) plus the Telus World of Science. The NEU's distribution system will continue to be extended to serve new SEFC development sites as they become ready for heat services.

Appendices B and C provide details on the SEFC NEU's services, technology, and on its ownership, operating and governance model.

Rate Structure

SEFC NEU rates are comprised of two components: a fixed Capacity Charge (related to the fixed capital and operating costs associated with the NEU) and a variable Energy Use Charge (related to customers' actual energy consumption).

The NEU has been designed with a levelized rate structure, which means that rates are designed to *under-recover* full costs in the early years of the NEU's operations (operating costs, capital costs, plus a reasonable rate of return), and then build gradually over time so that over the long-term, all the NEU's costs are fully recovered via rate revenues. Initial operating cash shortfalls that result from using this levelized rate structure are financed using a Rate Stabilization Reserve, which is essentially serving as a line of credit for the utility and is funded from the Capital Financing Fund. This rate-setting methodology is commonly used in capital-intensive utilities.

Consistent with this levelized rate approach, annual rate increases are made up of two components: an inflationary increase plus a Rate Escalation Factor. The Rate Escalation Factor is applied to customer rates over and above annual inflation to gradually increase rates over time, so that the early-year cash shortfalls are recovered through later-year revenues. This approach enables the NEU to maintain rates that are over the long term cost-competitive with the effective rates of other energy providers, whose rates tend to escalate at a rate that exceeds core inflation. If this approach were not taken, customer rates would have to be very high in the early years of the utility's operations, as fixed costs would be distributed over a relatively small initial customer base. Further details on the rate-setting methodology are described in Appendix D.

To ensure that the SEFC NEU continues to maintain stable customer rates and the appropriate investment returns to the City, staff will monitor uptake (rate at which new SEFC buildings are developed and connected to the NEU), operating costs and inflation over time and recommend annual adjustments to rates as appropriate.

DISCUSSION

2012 RECOMMENDED CUSTOMER RATES

Staff recommends that SEFC NEU customer rates for all three rate classes be increased by 3.22% over 2011 rates, as shown in Table 1. This is equivalent to a 1.22% real rate increase to customers above a forecast core inflation rate of 2.0% (source: *TD Economics Long-Term Economic Forecast*, September 2011). This 1.22% above inflation value is the Rate Escalation Factor required to maintain the levelized rate structure over time. This rate adjustment is consistent with Council's approved rate-setting methodology and principles, and is supported by the NEU Rate Review Panel.

TABLE 1. SEFC NEU 2011 AND 2012 RECOMMENDED CUSTOMER RATES

	2011	2012 PROPOSED	% CHANGE 2012/2011
<u>Class 1 (Residential and Mixed Use Residential within SEFC)</u>			
Capacity Charge (per square meter per month)	\$0.454	\$0.469	3.22%
Energy Use Charge (per MW.h)	\$38.166	\$39.395	3.22%
<u>Class 2 (Residential and Mixed Use Residential Outside SEFC) and Class 3 (Non-Residential)</u>			
Capacity Charge (per KW peak energy demand per month)	\$6.829	\$7.049	3.22%
Energy Use Charge (per MW.h)	\$38.166	\$39.395	3.22%

NOTES TO TABLE

- For the purposes of classifying buildings to apply these rate classes, the following definitions apply:
 - Residential: Residential uses comprise 100% of building net floor area.
 - Mixed-Use Residential: Residential uses comprise less than 100% and greater than or equal to 50% of net floor area.
 - Non-Residential: Building use is industrial, commercial or institutional, and, if residential uses are included, residential uses comprise less than 50% of the net floor area.

NEU Rate Review Panel Endorsement

The Rate Review Panel established by Council has reviewed and endorses the 2012 rates recommended in this report. The terms of reference of the Rate Review Panel can be found in Appendix E, and a letter from the Panel Chairperson advising on the 2012 rates in Appendix F.

Following its review of the 2011 NEU Customer Rate Report, the NEU Rate Review Panel made a number of recommendations in its letter dated November 23, 2010 (reference Appendix G) for staff's and Council's future consideration. Subsequent to this, staff consulted with the Rate Review Panel to determine appropriate actions with issues raised in the letter. Table 2 summarizes the issues raised and the recommended response actions, which were developed in consultation with the Rate Review Panel.

In December 2006 City Council approved a staff recommendation to review the City's continued ownership and operations of the NEU three years following establishment of the system. The City will be reviewing its ongoing role with respect to ownership and operations in 2012, with a report back to City Council planned for the second quarter of 2013. Should the City choose to retain ownership of the NEU, then a number of these issues raised by the Rate Panel will be studied and appropriate policy changes will be reviewed with Council. However it is recommended that changes not be made prior to this review, as any deviation from the current commercial private utility financial model would need to be changed again if the ownership changes. Such changes could result in undesirable rate instability for NEU customers.

Staff would like to acknowledge the contributions of the Rate Review Panel. Their advice helps to ensure that the rate increases recommended in this report reflect an appropriate

balance between the need to recover the City's costs for running the NEU and the customer's need to receive fair and competitive rates for energy services delivered.

TABLE 2. NEU RATE REVIEW PANEL LETTER DATED NOVEMBER 23RD 2011 - ISSUES AND ACTIONS

NEU RATE PANEL COMMENT ¹	RECOMMENDED ACTION
<p><u>Risk Compensation:</u></p> <ul style="list-style-type: none"> The proposed rates have been set using a 10% allowed return on a 40% equity component of the capital structure, even though the NEU is funded entirely by debt. The rate of return on equity and the equity component used to set rates are appropriate for 2011, but are of the view that either or both may be higher than necessary over the longer term. When there is more clarity concerning the utility's risk and future ownership, then it may be appropriate to reduce either or both figures and pass on the savings to customers. 	<ul style="list-style-type: none"> The utility capital structure and rate of return target should be reviewed upon such time that the City has determined whether or not it will continue to own the NEU. This approach minimizes rate instability for customers should the City choose to sell the NEU to a regulated private utility.
<p><u>Inflation Rate Assumptions:</u></p> <ul style="list-style-type: none"> It is possible that the NEU's operating costs will increase at a different pace than the standard inflation rate, due to the unique type of costs that underpin the NEU long-term expenses. 	<ul style="list-style-type: none"> Inflation rates for electricity and gas costs have been updated industry standard projections. The inflation rate is forecasted to be 2% for other operating costs that more closely correlate with core inflation.
<p><u>Rate Comparisons:</u></p> <ul style="list-style-type: none"> Comparisons of the NEU rates should not be limited to BC Hydro's rates. Natural gas and other district energy systems should also be included. 	<ul style="list-style-type: none"> The 2012 NEU Customer Rate Report includes comparisons with a variety of energy supply benchmarks.
<p><u>Load Attraction:</u></p> <ul style="list-style-type: none"> The best way for the NEU to reduce long-term rates is to quickly attract new customers. The NEU should be proactive in finding, assessing and providing heat supply services to potential new customers outside the boundaries of SEFC. 	<ul style="list-style-type: none"> Staff have surveyed all properties near to SEFC to identify other buildings that are economically feasible to connect to the NEU. The Telus World of Science is now connected, and staff are engaged in discussions with owners of other properties located outside SEFC.
<p><u>Operating Experience and Future Costs:</u></p> <ul style="list-style-type: none"> Because the NEU has limited operating experience, it is difficult to have certainty about how this system will perform over time. In particular, variances in the efficiency of heat supply equipment could have significant impacts on the operating costs in the future. 	<ul style="list-style-type: none"> Staff undertake annually a comprehensive review of the long-term forecasts embedded in the NEU rate model, including but not limited to review of system efficiencies.
<p><u>Capacity Charge Ratio:</u></p> <ul style="list-style-type: none"> The NEU rates collect a large percentage of its revenue requirements through a fixed Levy. This minimizes financial risk, but reduces the incentive for customers to conserve energy. This may be appropriate at this early stage of operations, but, as customer connections increase, the NEU should consider moving toward a rate structure that increases the customer incentive to conserve energy. 	<ul style="list-style-type: none"> The rate structure will be reviewed subsequent to the NEU ownership review to ensure that in the long term it achieves a balance between energy conservation and rate stability objectives. This will allow time to be able to better predict energy demand to minimize risk of revenue and rate instability.

NEU RATE PANEL COMMENT ¹	RECOMMENDED ACTION
<p><u>Rate Stabilization Reserve Financing:</u></p> <ul style="list-style-type: none"> The proposed (2011) rate increase results in a peak Rate Stabilization Reserve balance of \$9.5 million, which exceeds the Council approved financing authority limit of \$8 million. While this \$9.5 million balance incorporates a return on equity premium in the financing cost, the City has not yet established a policy on this. 	<ul style="list-style-type: none"> Based on direction from the Rate Review Panel, NEU rates have been adjusted to keep the Rate Stabilization Reserve projected debt within the Council-approved limit of \$8 M. The financing rate forecast for the Rate Stabilization Reserve should be reviewed upon such time that the City has determined whether or not it will continue to own the NEU. This approach minimizes rate changes to customers should the City choose to sell the NEU to a regulated private utility.
<p><u>Net Metering Credit:</u></p> <ul style="list-style-type: none"> The NEU's proposed net metering credit appears to approximate its cost savings, but it is not clear whether that reflects an approved policy. The NEU should establish a net metering policy, and then, if necessary, refine the net metering credit. 	<ul style="list-style-type: none"> To be consistent with Council Policy, energy supplied from customer buildings should be compensated at a rate that reflects the value of the benefit to the NEU. This avoids cross subsidization between customers.
<p><u>System Extension:</u></p> <ul style="list-style-type: none"> NEU has developed system extension rules, but the Panel has not been asked to review these. It's recommended that the NEU formalize its system extension tariffs, and that these be reviewed by the Expert Panel next year. 	<ul style="list-style-type: none"> The NEU bylaw includes provisions to enable extension of the system to non-SEFC properties. In consultation with the Rate Review Panel, staff have developed system extension rules to determine which non-SEFC properties are economically feasible to connect.

NOTES TO TABLE

- For complete detail on the comments provided by the NEU Rate Review Panel on November 23rd, 2010, please see letter in Appendix G.

BUSINESS PERFORMANCE

This section provides an update on the business performance of the SEFC NEU, with updated capital and operating costs, financing costs, electricity and natural gas price projections, as well as rates at which buildings are expected to be developed and connected to the SEFC NEU (referred to in this report as "uptake," which is directly related to the timing of future real estate development in SEFC).

Since the last business performance update was presented to Council in December 2010, a number of variables have changed in the business outlook. Electricity and long-term capital cost projections have increased, while reduced asset depreciation rates and faster uptake have had a positive financial impact. The net impact of these changes is marginally positive (see Table 3).

Variables that have increased long-term costs:

- Energy Costs:*** electricity costs are higher than projected in December 2010, primarily due to a new BC Hydro rate structure that applies to large commercial customers. This BC Hydro Rate structure has a conservation incentive that results in a higher electricity rate for any new electricity demand experienced on a year to year basis. Because the NEU's electricity demand increases every year with new SEFC buildings being connected to the system, the effective rate the NEU pays for electricity also

increases. As a result, the forecasted NEU electricity cost will increase between 4% and 9% per year over the old BC Hydro rate structure. The net impact of this change on the SEFC NEU is a higher annual operating cost, to be recovered through customer rates.

- *Capital Cost Projection:* Capital costs of the NEU system at build-out (when all SEFC developments are completed and connected to the NEU) are forecasted to increase \$1.7 million beyond the previous projection, largely due to the following:
 1. \$1.2 million of this increase is attributed to building energy transfer stations, which are located in the parkade level of each customer building served by the NEU. The unit price of energy transfer stations has increased 20% above the 2010 forecast, from \$145,000 to \$175,000 on average. The previous (2010) forecast was based on unit prices derived from construction costs experienced in 2009, where economies of scale were achieved through the bulk purchase of engineering, materials and construction services for 11 energy transfer stations. In 2011, the unit cost of energy transfer stations increase was largely due to the relatively small number being built and a wider variety of building developers. This condition will continue in future years as SEFC builds out.
 2. \$0.5 million of this increase is due to the connection of the Telus World of Science in the summer of 2011 (which has a positive net present value for the NEU). The net impact of this change on the SEFC NEU is somewhat higher annual capital financing costs, which are recovered through customer rates.

Variables that have decreased long-term costs:

- *Asset Depreciation Rates:* In previous years the NEU financial model incorporated a depreciation rate of 3.3% for all assets, based on an assumption that infrastructure assets would have a life expectancy of 30 years. Upon further detailed review of the NEU infrastructure classes, it is anticipated that the average asset life expectancy will exceed 40 years. The depreciation rate has been adjusted accordingly to 2.5%, which reduces the ongoing financing required to pay down asset depreciation. The net impact of this change on the SEFC NEU is somewhat lower annual depreciation costs, which will be reflected in annual customer rate calculations.
- *Uptake:* Due to an increase in building activity and the NEU connection to the Telus World of Science, the rate of uptake has increased over the December 2010 projection. The net impact of this change on the SEFC NEU is higher annual customer rate revenues, which contribute toward potentially achieving an annual revenue/expense breakeven sooner than the previous forecast.

Under the most likely set of key cost and revenue driver assumptions for the utility, the net impact of these changes to the financial performance of the SEFC NEU is described in Table 3. All of the long term financial metrics reported in Table 3 are within an acceptable range of the targets established in the original March 2009 forecast.

An update to the 30-year detailed cash flow projection is included in Appendix H. This cash-flow projection includes yearly forecasts for capital and operating costs and revenues.

TABLE 3. CHANGES TO LONG TERM FINANCIAL METRICS

FORECAST	INTERNAL RATE OF RETURN (IRR) ¹	FIRST YEAR REVENUES > EXPENSES ²	PEAK DRAW ON RATE STABILIZATION RESERVE ³	NET PRESENT VALUE OF RATE STABILIZATION RESERVE ⁴
March 2009 Forecast	5.8 %	2021	(\$7.3 M)	\$0 M
December 2010 Forecast	6.1 %	2020	(\$9.5 M)	\$0.3 M
Current Forecast	5.8 %	2020	(\$8.0 M)	\$1.1 M

NOTES TO TABLE

1. Internal Rate of Return: the projected internal rate of return for all NEU cash flows over a 25 year period, beginning in 2010.
2. First Year Revenues Exceed Expenses: includes all costs including all internal transfers, debt service and return on equity.
3. Peak Draw on Rate Stabilization Reserve: includes all costs including internal transfers, debt service and return on equity. In March 2009 Council authorized financing of up to \$8 M to cover the maximum peak draw anticipated at that time.
4. Net Present Value of Rate Stabilization Reserve: includes all projected yearly deficits and surpluses, calculated over a 25 year period beginning in 2010 (with all costs including internal transfers, debt service and return on equity).

ACTUAL VS PROJECTED 2011 COSTS AND REVENUES

Table 4 provides an operating and capital financial update for the first year of SEFC NEU operations, comparing 2011 operating revenues and expenses with forecasts reported to Council in December 2010.

The main differences between 2011 financial forecasts made in December 2010 and the 2011 actuals projected to year-end at the time of this report are as follows.

- *Operating Revenues:* Revenues are 7% lower than previously forecasted, due to lower than anticipated energy demand in early 2011. However, energy demand has increased substantially over the past year with increasing occupancy in the Olympic Village.
- *Operating Expenses:* Operating costs are 3% lower than previously anticipated, primarily as a result of lower than anticipated energy demand in 2011.
- *Cumulative Total Capital Expenditures:* Are 2% higher than previously forecasted, largely due to the connection of the Telus World of Science to the NEU. The connection of the Telus World of Science has a positive net present value for the NEU, and will not require any subsidization by other NEU customer buildings.

TABLE 4. SEFC NEU REVENUES AND EXPENSES,
DECEMBER 2010 FORECAST COMPARED TO SEPTEMBER 2011 ACTUAL (\$000s)

	"BUDGET" 2011 FORECAST REPORTED AT DECEMBER 2010	"ACTUAL" 2011 FORECAST TO YEAR-END (Q1-Q3 ACTUALS, Q4 PROJECTED)	\$ OVER BUDGET (UNDER BUDGET)	% OVER BUDGET (UNDER BUDGET)
ANNUAL OPERATING BUDGET				
REVENUES				
Capacity Levies	\$933	\$905	(\$28)	(3%)
Energy Use Charges	\$716	\$633	(\$83)	(12%)
Total Revenues	\$1,649	\$1,538	(\$111) ¹	(7%)
EXPENSES				
Fixed Operating Costs	\$831	\$831	\$0	0%
Variable Operating Costs	\$445	\$334	(\$111)	(25%)
Financing Costs including Return on Equity	\$2,061	\$2,061	\$0	0%
Total Expenses	\$3,337	\$3,226	(\$111) ¹	(3%)
OPERATING SHORTFALL (TO BE FUNDED FROM RATE STABILIZATION RESERVE)	(\$1,688)	(1,688)	\$0¹	0%
CAPITAL BUDGET				
Cumulative Total Capital Expenditures	\$33,806	\$34,500	\$694	2%
Less: Capital Grants	-\$10,170	-\$10,170	\$0	0%
Total Capital Expenditures, Net of Grants	\$23,636	\$24,330	\$694	3%

NOTE TO TABLE

1. The equivalent decrease of \$111,000 in Total Revenues and Total Expenses is coincidental. In typical years it is expected that there will be minor differences between these values.

Comparison of NEU 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 other energy providers, including: BC Hydro, FortisBC (natural gas), Central Heat Distribution Ltd. (in downtown Vancouver), Dockside Green community energy system (Victoria, BC), Lonsdale Energy Corporation (North Vancouver), SFU University (not yet operational, rate structure recently approved by the BC Utilities Commission), and RiverDistrict Energy (rate structure in process of BC Utilities Commission review).

Because the rate structures and type of service 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 proposed 2012 effective rate is expected to be \$91 per MW.h.

Table 5 shows the NEU's recommended 2012 rate compared to those of other energy providers. Note that for many of these providers rates are not yet available for the 2012 year, and rates are subject to change in 2012. While the 2012 effective rate is higher than other benchmarks, it continues to be within the target maximum 10% premium over electricity. This cost premium is viewed as acceptable by staff and the Rate Review Panel because it minimizes long-term debt servicing costs to be recovered from users and maximizes long-term rate stability.

TABLE 5. COMPARISON OF EFFECTIVE RATES, SEFC NEU WITH OTHER PROVIDERS

Energy Provider	Type of Service	Estimated Effective Rate (no HST)	Year of Effective Rate	Notes
SEFC NEU	Hot Water	\$91 per MW.h	Proposed 2012	The NEU bills strata corporations, not individual suites; any incremental strata sub-metering costs incurred by NEU consumers are not included here.
BC Hydro	Electricity	\$83 per MW.h \$88 per MW.h	2011 (Fiscal 2012*) 2012 (Fiscal 2013) forecast	BC Hydro effective rate calculation is based on 50% of consumption at BC Hydro's Residential Step 1 Rate and 50% at Step 2, and includes a 2.5% rate rider.
FortisBC	Natural Gas	\$83 per MW.h	2011	Assumes high efficiency boiler, factoring in conversion losses fuel costs = \$44 per MW.h. Installation and replacement of boiler equipment plus maintenance costs = \$39 per MW.h. Total effective cost = \$83 per MW.h
SFU UniverCity Energy	Hot Water	\$119 per MW.h	2012	Utility not yet operational, but rates have been approved by BCUC.
Lonsdale Energy Corporation	Hot Water	\$70 per MW.h	2011	Actual rates vary from building to building. This based on average typical building.
Central Heat Distribution Ltd.	Steam	\$78 - \$85 per MW.h	2011	Actual rates vary from building to building, dependent on size of customer and efficiency of converting steam to energy.
RiverDistrict Energy (East Fraserlands)	Hot Water	\$87 per MW.h	2012	Based on forecast submitted to BCUC. Utility not yet operational and rate not yet approved by BCUC

SENSITIVITY ANALYSIS

This section provides a summary of the sensitivity analysis undertaken to evaluate the impact of the rate of uptake (buildings connected to the utility) over the coming years. Since connection to the utility is mandatory within the SEFC Official Development Plan area, uptake depends largely on the rate of development.

This analysis compares two scenarios:

- *Scenario A. Most likely uptake forecast* - This is the scenario that represents the most likely uptake pattern over the next twenty-five years. The Director of Planning has concurred with these forecasts.
- *Scenario B. Significantly delayed uptake* - This is the scenario that staff believes is a plausible worst case scenario, assuming no further development in Southeast False Creek until 2018, with ultimate connected load reaching the same levels as Scenario A by 2027.

Assumed Rate Increases

This sensitivity analysis assumes a steady 3.22% rate increase over twenty-five years (2.0% inflation plus 1.22% Rate Escalation Factor). As discussed in the first section of this report, actual rate increases may change over time with changes to rate of uptake, inflation and input costs.

FIGURE 1. PROJECTED CONNECTED LOAD TO THE NEU ("UPTAKE"), MOST LIKELY VS SIGNIFICANTLY DELAYED SCENARIOS

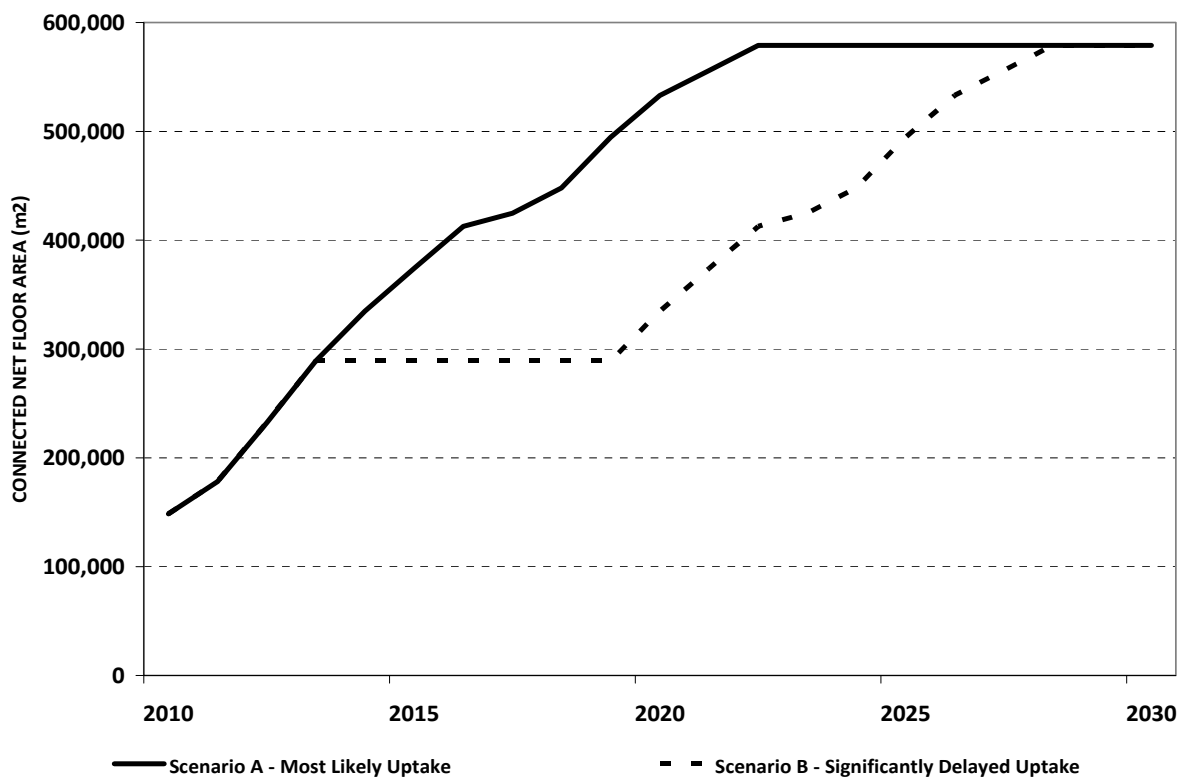


FIGURE 2. MAP OF SCENARIO A - MOST LIKELY UPTAKE

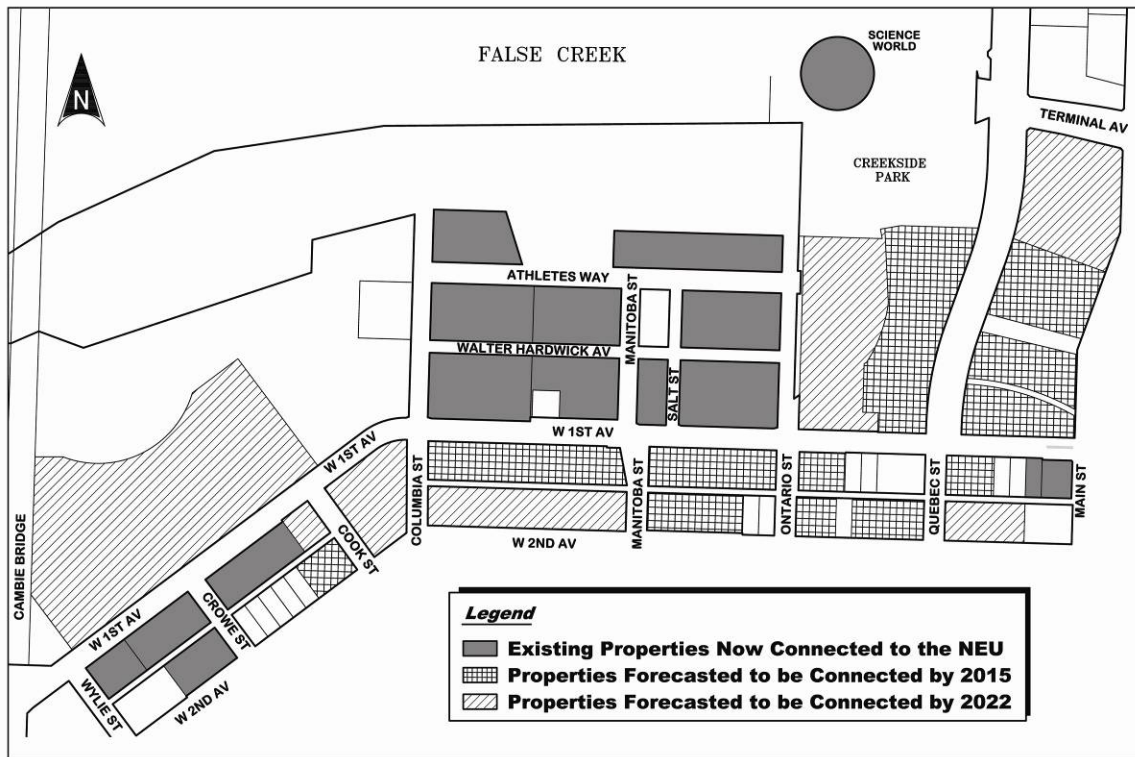
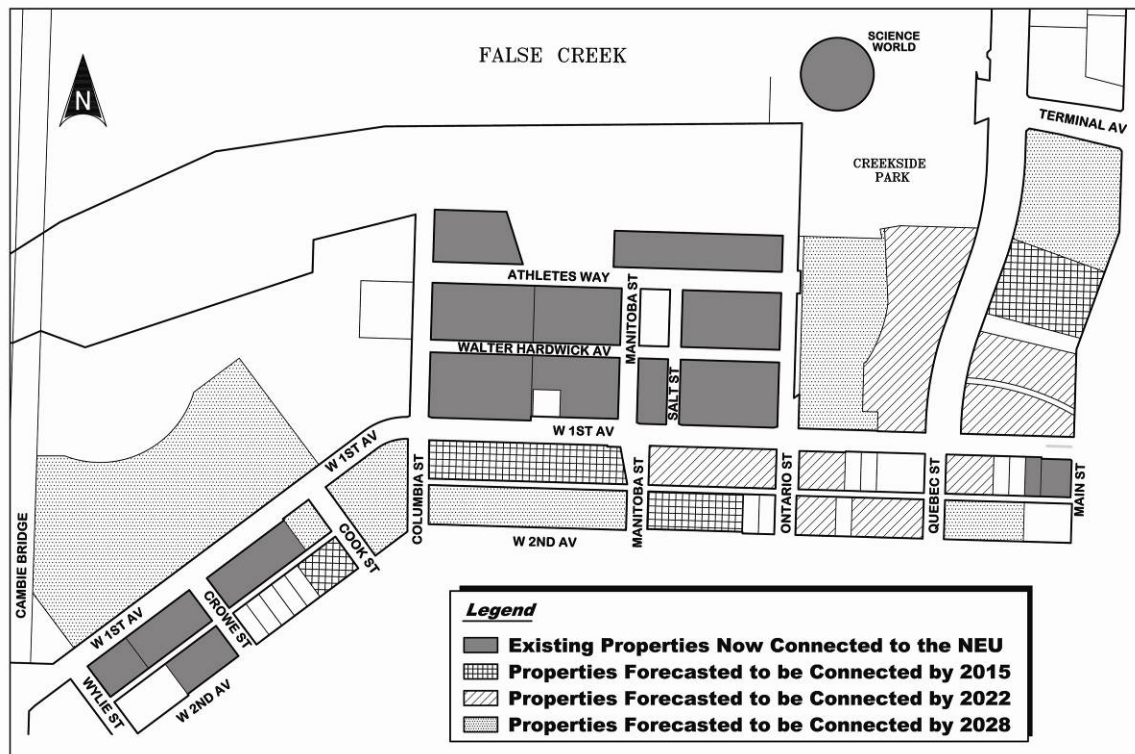


FIGURE 3. MAP OF SCENARIO B - SIGNIFICANTLY DELAYED UPTAKE



Sensitivity Analysis Results

For the two scenarios, this analysis compares:

- the twenty-five year internal rate of return, or IRR for the utility,
- the length of time it takes for the SEFC NEU annual revenues to exceed annual expenses,
- the peak amount required from the Rate Stabilization Reserve (to fund the operational cash shortfall in the early years of operations), and
- the estimated annual increase to customer rates in addition to inflation required to maintain a maximum peak draw on the Rate Stabilization Reserve of \$8 M.

The results of this sensitivity analysis are summarized in Table 6 below. These results show that while the SEFC NEU business performance is sensitive to uptake, adjusting the Rate Escalation Factor upward could compensate for the slower uptake and control the size of the peak draw on the Rate Stabilization Reserve at \$8 M.

The projected financial impacts arising from the Significantly Delayed Uptake scenario have reduced considerably since December 2010. This is due to a higher level of uptake security arising from new SEFC developments with construction underway. While the degree of this risk has reduced over the past year, it continues to be the recommendation of staff and the Rate Review Panel that the City pursue economically feasible connections of properties external to SEFC. Connection of such properties has the added benefit of increasing the amount of greenhouse gas emissions avoided by the NEU.

TABLE 6. RESULTS OF SEFC NEU SENSITIVITY ANALYSIS (ALL RESULTS ARE ESTIMATES)

SCENARIO	INTERNAL RATE OF RETURN (IRR)	FIRST YEAR REVENUES > EXPENSES ¹	PEAK DRAW ON RATE STABILIZATION RESERVE ²	ANNUAL RATE INCREASE REQUIRED TO CAP PEAK DRAW ON RATE STABILIZATION RESERVE AT \$8 M ³
A: Most Likely Uptake	5.8 %	2020	\$8.0 M	3.22 %
B: Significantly Delayed Uptake	4.4 %	2021	\$11.7 M	6.22 %

NOTES TO TABLE

1. First Year Revenues Exceed Expenses: includes all costs including all internal transfers, debt service and return on equity.
2. Peak Draw on Rate Stabilization Reserve: includes all costs including internal transfers, debt service and return on equity.
3. Annual Rate Increase Required to Cap Peak Draw on Rate Stabilization Reserve at \$8 M: under this scenario, the annual rate increase would apply until 2020, at which time subsequent Rate increases could be reduced to level comparable with base case. This projected rate increase is calculated as the Rate Escalation Factor plus 2% inflation.

GREENHOUSE GAS EMISSION (GHG) PERFORMANCE

The NEU seeks to achieve a 56% GHG reduction compared to Business-as-Usual¹. This target is based on 70% of the annual energy supply coming from the sewage heat recovery process. For the year 2011 it is anticipated that GHG emission reduction will be 50% below the Business-as-usual benchmark, which is 10% below the target.

This 10% below target performance is due to a prolonged sewage heat recovery process outage experienced in January and February of 2011. This outage was due to a mechanical failure in the heat exchanger that recovers heat from sewage. The failure was since corrected by the equipment supplier and is unlikely to recur. Following this correction, the sewage heat recovery system has performed to expectations, and a 56% GHG reduction will continue to be the target in future years.

In October 2011, the NEU began providing service to the Telus World of Science, which was previously heated with natural gas boilers. The NEU is projected to reduce the Telus World of Science's GHG emissions from 360 to 100 tonnes per year, which is a 72% reduction.

FINANCIAL IMPLICATIONS

The 3.22% rate increase recommended in this report is set to limit the size of the Rate Stabilization Reserve long-term debt to the Council-approved maximum of \$8 million.

The SEFC NEU is fully funded through utility customer fees.

CONCLUSION

This report recommends that SEFC NEU rates be increased by 3.22% in 2012, and this rate increase has been endorsed by the City of Vancouver Neighbourhood Energy Utility Rate Review Panel. A 3.22% rate increase is consistent with Council's approved rate-setting principles and methodology, and provides a good balance between maintaining cost-competitive customer rates and ensuring the long-term financial sustainability of this utility.

* * * * *

¹ Business-as-Usual is defined as the type of heating and domestic hot water system that would be installed in typical local construction in absence of the NEU. It assumes electric baseboard heat for residential units and natural gas for ventilation air, domestic hot water and commercial/institutional spaces

**APPENDIX A
ENERGY UTILITY SYSTEM BY-LAW DRAFT AMENDMENT**

BY-LAW NO. _____

**A By-law to amend Energy Utility System By-law No. 9552
Regarding Updates to Levies and Charges**

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

1. This By-law amends the indicated provisions and schedule of the Energy Utility System By-law.
2. 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 4.1(b) (i), (ii), and (iii) that exceeds 65 W per m ²	\$1.50
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PART 2 - Monthly levy

Class 1 - SEFC residential or mixed use residential building	\$0.469 per m ²
Class 2 - Residential or mixed use residential building located outside SEFC	\$7.049 per KW of peak heat energy demand
Class 3 - Non-residential building	\$7.049 per KW of peak heat energy demand

PART 3 - Monthly charge

Monthly charge	\$39.395 per MW per hour
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PART 4 - Credit

Credit for heat energy returned to energy transfer station	\$39.395 per each MW per hour multiplied by 50%
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3. 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.

4. This By-law is to come into force and take effect on January 1, 2012.

ENACTED by Council this day of , 2011

Mayor

City Clerk

APPENDIX B
OVERVIEW OF THE CITY OF VANCOUVER'S
SOUTHEAST FALSE CREEK NEIGHBOURHOOD ENERGY UTILITY

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.

The NEU Technology

The primary energy source for the NEU is sewage waste heat recovery, in which sewage waste heat is captured and used to heat water at the False Creek Energy Centre (referred to in this appendix 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 derives most of its energy from sewage heat recovery, natural gas boilers are 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 delivers the heated water to SEFC buildings (termed the "Distribution Pipe System," or DPS). Energy Transfer Stations (ETS) located within each connected building control space heating and domestic hot water for distribution by the (customer owned) building mechanical system.

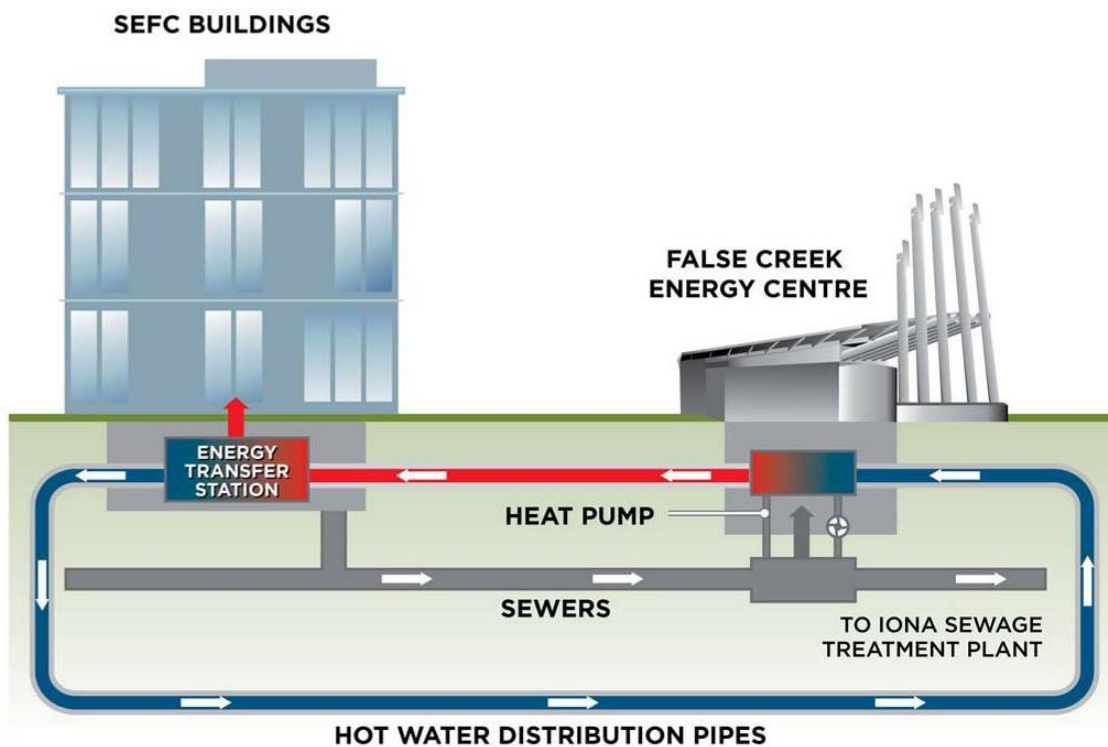
Metering is incorporated in the ETS's for energy measurement and billing purposes. Three of the ETS's also enable customer-generated solar thermal energy to be distributed to the wider neighbourhood.

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

- *False Creek Energy Centre*: Generates hot water through sewer waste heat recovery and natural gas boilers. Owned and operated by the NEU.
- *Distribution Pipe System (DPS)*: A set of underground pipes that deliver hot water to connected buildings. Owned and operated by the 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 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).

It is noted that, for market residential buildings, the NEU bills strata corporations, and they in turn are responsible for allocating NEU costs among individual unit owners. It is up to each strata corporation to determine the basis for these allocations. Some buildings connected to the NEU have sub-metering systems installed that measure energy consumed by each unit. NEU rates do not include any costs associated with sub-metering systems owned by strata corporations.

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).

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.

History of By-law Amendments

On November 15, 2007, Council approved the creation of the *Energy Utility System By-law*. On October 28, 2008 Council approved an amendment to this by-law, 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.

On March 5, 2009, Council approved amendments to the *Energy Utility System By-law*, including the establishment of 2009 rates and fees for the NEU.

On December 1, 2009, Council approved further amendments to the *Energy Utility System By-law*, including the establishment of 2010 rates and fees for the NEU. With the system fully functional, the separate rates for pre-occupancy heat services was also eliminated.

On December 2, 2010, Council approved amendments to the *Energy Utility System By-law*, including establishment of 2011 rates and fees for the NEU.

Expansion in Southeast False Creek

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 580 thousand square metres of development. The NEU currently serves 180 thousand square metres of development, including the Olympic Village, 3 SEFC buildings outside the Olympic Village, and the Telus World of Science. In addition, NEU infrastructure has recently been connected to 2 SEFC developments outside the Olympic Village that are not yet occupied.

As with the Telus World of Science, the City may also extend the NEU system to serve properties outside of the SEFC Official Development Plan area, in cases where the economic test is positive.

APPENDIX C
SOUTHEAST FALSE CREEK NEIGHBOURHOOD ENERGY UTILITY
OWNERSHIP MODEL, GOVERNANCE AND RATE-SETTING PRINCIPLES
APPROVED BY CITY COUNCIL IN DECEMBER 2006

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 stabilization 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 by-law.

APPENDIX D
SOUTHEAST FALSE CREEK NEIGHBOURHOOD ENERGY UTILITY
RATE STRUCTURE AND METHODOLOGY
APPROVED BY CITY COUNCIL MARCH 2009 AND JULY 2010

Fixed and Variable Charges

The Southeast False Creek Neighbourhood Energy Utility (NEU) rates are comprised of the following two elements:

- ENERGY USE CHARGE (termed the “Charge” in the By-law) - This monthly charge is based on amount of energy consumed (measured in megawatt-hours, or MW.h), and varies with energy use accordingly. 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.
- CAPACITY LEVY (termed the “Levy” in the By-law) - For residential and mixed-use residential buildings in SEFC, this monthly charge is based on floor area, which is measured in square metres, and indicated in building permits. For non-residential buildings and all buildings located outside SEFC, the Levy is based on peak energy demand, measured in kilowatts. This charge reflects each buildings’ peak energy demand; the NEU’s fixed costs are recovered via the Capacity Levy, and this charge does not vary with a customer’s energy use.

Levelized Rate Approach

The NEU rates are established based on a levelized rate approach. This approach 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.

This methodology was chosen because 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. The under-recovery in the earlier years of the NEU is to be financed with a rate stabilization reserve, borrowed from the Capital Financing Fund.

The Annual Levelized Rate Escalation Factor is the percentage by which rates must be increased each year over and above any inflationary increases, in order for the NEU to achieve the present value of all future revenue requirements over a twenty-five year period. It is noted that this approach to structuring rates is commonly used in the capital-intensive energy utility business, and *it is critical to the financial sustainability of the NEU that annual rate adjustments include this escalation over regular inflationary increases.*

The initial Annual Levelized Rate Escalation Factor was set at 1.15% over inflation (March 2009). This rate may be adjusted over time, to ensure that over the long term revenues recover all costs including debt service and return on equity.

Rate Stabilization Reserve

In March 2009, Council approved an NEU Rate Stabilization Reserve. This reserve serves as a line of credit upon which the NEU can draw upon, with the maximum amount not to exceed \$8 million.

The NEU Rate Stabilization Reserve serves two purposes:

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

To meet this first purpose (financing planned operating shortfalls in earlier years of operations), the NEU's cumulative draws against this Reserve are expected to grow until the business starts to generate an operating surplus, at which point it will begin repaying the loan. Projections included in the March 2009 Council report forecasted that the NEU will require approximately \$1.6 million in rate stabilization funds in the first year of operations, and a smaller amount in each year thereafter, until Year 12 of operations, with estimated total cumulative draws totalling \$7.3 million. In March 2009 it was forecasted that by approximately Year 13 of operations, the NEU will begin to pay down these borrowed funds with the annual surpluses generated by the NEU.

This second function of this Reserve (year-to-year rate stability) is the same as that of the other rate stabilization 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 Stabilization 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.
- Once the NEU begins to generate an operating surplus (projected in March 2009 to be in approximately Year 12), the full amount of the surplus will be dedicated to repaying the Capital Financing Fund (principal and interest).

Rate-Setting Methodology

The methodology used sets NEU rates to under-recover full costs in the early years of the NEU's operations, and then builds 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. This rate calculation is done in the following three steps.

- *Step 1 - 25-Year Pro Forma:* The starting point is a twenty-five year projected operating budget for the NEU (that includes capital financing costs and a target return on investment).
- *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.
- *Step 3 - Determine Annual Levelized Rate Escalation Factor:* The Annual Levelized Rate Escalation Factor is the amount by which NEU rates are set to increase over any annual inflationary increases, in order for the NEU to achieve the present value of all future revenue requirements over twenty-five years is determined. *(It is noted that it is critical to the financial sustainability of the NEU that annual rate adjustments include this escalation factor over time.)*

Using this approach, it is reasonably likely that NEU rates will diverge from BC Hydro rates over time. The extent of this divergence will depend on a number of factors, including the rate at which buildings connect to the NEU system (which in turn depends on property development in the neighbourhood), the rate at which the NEU's operating expenses increase over time, and, the rate of increase for BC Hydro comparator residential rates.

Rate Classes

In July 2010, Council established three separate rate classes for the Southeast False Creek Neighbourhood Energy Utility. For all three classes, the variable Energy Use Charge is calculated as a function of energy consumed. However, for Class 1, the fixed Capacity Levy is calculated based on the floor area connected to the SEFC NEU, but it is based on actual peak energy demand for Classes 2 and 3.

Since residential buildings within SEFC are relatively uniform, floor area serves as an appropriate proxy for each building's NEU capacity requirements. However, residential and mixed use buildings outside of the SEFC, as well as non-residential buildings within the SEFC are much less uniform, and therefore for these buildings, floor area does not generally correlate with capacity requirements. This is the reason Classes 2 and 3 have been added to the SEFC NEU rate schedule, and why for these two rate classes actual peak energy demand is used rather than floor area to calculate fixed Capacity Levies.

**TABLE 1. SOUTHEAST FALSE CREEK NEIGHBOURHOOD ENERGY UTILITY
RATE CLASSES AND RATE STRUCTURES**

RATE CLASS	APPLIES TO	BASIS FOR THE FIXED CAPACITY LEVY	BASIS FOR THE VARIABLE ENERGY USE CHARGE
1. Residential and Mixed Use Residential Within SEFC	Residential or mixed-use buildings located within SEFC	Floor area (square metres)	Amount of energy consumed, megawatt-hours
2. Residential and Mixed Use Residential Outside of SEFC	Residential and mixed-use residential buildings located outside SEFC	Peak energy demand (megawatts)	Amount of energy consumed, megawatt-hours
3. Non-Residential	Non-residential buildings located both inside and outside SEFC	Peak energy demand (megawatts)	Amount of energy consumed, megawatt-hours

NOTE TO TABLE

1. For the purposes of establishing the Capacity Levy for the two new rate classes, actual peak energy demand in megawatts will be submitted for each building by the building owner, based on actual data if available, or projected figures if not. For the two new rate classes, such peak capacity calculations are passed through a peer review process to evaluate their accuracy. This figure will be monitored by the NEU and adjusted over time as appropriate.
2. For the purposes of classifying buildings to apply these rate classes, the following definitions apply:
 - Residential: Residential uses comprise 100% of building net floor area.
 - Mixed-Use Residential: Residential uses comprise less than 100% and greater than or equal to 50% of net floor area.
 - Non-Residential: Building use is either industrial, commercial or institutional, and, if residential uses are included, residential uses comprise less than 50% of net floor area.

**APPENDIX E
CITY OF VANCOUVER NEIGHBOURHOOD ENERGY UTILITY
EXPERT RATE REVIEW PANEL
TERMS OF REFERENCE
APPROVED BY VANCOUVER CITY COUNCIL: JULY 20, 2010**

1. Objective and Scope

This Neighbourhood Energy Utility (NEU) Expert Rate Review Panel (referred to as the "Expert Panel" in these Terms of Reference) is established by Vancouver City Council, with the objective of advising City staff and City Council on the annual establishment of user rates for the NEU in Southeast False Creek and for any other areas of the City where City-managed neighbourhood energy utility services are provided.

This Expert Panel provides objective, expert advice to the City to ensure that the rate structure and annual rates for the NEU are consistent with Council's approved rate setting principles (reference Section 8), within the long-term levelized rate structure established by City Council for the NEU (reference Council report on NEU Rates March 2009, RTS7292).

The scope of the Expert Panel's rate review would include the following factors used to establish annual rates for the NEU:

- long-term forecasted cost inputs, including forecasted fuel costs and the NEU's cost of capital, including debt charges and return on equity premiums,
- revenue forecasts,
- the rate escalation factor that underlie the levelized rate structure, and annual inflationary rate increases,
- rate stabilization reserve requirements, and
- comparisons of the NEU rates to other appropriate energy benchmarks to evaluate competitiveness.

The Expert Panel will also review staff's recommendations concerning any changes to the fundamental rate structure and design that may arise out of the comprehensive rate review Council has instructed staff to undertake every five-years.

Upon completion of the rate setting process each year, the chair of the Expert Panel will deliver a letter to communicate the Panel's objective opinion on the proposed rate adjustments, attached to the appropriate staff report to Council. The chair of the Expert Panel may also attend the annual City Council meeting at which the NEU rates are approved.

2. Selection Criteria for the Expert Panel

The Expert Panel has three members. The selection criteria for the Expert Panel are:

- **EXPERTISE:** The Expert Panel shall have within its membership a variety of expertise to ensure a balanced review process. Expertise should be divided amongst Expert Panel members as follows:

- Utility Pricing and Regulation(Chairperson): Demonstrated expertise and experience in the area of utility finance/pricing, ideally with past experience working for or reporting to British Columbia Utilities Commission or another similar regulatory body.
 - Finance: A sophisticated understanding with demonstrated expertise and experience in finance and financial modelling, ideally in the field of utility finance and pricing.
 - Green Energy: Demonstrated expertise in the area of renewable energy production and demand management.
- OBJECTIVITY: Each Expert Panel member must be able to carry out the work objectively, have the demonstrated ability to make complex decisions that equitably balance the interests of various stakeholders, and be perceived as a credible, objective expert.

In the interest of avoiding any conflicts of interest, Expert Panel members should not be:

- an employee of the City of Vancouver,
- an elected official for the City of Vancouver,
- a customer of the NEU,
- an employee or major shareholder of a competing energy utility, or
- in any position or role that would be perceived as a conflict of interest as related to the responsibilities described in these Terms of Reference.

3. Selection Process and Membership Term

Candidates for Expert Panel Membership will be recommended to City Council by the General Manager of Engineering Services and either of the General Manager of Business Planning and Services or the General Manager of Financial Services. Recommendations will be made based on each individual's demonstrated expertise and objectivity, as described in Section 2. City Council is responsible for appointing members to the Expert Panel.

The term of each Expert Panel member is three years. The terms of initial members appointed to the Panel may be varied to create a schedule of staggered term renewals.

4. Primary Liaison with City Staff

The City of Vancouver's NEU Manager will be the primary liaison between City staff and the Expert Panel, and will provide administrative support to the Expert Panel as needed. While the primary liaison will be with City staff, the Expert Panel's final recommendation letter goes direct to City Council attached to the annual staff rate report.

5. Budget

At the time of Expert Panel appointment, Council also approves the budget and stipend for the Expert Panel. All expenses submitted by the Expert Panel members will be

reviewed and approved by the General Manager of Engineering Services, or designate, provided that the expenses are within the approved budget.

6. Approved Rate Setting Principles

On December 14, 2006, Council approved the following rate-setting principles for the NEU. These principles are used as guidelines for further rate adjustments.

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 provides 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 stabilization 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 by-law.

APPENDIX F
LETTER OF ENDORSEMENT FROM THE
CITY OF VANCOUVER NEIGHBOURHOOD ENERGY UTILITY
EXPERT RATE REVIEW PANEL, REGARDING 2012 PROPOSED RATES

Mayor and Council
City of Vancouver
453 West 12th Avenue
Vancouver, BC V5Y 1V4

November 21, 2011

Re: NEU Expert Rate Review Panel Review

Dear Mayor Robertson and Councillors,

The purpose of this letter is to advise Council of the Expert Rate Review Panel's views and recommendations concerning the NEU 2012 customer rates.

The Panel met with City staff several times during the year to exchange views and gather further information about the NEU operations and policies, and to discuss the issues raised in the Panel's letter of November 23, 2010. The Panel has reviewed the November 4, 2011 draft of the Administrative Report to the Standing Committee on City Services and Budgets (the "Report"). Based on the information provided by City staff, the Panel supports the proposed rate increase of 3.22%, and finds that the rate structure is appropriate for 2012. The ratemaking approach underlying the proposed 2012 NEU rates is, in the Panel's view, generally consistent with the rate setting principles established by City Council, and achieves a reasonable balance between the interests of City taxpayers and NEU customers.

The Panel acknowledges the progress made by City staff over the past year on several issues, including the development of an extension policy, a comprehensive comparison of NEU rates with rates of other providers, better forecasting of energy input costs and efforts to attract new customers.

The 2012 Rates

In order to protect the City's taxpayers, the NEU must set rates at a level that will cover all of the utility's forecasted costs over a 25 year period. Based on the results of the City's model, the proposed 2012 rates are consistent with this long-term goal and with the Council-approved \$8 million peak draw on the Rate Stabilization Reserve.

However, the revenue and cost forecasts underlying the rates rely on many assumptions about the future. The Panel accepts City staff's projections of operating costs and revenue, but notes

that there is a risk that uptake and/or input costs could cause the Rate Escalation Factor to rise in the future.

The Report includes a comparison of the proposed NEU rates with the rates of other energy providers. The comparison shows that the NEU rates will be higher than most of the comparators, but within the range of relevant benchmarks. The Panel considers the proposed 2012 rates competitive, but notes that if the Rate Escalation Factor rises in the coming years, the competitiveness of NEU rates could be affected.

The Panel is pleased to see that a formal system extension policy has been developed, as recommended in the 2010 review letter.

Longer-term Considerations

The Panel understands that the City intends to review its continued ownership and operation of the NEU during the coming year. In order to minimize rate instability in the event of a sale, the Panel agrees that some issues raised in the Panel's 2010 review letter should be deferred until after the ownership review. These issues include risk compensation and the deemed financing rate (for rate setting purposes) for the Rate Stabilization Reserve.

Two other issues discussed in the Panel's last review letter can also be left unchanged, but monitored, for now. The capacity charge ratio favours financial risk management over conservation, a choice that the Panel considers prudent at this early stage of the NEU's development. The net metering credit is designed to avoid the subsidization of customer - provided energy by other NEU customers, but the estimation of the value of that energy depends on assumptions that should be monitored as the NEU gains operating experience.

Yours truly,

Nadine Nicholls

Chairperson of the Expert Rate Review Panel

APPENDIX G
PAST LETTER OF ENDORSEMENT FROM THE
CITY OF VANCOUVER NEIGHBOURHOOD ENERGY UTILITY
EXPERT RATE REVIEW PANEL
(PROVIDED IN DECEMBER 2010 REGARDING 2011 NEU RATES)

Mayor and Council
City of Vancouver
453 West 12th Avenue
Vancouver, BC V5Y 1V4

November 23, 2010

Re: NEU Expert Rate Review Panel Review

Dear Mayor Robertson and Councillors,

The purpose of this letter is to advise Council of the Expert Rate Review Panel's views and recommendations concerning the NEU 2011 customer rates.

The Panel reviewed background information about the utility; cost and revenue forecasts; sensitivity analysis; and the November 15 through 19, 2010 drafts of the Administrative Report to the Standing Committee on City Services and Budgets. The Panel also met with City staff for the first time on October 28th and then again on November 10th to exchange views and gather further information about the NEU rate setting process.

The Panel supports the proposed rate increase of 3.15%, and finds that the rate structure is appropriate for 2011. The ratemaking approach underlying the proposed 2011 NEU rates is, in the Panel's view, generally consistent with the rate setting principles established by City Council, and achieves a reasonable balance between the interests of City taxpayers and NEU customers. Significantly, this is the same rate of increase that had been contemplated for 2011 previously by City staff in its Administrative Report of February 25, 2009 and provides customers with rate stability.

In providing its recommendation, however, the Panel notes certain limitations in its review process. In particular, the Panel was provided with very little time to review and provide independent analysis of a considerable volume of data and a large number of assumptions that underpin staff's recommendations. Moreover, there were, in some cases, material changes to the information provided to the Panel over even the limited period of our analysis. As such, the Panel was more reliant on staff's conclusions and methodologies than may be appropriate for a truly independent review. These limitations do not, in our view, materially affect the weight that should be given to the Panel's endorsement of the 2011 rates. However, the nature of compounding error would raise concerns if the Panel is not able to provide a more comprehensive review in subsequent years.

In addition, the Panel wishes to make clear that it does not endorse staff's Administrative Report in its entirety. Instead, the Panel has limited its review and comments to the scope approved by Council. Issues related to the rate increase and rate structure, and recommendations concerning future adjustments are discussed below.

The 2011 Rates

In order to protect the City's taxpayers, the NEU must set rates at a level that will cover all of the utility's forecasted costs. Some of the costs are actual expenses that the utility will incur for items such as labour, fuel, and equipment maintenance. Other costs, particularly those intended to compensate the City for risk, have a more subjective basis. In determining costs of this nature, it is important to find an appropriate balance between managing the utility's risk and establishing fair rates for both existing and future customers.

Operating Costs

The model provided by staff relies on many assumptions in order to develop a forecast of future operating costs. This challenge is particularly acute for the NEU, because of the attempt to stabilize rates over a very long time period. (Many utilities do not attempt this and, instead, charge current-period customers all current-period costs, which makes forecasting a much shorter-term, and therefore easier, undertaking).

Included in the NEU forecast are the future costs of natural gas, electricity, labour and overheads, as well as the cost of contracts with third parties. There are also significant assumptions about the energy efficiency of its key heat sources, heat pumps and natural gas, for which the NEU has limited operating history. Although the Panel is not aware of any errors or omissions in specific operating cost assumptions, it is concerned that cost input adjustments over time may significantly change the level of future rates, as operating costs rise from 40 percent of total expenses initially (2010) to 75% in year 25 (2034).

Risk Compensation

Setting rates on a cost-of-service basis involves making determinations about the utility's risk level, since a utility's perceived risk affects: (1) its cost of debt; (2) the amount of equity the utility needs to hold to be financially stable; and (3) the rate of return that must be offered in order for the utility to attract that equity capital.

As such, the assessed level of a utility's risk is a component of determining both the return on equity and the capital structure of the utility that is used for ratemaking purposes. The capital

structure may reflect the actual amount of equity invested in the utility, or it may be a deemed structure – that is, a proxy used only for the purpose of setting rates.

The proposed NEU rates have been set using a 10% allowed return on a 40% equity component of the capital structure, even though the utility is funded entirely by debt. We are generally satisfied that the rate of return on equity and the equity component used to set rates are appropriate for 2011, but are of the view that either or both may be higher than necessary over the longer term. When there is more clarity concerning the utility's risk and future ownership, then it may be appropriate to reduce either or both figures and pass the savings on to customers.

Revenue Forecast

The Panel accepts staff's opinions regarding the "Most Likely Uptake" scenario and the resulting revenue forecast.

Rate Escalation Factor, Inflation Rate and Reserve

The 3.15% rate increase is the equivalent of a 2% inflation rate plus a 1.15% real rate escalation. This increase is sufficient for 2011, but may not reflect future rate increases. It is quite possible that the NEU's operating costs will increase at a different pace than the standard inflation rate, simply because of the types of costs that underpin the NEU long-term expenses.

The proposed 3.15% rate increase is projected to result in revenues exceeding costs earlier than the initial target of year 12, and a peak draw on the Rate Stabilization Reserve of \$9.5 million. Importantly, this is not necessarily the value borrowed from the Capital Finance Fund, since some of the shortfall could be, in effect, financed from the retained earnings of the NEU (earned through returns on deemed equity and "internal transfers"). In that case the proposed rates would not, as we understand it, exceed the \$8 million borrowing cap.

The Panel notes, therefore, an unresolved tension underlying the proposed rate increase. If Council accepts some financial interdependency between the NEU and the City, then the proposed rate increase is consistent with the \$8 million funding cap. However, if Council adheres to a policy of financial independence of the NEU, then it would be inconsistent to assume that the Rate Stabilization Reserve can be partially financed by internal transfers.

The Panel has been presented with various estimates of the year that revenues will first exceed costs and the peak draw and we do not have a high level of confidence in the precise figures. We note, however, that the NEU has several years to adjust if it proves necessary to increase the rate escalation factor and therefore we are not immediately concerned with the existing uncertainty about the assumed source of funding of the Reserve.

Rate Comparison

In staff's Report, the NEU rates are compared with BC Hydro's rates for electric heating. While we support this rate comparison as a check for customer acceptability, we believe that rates should be set on cost-of-service principles. We do not believe that sound ratemaking would view competing rates as a ceiling up to which NEU rates can be raised without a cost-based justification.

We also note that the NEU's "business as usual" scenario (i.e., without NEU) assumes that most non-residential customers in SEFC and adjoining areas would use natural gas for space and hot water heating, while residential customers would use a combination of natural gas and electricity. Therefore, comparisons of the NEU rates to other appropriate energy benchmarks should not be limited to BC Hydro's rates; natural gas and district energy systems (such as Lonsdale and Dockside) offer additional benchmarks.

Using a broader range of comparisons provided by the staff's consultant, the Panel concludes that the proposed 2011 rates are within the range of relevant benchmarks, albeit higher than some options. The competitiveness of the NEU rates is enhanced by their expected stability compared to some benchmarks.

Longer-term Considerations

The Panel conducted this year's review under serious time constraints, but we are hopeful that there will be an opportunity next year to address a number of additional issues, including the following.

Load Attraction

The best way for the NEU to reduce long-term rates and to manage risks arising from the Rate Stabilization Reserve is to attract new customers as quickly as possible. In particular, NEU must be poised to capture additional customers from outside SEFC when the potential customers are installing or replacing their energy systems. Once an energy user has made a commitment to an energy system, that system will have a useful life of several decades before it could be economically displaced. As such, NEU should be proactive in finding, assessing and providing competitive proposals to any potential NEU customers.

Operating Experience and Future Costs

In light of the fact that there is limited operating experience for the NEU and its customers, it is difficult to have certainty about how this system will perform over time. In particular, the

efficiency of the heat pumps and the relative need to supplement with heat from the natural gas boiler(s) could have significant impacts on the operating costs in future. However, over the next 12 months, a more accurate picture of energy conversion efficiencies should emerge.

In addition, there will be changes in future energy input cost estimates for electricity and natural gas. While energy commodity volatility is likely to continue, future cost estimates should continually be reviewed and appropriate sensitivity analysis examined. For instance, by year 25 in the current forecast, over 50% of the operating costs are electricity and natural gas.

Capacity Charge Ratio

The NEU rates collect a relatively large percentage of the utility's revenue requirements through a Capacity Levy that is independent of energy use. This is a valid practice from a risk management perspective, but it tends to hamper conservation because the resulting low Energy Charge makes it harder for customers to justify energy savings investments or actions, as the energy "price signal" is somewhat muted.

At this early stage in the NEU's development, it may be appropriate to favour managing the utility's financial risk over conservation but, as customer connections increase, the Panel is of the view that the NEU should consider moving toward a rate structure that achieves a better balance between these competing principles.

The Panel also suggests a review of the "excess demand fee" contained in the NEU rates. The Panel has not reviewed this provision for either fairness or efficacy, but does have some concerns about how it may be applied and administered. However, as the Panel sees no revenue from this charge in staff's analysis, it is content to review this matter at a later time.

Source of Rate Stabilization Financing

The proposed rate increase results in a peak Rate Stabilization balance of \$9.5 million. Because of the current \$8 million cap on borrowing from the Capital Fund, rate increases of this level assume that some stabilization funding is, in effect, coming from the retained earnings of the utility. The Panel is not opposed to this approach for the setting of 2011 rates, and notes that the financing of the Rate Stabilization Reserve on a weighted average cost of capital basis offers the utility appropriate compensation. However, the Panel recognizes that this approach may draw less financial separation between the utility and the City than may have been implied by some of the approved principles, and may be sub-optimal when considering the NEU on a purely commercial basis (including considering the utility's finances in the context of a possible sale). As such, the Panel suggests that the development of a clear policy on sources of funds for the Rate Stabilization Reserve balance should be a priority ahead of setting the 2012 rates.

Net Metering Credit

There are different options for setting net metering credits. Customers often expect to be paid for the energy they supply at the same rate as they pay the utility for energy that they buy. However, the benefit to the utility of customer-provided energy is often much lower, so utilities tend to prefer net metering credits that reflect their actual cost savings. The NEU's proposed net metering credit appears to approximate its cost savings, but it is not clear whether that reflects an approved policy. The NEU should establish a net metering policy and then, if necessary, refine the net metering credit.

System Extension

For most regulated utilities, the terms and conditions of system extension form part of the rates or tariffs. We understand that the NEU has developed system extension rules, but we have not been asked to review these. As noted above (under load attraction), the rates charged new customers are important to overall ratemaking, and to the overall success of the utility. We suggest that the NEU formalize its system extension tariffs, and that these be reviewed by the Expert Panel next year.

Yours truly,

Nadine Nicholls,

Chairperson of the Expert Rate Review Panel

**APPENDIX H
CITY OF VANCOUVER SOUTHEAST FALSE CREEK NEIGHBOURHOOD ENERGY UTILITY
FINANCIAL PRO FORMA**

NOTES TO PRO FORMA

1. "Insurance, Property Tax & Other Internal Transfers" line item includes the following expenses: Property and liability insurance premiums, property taxes, other taxes and credits, municipal access fees, customer service and billing, carrying cost on working capital, land rent and corporate overheads.
2. The internal rate of return assumes no terminal value of NEU infrastructure assets in 2035.
3. This pro forma assumes a straight-line annual levelized Rate Escalation Factor. In actuality, the City will regularly compare rates to those of BC Hydro and other suitable benchmark(s) to ensure SEFC NEU rates remain competitive. Therefore in any given year, actual escalation may be more or less than that assumed in this pro forma.
4. All values in this pro forma are expressed in nominal dollars (or, "dollars of the day"). This means that inflation has been incorporated into future costs and expenses.

City of Vancouver Southeast False Creek Neighbourhood Energy Utility - Most Likely Uptake Projections (\$000's)

	2011	2012	2013	2014	2015	2016	2017	2018
EXPENSES (REVENUE REQUIREMENTS)								
<u>Fixed Operating Costs</u>								
System Maintenance	\$142	\$154	\$166	\$174	\$181	\$190	\$242	\$251
Management and Staff (Including Overheads)	\$517	\$527	\$538	\$549	\$560	\$571	\$582	\$594
Insurance, Property Tax & other Internal Transfers	\$230	\$247	\$265	\$280	\$294	\$309	\$321	\$334
Total Fixed Operating Costs	\$889	\$929	\$969	\$1,003	\$1,035	\$1,070	\$1,146	\$1,179
Variable Operating								
Natural Gas	\$129	\$324	\$417	\$524	\$696	\$824	\$923	\$1,047
Electricity (Total)	\$257	\$348	\$450	\$593	\$665	\$739	\$759	\$802
Heat Plant Non-Fuel Costs	\$60	\$102	\$130	\$153	\$171	\$190	\$196	\$207
Total Variable Operating Costs	\$446	\$774	\$996	\$1,270	\$1,533	\$1,754	\$1,878	\$2,056
<u>Financing and Depreciation Costs</u>								
FCM Loan Interest	\$85	\$81	\$77	\$73	\$70	\$66	\$62	\$58
Other Debt Interest	\$404	\$414	\$424	\$420	\$415	\$411	\$407	\$402
Return on Equity	\$919	\$933	\$948	\$942	\$935	\$929	\$923	\$916
Depreciation	\$609	\$634	\$659	\$672	\$685	\$699	\$713	\$727
Total Utility Financing and Depreciation	\$2,017	\$2,062	\$2,108	\$2,107	\$2,104	\$2,105	\$2,105	\$2,103
TOTAL EXPENSES (UTILITY ACCTING METHOD)	\$3,353	\$3,765	\$4,072	\$4,379	\$4,672	\$4,929	\$5,129	\$5,339
REVENUES								
Fixed Capacity Levies	\$905	\$1,306	\$1,678	\$2,006	\$2,312	\$2,634	\$2,799	\$3,047
Variable Energy Use Charge	\$633	\$1,002	\$1,287	\$1,539	\$1,774	\$2,021	\$2,147	\$2,337
TOTAL REVENUES	\$1,538	\$2,309	\$2,964	\$3,545	\$4,086	\$4,655	\$4,945	\$5,384
SURPLUS (SHORTFALL)								
Annual Surplus (Shortfall)	-\$1,815	-\$1,456	-\$1,108	-\$835	-\$586	-\$274	-\$184	\$45
Cumulative Surplus (Shortfall)	-\$3,388	-\$4,844	-\$5,952	-\$6,787	-\$7,373	-\$7,647	-\$7,831	-\$7,786
Internal Rate of Return (assume no terminal value)	5.79%							

Major Assumptions								
A. Uptake								
Net Connected Floor Area (m2)	178,167	232,331	289,007	334,787	373,893	412,655	424,724	448,010
Energy Sales (MW.h)	19,509	25,440	31,646	36,659	40,941	45,186	46,507	49,057
B. Forecasted Customer Rates (BEF HST)								
Fixed Capacity Levy	\$0.454	\$0.469	\$0.484	\$0.499	\$0.515	\$0.532	\$0.549	\$0.567
Year over Year Rate Adjustment		3.22%	3.22%	3.22%	3.22%	3.22%	3.22%	3.22%
Variable Energy Use Charge	\$38.166	\$39.395	\$40.663	\$41.973	\$43.324	\$44.719	\$46.159	\$47.646
Year over Year Rate Adjustment		3.22%	3.22%	3.22%	3.22%	3.22%	3.22%	3.22%
C. Capital Expenditures								
Total Capital Expenditures	34,500	999	1,019	520	530	541	551	562
Less: Capital Grants	10,170	0	0	0	0	0	0	0
Total Capital Expenditures, Net of Grants	24,330	999	1,019	520	530	541	551	562

City of Vancouver Southeast False Creek Neighbourhood Energy Utility - Most Likely Uptake Projections (\$000's)

	2019	2020	2021	2022	2023	2024	2025
EXPENSES (REVENUE REQUIREMENTS)							
<u>Fixed Operating Costs</u>							
System Maintenance	\$260	\$289	\$299	\$308	\$312	\$317	\$321
Management and Staff (Including Overheads)	\$896	\$914	\$933	\$951	\$970	\$990	\$1,009
Insurance, Property Tax & other Internal Transfers	\$381	\$400	\$417	\$433	\$443	\$453	\$463
Total Fixed Operating Costs	\$1,537	\$1,603	\$1,648	\$1,692	\$1,725	\$1,759	\$1,794
Variable Operating							
Natural Gas	\$929	\$1,020	\$1,084	\$1,149	\$1,171	\$1,193	\$1,215
Electricity (Total)	\$1,033	\$1,150	\$1,239	\$1,332	\$1,375	\$1,420	\$1,466
Heat Plant Non-Fuel Costs	\$249	\$274	\$292	\$310	\$316	\$322	\$329
Total Variable Operating Costs	\$2,211	\$2,444	\$2,614	\$2,791	\$2,862	\$2,935	\$3,009
<u>Financing and Depreciation Costs</u>							
FCM Loan Interest	\$54	\$50	\$45	\$41	\$37	\$32	\$28
Other Debt Interest	\$563	\$554	\$567	\$558	\$531	\$505	\$478
Return on Equity	\$1,149	\$1,136	\$1,155	\$1,141	\$1,103	\$1,065	\$1,026
Depreciation	\$895	\$909	\$945	\$960	\$960	\$960	\$960
Total Utility Financing and Depreciation	\$2,661	\$2,649	\$2,711	\$2,699	\$2,630	\$2,562	\$2,491
TOTAL EXPENSES (UTILITY ACCOUNTING METHOD)	\$6,409	\$6,696	\$6,974	\$7,182	\$7,217	\$7,256	\$7,294
REVENUES							
Fixed Capacity Levies	\$3,472	\$3,863	\$4,159	\$4,470	\$4,614	\$4,762	\$4,916
Variable Energy Use Charge	\$2,663	\$2,963	\$3,190	\$3,429	\$3,539	\$3,653	\$3,771
TOTAL REVENUES	\$6,135	\$6,826	\$7,349	\$7,899	\$8,153	\$8,415	\$8,686
SURPLUS (SHORTFALL)							
Annual Surplus (Shortfall)	-\$274	\$131	\$376	\$716	\$936	\$1,160	\$1,392
Cumulative Surplus (Shortfall)	-\$8,060	-\$7,929	-\$7,554	-\$6,837	-\$5,901	-\$4,742	-\$3,349
Internal Rate of Return (assume no terminal value)							

Major Assumptions							
A. Uptake							
Net Connected Floor Area (m2)	494,536	533,092	556,024	578,956	578,956	578,956	578,956
Energy Sales (MW.h)	54,152	58,374	60,885	63,396	63,396	63,396	63,396
B. Forecasted Customer Rates (BEF HST)							
Fixed Capacity Levy	\$0.585	\$0.604	\$0.623	\$0.643	\$0.664	\$0.685	\$0.708
Year over Year Rate Adjustment	3.22%	3.22%	3.22%	3.22%	3.22%	3.22%	3.22%
Variable Energy Use Charge	\$49.180	\$50.763	\$52.398	\$54.085	\$55.827	\$57.624	\$59.480
Year over Year Rate Adjustment	3.22%	3.22%	3.22%	3.22%	3.22%	3.22%	3.22%
C. Capital Expenditures							
Total Capital Expenditures	6,716	585	1,434	609	0	0	0
Less: Capital Grants	0	0	0	0	0	0	0
Total Capital Expenditures, Net of Grants	6,716	585	1,434	609	0	0	0

City of Vancouver Southeast False Creek Neighbourhood Energy Utility - Most Likely Uptake Projections (\$000's)

	2026	2027	2028	2029	2030	2031	2032
EXPENSES (REVENUE REQUIREMENTS)							
<u>Fixed Operating Costs</u>							
System Maintenance	\$325	\$329	\$334	\$338	\$365	\$370	\$374
Management and Staff (Including Overheads)	\$1,030	\$1,050	\$1,071	\$1,093	\$1,114	\$1,137	\$1,159
Insurance, Property Tax & other Internal Transfers	\$474	\$485	\$496	\$507	\$520	\$532	\$544
Total Fixed Operating Costs	\$1,828	\$1,864	\$1,901	\$1,937	\$1,999	\$2,038	\$2,077
Variable Operating							
Natural Gas	\$1,238	\$1,261	\$1,285	\$1,309	\$1,334	\$1,359	\$1,385
Electricity (Total)	\$1,513	\$1,561	\$1,611	\$1,662	\$1,715	\$1,769	\$1,824
Heat Plant Non-Fuel Costs	\$335	\$342	\$349	\$356	\$363	\$370	\$377
Total Variable Operating Costs	\$3,086	\$3,164	\$3,245	\$3,327	\$3,411	\$3,498	\$3,587
<u>Financing and Depreciation Costs</u>							
FCM Loan Interest	\$23	\$18	\$14	\$9	\$4	\$0	\$0
Other Debt Interest	\$452	\$425	\$399	\$372	\$346	\$549	\$523
Return on Equity	\$988	\$949	\$911	\$873	\$834	\$796	\$757
Depreciation	\$960	\$960	\$960	\$960	\$960	\$960	\$960
Total Utility Financing and Depreciation	\$2,423	\$2,351	\$2,284	\$2,213	\$2,143	\$2,304	\$2,239
TOTAL EXPENSES (UTILITY ACCTING METHOD)	\$7,336	\$7,379	\$7,429	\$7,478	\$7,554	\$7,840	\$7,903
REVENUES							
Fixed Capacity Levies	\$5,074	\$5,237	\$5,406	\$5,580	\$5,760	\$5,945	\$6,137
Variable Energy Use Charge	\$3,892	\$4,018	\$4,147	\$4,280	\$4,418	\$4,561	\$4,707
TOTAL REVENUES	\$8,966	\$9,255	\$9,553	\$9,860	\$10,178	\$10,506	\$10,844
SURPLUS (SHORTFALL)							
Annual Surplus (Shortfall)	\$1,630	\$1,876	\$2,124	\$2,383	\$2,624	\$2,665	\$2,941
Cumulative Surplus (Shortfall)	-\$1,719	\$157	\$2,281	\$4,664	\$7,288	\$9,953	\$12,894
Internal Rate of Return (assume no terminal value)							

Major Assumptions							
A. Uptake							
Net Connected Floor Area (m2)	578,956	578,956	578,956	578,956	578,956	578,956	578,956
Energy Sales (MW.h)	63,396	63,396	63,396	63,396	63,396	63,396	63,396
B. Forecasted Customer Rates (BEF HST)							
Fixed Capacity Levy	\$0.730	\$0.754	\$0.778	\$0.803	\$0.829	\$0.856	\$0.883
Year over Year Rate Adjustment	3.22%	3.22%	3.22%	3.22%	3.22%	3.22%	3.22%
Variable Energy Use Charge	\$61.395	\$63.372	\$65.413	\$67.519	\$69.693	\$71.937	\$74.254
Year over Year Rate Adjustment	3.22%	3.22%	3.22%	3.22%	3.22%	3.22%	3.22%
C. Capital Expenditures							
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

