



ADMINISTRATIVE REPORT

Report Date: November 20, 2018
Contact: Chris Baber
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Meeting Date: December 11, 2018

TO: Vancouver City Council
FROM: General Manager of Engineering Services
SUBJECT: False Creek Neighbourhood Energy Utility ("NEU") 2019 Customer Rates

RECOMMENDATION

- A. THAT Council approve, in principle, the proposed amendments to the Energy Utility System By-law ("the By-law"), generally as set out in Appendix A, including:
 - I. the 2019 customer rates and fees, with a 3.2% increase over 2018 customer rates. In accordance with Council Policy to improve the energy conservation price signal, this 3.2% increase is to be achieved by increasing the Fixed Capacity Levy by 2.6% and the Variable Energy Charge by 4.0%;
 - II. an Initial Connection Levy for future Neighbourhood Energy Utility ("NEU") customer buildings, in the amount of \$85,000, plus \$100 per kilowatt of peak energy demand associated with the respective customer building; and
 - III. greater design flexibility for customer buildings, and miscellaneous amendments including billing issues.
- B. THAT Council instruct the Director of Legal Services to bring forward for enactment the By-law amendments, generally as set out in Appendix A.
- C. THAT Council update key performance indicators ("KPIs") and targets as set out in this report to guide future rate setting for the NEU under the commercial utility rate model.

REPORT SUMMARY

This report seeks Council approval of the recommended 2019 NEU customer rates, which incorporates a 3.2% net increase over 2018. This increase enables the NEU to recover its long-term costs under the commercial utility rate model, while providing stable and competitive

energy rates for customers. This will result in a cost increase of ~\$29 per year (from \$902 to \$931 per year) for the occupants living in an average 75 square metre (800 square feet) suite. This rate increase has been endorsed by the Neighbourhood Energy Expert Panel, which provides the City with independent, expert advice on NEU rate setting.

In accordance with Council policy to improve the energy conservation price signal, this 3.2% net increase is to be achieved through a 2.6% increase to the Fixed Capacity Levy and a 4.0% increase to the Variable Energy Charge components of the NEU rate structure.

In 2015, Council adopted a set of KPIs and targets to provide greater clarity for future rate setting and to track the financial viability of the NEU. This report recommends an update to one of the KPIs to accommodate for the NEU service area expansion, as approved by Council in February 2018.

This report also seeks Council approval of an Initial Connection Levy for future customer buildings. Similar to connection fees used for water and sewer utilities, the levy would recover the cost of connecting a new building to the NEU distribution network. This will result in an estimated \$185,000 cost to a typical 15,000 square metres (162,000 square feet) development. This cost to the development is offset by cost savings for the building mechanical system and building envelope. The connection fee would come into effect for new developments applying for a building permit beginning September 1, 2019.

In addition, staff are recommending a number of amendments to the Energy Utility System By-law to provide greater design flexibility for buildings connected to the NEU and miscellaneous minor wording amendments.

COUNCIL AUTHORITY/PREVIOUS DECISIONS

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

In March 2009, Council instructed staff to report back to Council annually on adjustments to the NEU rates, and to bring a comprehensive rate review to Council every five years.

In July 2010, Council approved the establishment of an independent Neighbourhood Energy Expert Panel (referred to as the "Expert Panel" in this report) to advise staff and Council on future 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.

In October 2012, Council approved the Vancouver Neighbourhood Energy Strategy and Energy Centre Guidelines, to address the Greenest City 2020 Action Plan objective of reducing 120,000 tonnes carbon dioxide per year through the conversion of existing steam heat systems to low carbon energy sources and the deployment of sustainable energy systems for high-density neighbourhoods.

In April 2014, Council approved a transition strategy to adjust the NEU rate structure to strengthen the energy conservation price signal while maintaining energy rates at the same level as projected under the commercial utility rate model.

In July 2015, based on the result of the comprehensive review of the NEU after five years of operation, Council adopted key performance indicators and targets to guide NEU rate setting under the commercial utility rate model.

In February 2018, Council adopted the NEU investment decision framework to guide NEU expansion into parts of Mount Pleasant, Northeast False Creek and the False Creek Flats. Further to this, in April 2018, Council enacted an amendment to the Energy Utility System Bylaw to include these service areas (see Figure 1).

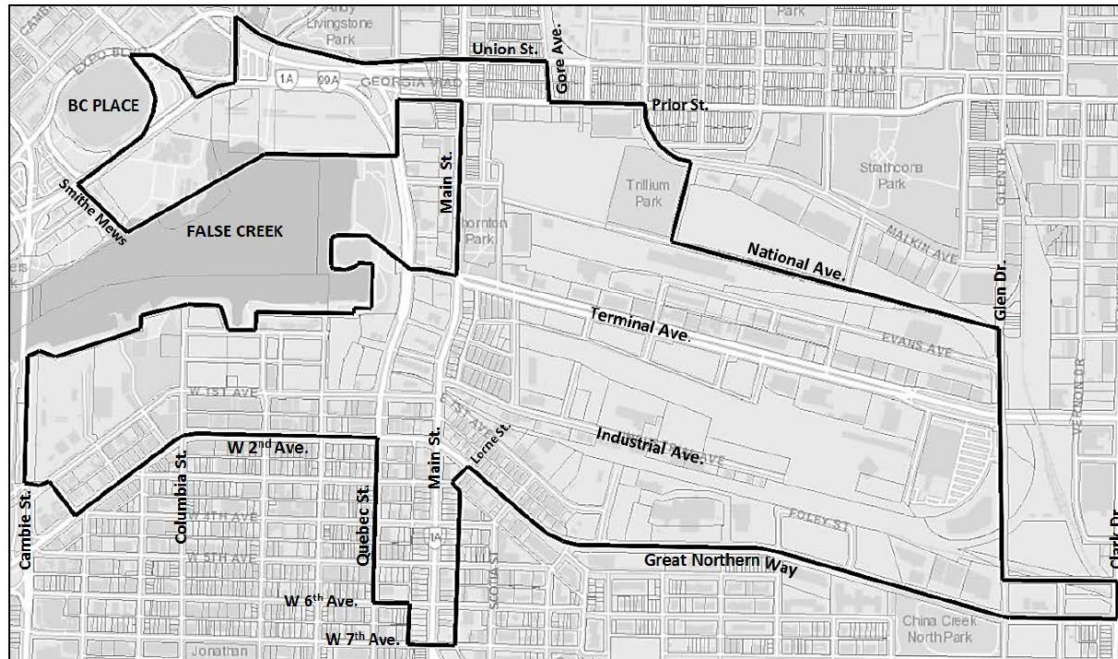
REPORT

Background/Context

The fundamental goal of the NEU is to minimize GHG emissions via a financially self-sustaining, commercially operated utility that delivers competitively priced thermal energy services. The NEU currently derives two-thirds of its energy supply from renewable sources, such as sewage waste heat and renewable natural gas. This results in substantial greenhouse gas emission reductions compared to traditional methods of providing heat and hot water to buildings. While non-NEU building approaches to achieve low-carbon do not require any direct City investment, the NEU provides the following unique benefits:

- it provides the City with direct long-term control to secure 100.0% renewable energy target for connected buildings;
- it increases the local supply of renewable energy and reduces reliance on new renewable energy from more remote locations;
- the NEU provides long-term flexibility to adapt to new technologies; and
- it provides a renewable energy retrofit opportunity for existing gas-heated buildings.

The NEU began operation in January 2010, and since then has rapidly expanded to serve 498,000 square metres (5,370,000 square feet –about 85.0% of the original business case projection) of residential, commercial and institutional floor area. Over time, the NEU will continue to be extended to serve new developments in Southeast False Creek, Mount Pleasant, the False Creek Flats and Northeast False Creek, with total build-out currently forecast at 2,100,000 square metres (22,600,000 square feet – approximately 380.0% greater than projected in the original business case) of floor area.

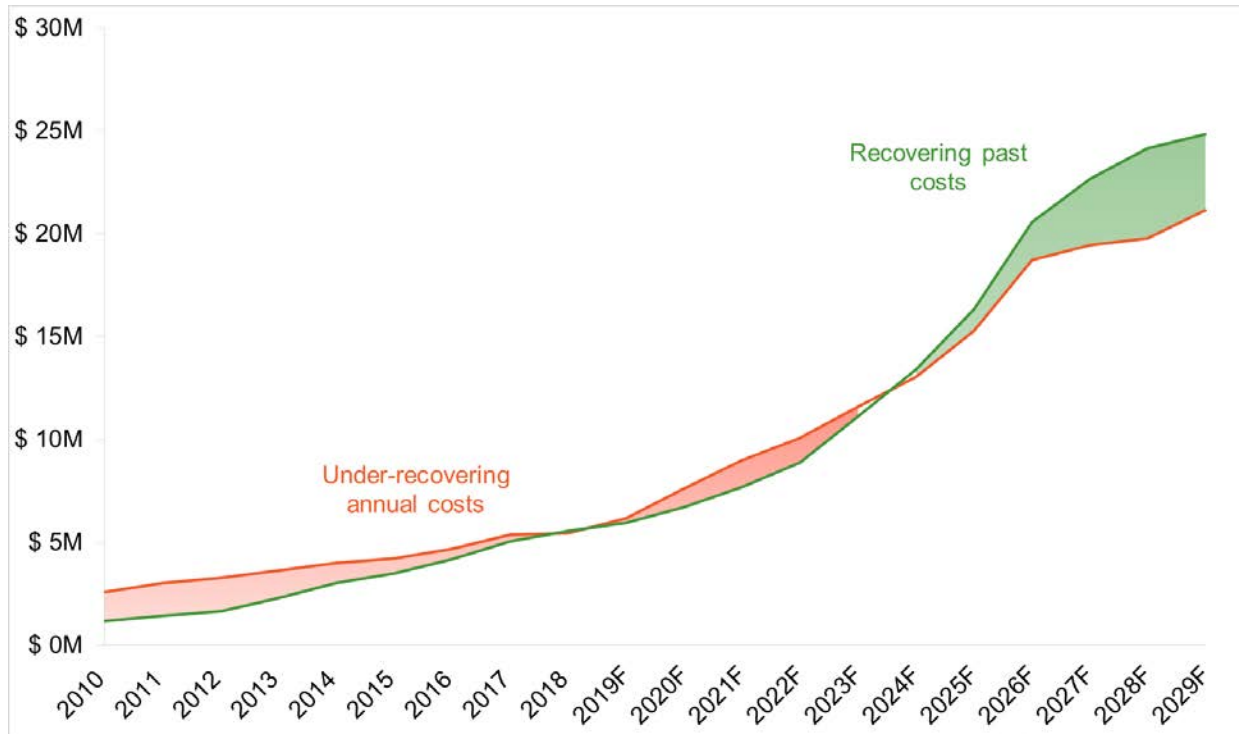
FIGURE 1. MAP OF NEU SERVICE AREA

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

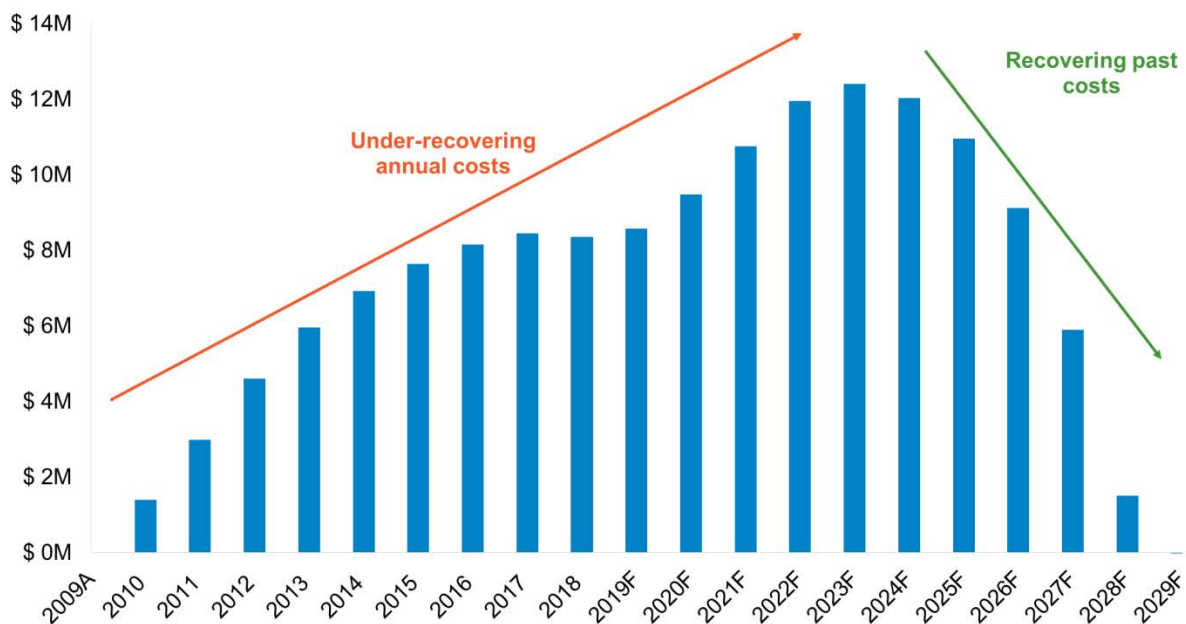
Levelized Rate Structure

NEU customer rates are comprised of two components: a Fixed Capacity Levy (related to the fixed capital and operating costs associated with the NEU) and a Variable Energy Use Charge (related to customers' actual energy consumption). To ensure fair and appropriate rates, all annual rate changes are reviewed by the independent Expert Panel.

To provide competitive and stable rates for the NEU customers, rates are established based on a levelized rate approach. As illustrated in Figure 2 below, rates are set to *under-recover* annual costs in the early years of the NEU's operation when the customer base is small, and to gradually recover past costs and a modest return on investment when the customer base is fully established. This approach ensures that infrastructure costs are more equitably distributed between the initial customers and those who connect in later years. If the levelized rate approach were not taken, customer rates would have to be set much higher in the early years of operation. This is a common practice by privately owned utilities regulated by the BC Utilities Commission ("BCUC").

FIGURE 2: LEVELIZED RATE APPROACH

To ensure that the balance of under-recovered costs (Figure 3) can be recovered within a reasonable timeframe without impacting the affordability of customer rates, annual rate increases under the levelized rate approach include two components: an inflationary increase and a Rate Escalation Factor. The Rate Escalation Factor is applied to customer rates above annual inflation to gradually increase rates over time to ensure all of the NEU's revenue requirements are met over the long-term. Using this approach enables the NEU to maintain rates that are stable, competitive and appropriate.

FIGURE 3: CUMULATIVE BALANCE OF UNDER-RECOVERED COSTS UNDER LEVELIZED RATE APPROACH

Strategic Analysis

The NEU recovers its costs using three different rate classes: (1) Residential and Mixed Use Residential Buildings within the Southeast False Creek ("SEFC") Official Development Plan area; (2) Residential and Mixed Use Residential buildings Outside of SEFC; and (3) Non-Residential Buildings. These separate rate classes were established to ensure that NEU costs are equitably distributed among different customers, based on a cost of service model.

Staff recommends that NEU customer rates for all three rate classes be increased by 3.2% over 2018 rates, as shown in Table 1. Consistent with Council policy to improve the energy conservation price signal, staff recommends that this 3.2% increase be achieved through a 2.6% increase to the Fixed Capacity Levy and a 4.0% increase to the Variable Energy Charge. This allocation is supported by the Expert Panel, and will improve the conservation price signal while maintaining energy rates at the same level as projected under the commercial utility rate model.

A 3.2% increase is equivalent to a 1.2% real rate increase to customers above a forecast mid-term average inflation rate of 2.0%. This 1.2% above inflation value is the Rate Escalation Factor, which enables the NEU to maintain rates that are stable and affordable, while keeping the NEU on track to recover its costs in accordance with the commercial utility rate model.

Applied as recommended by staff, this 3.2% increase will result in a cost increase of ~\$29 per year (from \$902 to \$931 per year) for a resident living in an average 75 square metre (800 square feet) suite with an average energy demand of 8.2 megawatt hours per year.

TABLE 1. NEU 2018 AND RECOMMENDED 2019 CUSTOMER RATES¹

	2018	2018 PROPOSED	% CHANGE
<u>Class 1 (Residential and Mixed Use Residential within SEFC)</u>			
Fixed Capacity Levy	\$0.554 per m ² per month	\$0.568 per m² per month	2.6%
Variable Energy Use Charge	\$49.103 per MW.hr	\$51.068 per MW.hr	4.0%
Net Effective Rate²	\$109.8 per MW.hr	\$113.3 per MW.hr	3.2%
<u>Class 2 (Residential and Mixed Use Residential Outside SEFC) and Class 3 (Non-Residential)</u>			
Fixed Capacity Levy	\$8.326 per KW peak demand per month	\$8.542 per KW peak demand per month	2.6%
Variable Energy Use Charge	\$49.103 per MW.hr	\$51.068 per MW.hr	4.0%

NOTES TO TABLE

- For the purposes of classifying buildings to apply these rate classes, the following definitions apply:
 - Residential: Residential uses comprise 100.0% of building net floor area.
 - Mixed-Use Residential: Residential uses comprise less than 100.0% and greater than or equal to 50.0% of net floor area.
 - Non-Residential: Building use is industrial, commercial or institutional, and, if residential uses are included, residential uses comprise less than 50.0% of the net floor areas.
- Net effective rate is based on a reference building with an annual energy demand of 109 KW.hr per square metre of floor area. Actual effective rates for customers will vary due to differences in energy performance from building to building.

NEU EXPERT PANEL INPUT

The Expert Panel established by Council provides staff with invaluable advice on many elements of the business of the NEU. In their annual letter to Council, as attached in Appendix

D, the Panel has endorsed the 2019 rate increase of 3.2%. In accordance with established policy to strengthen the conservation price signal, the Expert Panel also agrees that this 3.2% increase should be allocated by a 2.6% increase to the Fixed Capacity Levy and a 4.0% increase to the Variable Energy Charge components of the rate structure.

It is noted in the Expert Panel letter that endorsement of the rate increase is subject to Council approval of the increase to the KPI for Maximum Balance of Under-recovered Costs (see discussion below and Recommendation C). This is necessary because the Expert Panel makes its recommendations within the approved Council policy pertaining to the NEU, including alignment with KPI targets.

Staff would like to acknowledge the contributions of the Expert 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 operating the NEU and the customer's need to receive fair and competitive rates for energy services delivered.

FINANCIAL PERFORMANCE UPDATE

This section provides an update on the financial performance of the NEU, based on the commercial utility rate model, as well as a comparison of the customer rates against various benchmark utilities.

In June 2015, Council adopted key financial performance indicators ("KPIs") and targets for the NEU. These KPIs are used to track long-term financial performance of the utility, and to guide future rate setting. Table 2 below compares the KPIs associated with the levelized rate approach under the original forecast included in the 2010 rate report, the last forecast, and the current forecast. The NEU remains on target for most KPIs, with the exception of the 2015 target for the Maximum Balance of Under-Recovered Costs.

TABLE 2: NEU KPIs

	Original Forecast Feb '09	Last Forecast Nov '17	Current Forecast³
Maximum Balance of Under-Recovered Costs <i>Target: not to exceed \$9.0 M</i> <i>Recommend changing target to \$15.0 M, to accommodate NEU expansion areas approved by Council in February 2018</i>	\$ 7.3 M	\$ 8.4 M	\$ 12.5 M
Recovery Timeline for Under-Recovered Costs <i>Target: not to exceed 25 years</i>	22 years (2031)	18 years (2027)	20 years (2029)
Escalated Rate Increases¹ <i>Target: Rate Escalation Factor to be eliminated when annual revenues exceed annual costs</i>	3.2% thru 2035 ²	3.2% thru 2019	3.2% thru 2023

Notes to table

1. Includes mid-term average inflation of 2.0%
2. Original forecast maintained escalated rate increase over entire timeline, until 2035
3. Includes expansion areas added in February 2018 that were not factored into previous years' forecasts

In February of 2018, Council approved expansion of the NEU service area to parts of Mount Pleasant, the False Creek Flats and Northeast False Creek. In accordance with the expansion of the utility, staff recommends increasing the KPI target for Maximum Balance of Under-Recovered Costs from \$9M to \$15M (Recommendation C). The recommended 68.0% increase

to this KPI is viewed as reasonable given the customer base is now forecast to be 2.8 times larger than previous years long-term forecasts.

The proposed revision to this KPI is outside the scope of the Expert Panel's review. However, the Expert Panel views this forecast increase to the Maximum Balance of Under-Recovered Costs from \$8.4M to \$12.5M as reasonable within the Council-approved NEU expansion plan and the commercial utility rate model.

Actual vs. Proforma 2018 Costs and Revenues

Table 3 compares 2018 revenues and expenses as forecast at the end of Q3 for the 2018 Operating and Capital Budgets under the commercial utility model. Offsetting minor variances in operating revenues and costs has resulted in an operating shortfall that is forecast to be \$5k lower than budgeted.

A key difference between 2018 budget and the 2018 actuals projected to year-end is the Capital Costs forecast, projected at \$4.1M lower than budget (a 72.0% variance). This variance is due to a schedule shift in the procurement for the sewage heat recovery expansion project. Procurement was originally slated to begin in late 2018 and has since been pushed to early 2019.

At the time of this report, two (2) unforeseen events could potentially result in an operating cost variance at year end. For both of these events, there is insufficient information available to adequately assess the year end cost impacts:

1. *October 9, 2018, Enbridge Natural Gas Transmission Pipeline Failure:* While the pipeline has since been repaired, it is not yet running at full capacity and could potentially result in a significant short-term increase to the cost of natural gas.
2. *October 28, 2018, Flooding Event at the False Creek Energy Centre:* flooding caused by a 1-in-25 year rainfall event has resulted in a prolonged outage of the sewage heat recovery system, which is currently undergoing remediation. This flooding event has not disrupted the delivery of energy to customers, but the NEU will be fully reliant on its natural gas boilers until the sewage heat recovery system is operational again. While the City has insurance coverage in place for this event, at the time of this report the cost to the City is uncertain.

TABLE 3. 2018 NEU REVENUES AND EXPENSES, BUDGET COMPARED TO YEAR-END FORECAST (\$000s) BASED ON THE COMMERCIAL UTILITY RATE MODEL

(\$ 000's)	2018 Budget	2018 Forecast	\$ Variance	% Variance	2019 Budget
Revenues					
Capacity Levies	3,317	3,337	-		3,432
Energy Use Charges	2,229	2,224	-		2,501
Other					
Total Revenues	5,546	5,561	15	0%	5,933
Operating Expenses					
Natural Gas & Electricity	2,001	1,879	(122)		2,070
Staff, Maintenance, Overhead & Other*	851	961	110		1,007
Total Operating Expenses	2,852	2,840	(12)	(0%)	3,077
Financing Expenses*					
Interest Expense	767	772	5		865
Return on Equity	1,114	1,124	10		1,245
Depreciation	834	841	7		938
Total Financing Expense	2,715	2,737	22	1.0%	3,048
Total Expenses	5,567	5,577	10	0%	6,125
Operating Shortfall, Resulting from Levelized Rates	21	16	5	(24.0%)	192
System Expansion Capital Costs	5,743	1,613	(4,130)	(72.0%)	7,608

*Reflects costs under the commercial utility model

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 assess the competitiveness of the NEU, staff examined what a typical NEU customer would pay compared with other energy providers. Table 4 includes comparisons with BC Hydro, FortisBC natural gas, and a range of district energy providers.

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 the recommended rate increase of 3.2%, the proposed 2019 effective rate for the NEU is \$113 per MW.h. This effective rate assumes an average residential customer would consume 109 kilowatt hours per square metre of floor area annually, regardless of what energy provider they use.

The NEU effective rate continues to be well within the target maximum 10.0% premium over electricity. The proposed 2019 NEU rate is 11.0% lower than the forecast 2019 BC Hydro effective rate.

The proposed 2019 NEU effective rate will be 27.0% higher than the cost of using high efficiency natural gas boilers. This is based on the current natural gas commodity price which is at a near historical low and is subject to significant change from year to year. The NEU offers more stable and predictable rates compared to natural gas, and much lower GHG emissions.

TABLE 4. COMPARISON OF EFFECTIVE RATES, NEU WITH OTHER PROVIDERS

Energy Provider	GHG Emission Intensity (kg CO ₂ /MW.h)	Estimated Effective Rate ¹ (\$/MW.h)	Year of Effective Rate	Notes
NEU (Hot Water)	70	\$113	Proposed 2019	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)	24 ²	\$126 ²	2019	BC Hydro effective rate calculation is based on 50.0% of consumption at BC Hydro's Residential Step 1 Rate and 50.0% at Step 2, and includes a rate rider and basic charge.
FortisBC (Natural Gas)	220 ³	\$89 ³	2018	Fuel costs, based on FortisBC Lower Mainland Rate 3, with high efficiency boiler and factoring in conversion losses = \$39 per MW.h. Installation and replacement of boiler equipment plus maintenance = \$50 per MW.h. Total effective cost = \$89 per MW.h.
Creative Energy Ltd. (Steam)	300 ³	\$73	2018	Actual effective rate for this Downtown steam system varies depending on size of building and building efficiency of converting steam to energy. Rates fluctuate with the commodity price of natural gas.
UBC Neighbourhood DEU (Hot Water)	220 (Existing) 88 (2024)	\$103	2019	UBC Neighbourhood DE operations began in 2015, using temporary natural gas boilers, and plans to use waste heat from the Triumph particle accelerator facility once the customer base is sufficiently established (forecast 2024).
SFU UniverCity Energy (Hot Water)	220 (Existing) 43 (2019)	\$121 ⁴	2019	SFU UniverCity Energy operations began 2012, using a temporary natural gas boiler. This system will utilize a biomass facility for low carbon energy supply once customer base is sufficiently established (forecast 2019).
River District Energy (Hot Water)	220 (Existing) 32 (Future)	\$96 ⁴	2018	River District Energy operations began in 2012, using a temporary natural gas boiler, and plans to switch to a low carbon energy supply once the customer base is sufficiently established.
Richmond Oval Village District Energy (Hot Water)	220 (Existing) 23 (2024)	\$94	Proposed 2019	Oval Village District energy operations began 2015, using a natural gas boiler, and plans to use Sewer Heat Recovery once customer base is sufficiently established (forecast 2024).
Surrey City Energy (Hot Water)	220 (Existing) 53 (2024)	\$115	2019	Surrey City Energy operations began in 2015, using temporary natural gas boilers. This system will use an undetermined proportion of renewable natural gas beginning in 2017, and plans to implement a wood waste fuelled energy centre in 2024.
PCI Marine Gateway (Heating & Cooling)	58	\$121 ⁴	Proposed 2019	The PCI Marine Gateway development will utilize a geo-exchange heating and cooling system, which will be provided by FortisBC Alternative Energy Services.

NOTES TO TABLE

- Effective rate estimates are based on a reference building with an annual energy demand of 109 KW.hr per m² of floor area. Actual effective rates for customers will vary due to differences in energy performance from building to building.
- Although B.C. Hydro's electricity is on-average a low carbon energy source, new electricity demand is largely served by sources that have a much higher production cost than BC Hydro's retail customer rates. In addition, as demonstrated by a recent BC Auditor General's Report, BC Hydro's current rates are not sufficiently high enough

to recover BC Hydro's operating costs, and the electric utility's deferral account debt is significant. Also, electric baseboard heat is often used in conjunction with natural gas for ventilation air and hot water, and that natural gas may supply more than 50.0% of the building heat demand.

3. FortisBC, UBC Neighbourhood DEU, River District Utility, and Creative Energy Steam rates are largely dependent on the commodity cost of natural gas, which is currently at a near historical low and subject to natural gas commodity price volatility. The GHG emission intensity as reported in Table 4 reflects provincial standard methods for calculating GHG emissions, and does not include upstream emissions associated with the extraction and transportation of natural gas.
4. Estimated effective rates sourced from BC Utilities Commission rate filings, which are based on modeled energy performance of buildings served by the reference systems. A high estimated effective rate does not necessarily imply that the customer's total cost of heating will be high, because some new developments consume significantly less energy than others.

Initial Connection Levy for New Service Connections to the NEU

Staff recommends adopting an Initial Connection Levy to recover the cost of connecting the NEU to future customers of the utility. This is similar to the use of connection fees for waterworks and sewer utilities, and is also a standard practice in the energy utility sector. The proposed Initial Connection Levy has been developed following a comprehensive consultation process with the development industry (see Table 6 for a summary of feedback received).

When the NEU was first established, there was no Initial Connection Levy charged to new developments. At that time, residential buildings outside of the NEU service area did not have a strict GHG performance requirement, and were generally constructed using a combination of electric resistance heat and natural gas boilers/air heaters (the lowest installation cost option available to developers). Connecting to the NEU required a more expensive hydronic heating system in the building, and there was a desire to avoid construction cost premiums for buildings connecting to the NEU.

Since that time, strict GHG performance limits have been implemented on a city-wide basis through the Zero Emissions Building Plan. Connecting to the NEU provides developers with a cost-effective means to achieve the Zero Emissions Building Plan GHG limits, as it results in mechanical system and building envelope cost savings for new developments. Adoption of an Initial Connection Levy would help to distribute this cost savings between the building developer and the end-user, who ultimately pays for NEU infrastructure costs via NEU rates.

The amount of the proposed Initial Connection Levy is dependent on the amount of peak energy demand required for a new building (see Table 5). The levy would recover the cost of the pipe connection to the NEU distribution system, plus the cost of the customer building energy-transfer interface. Based on this formula, a developer of a residential building of 15,000 square meters (161,500 square feet) would pay an Initial Connection Levy of approximately \$185,000. This Connection Levy revenue will lower capital funding requirements for the utility, resulting in lower long-term energy costs for NEU customers.

TABLE 5. PROPOSED NEU CONENCTION LEVY STRUCTURE

COMPONENT	AMOUNT	RATIONALE
Fixed Portion	\$85,000	Recovers cost of the connection pipe, which is largely influenced by factors other than peak energy demand (e.g. distance from NEU distribution pipe, road type, etc.).
Variable Portion	\$100/kW of peak energy demand required for a building	Recovers cost of the energy transfer interface, which is directly impacted by the amount of peak energy demand required for a building.

Staff recommends that the Initial Connection Levy be effective for any new NEU customers who submit a building permit or NEU connection application after September 1, 2019. With the introduction of the Initial Connection Levy, staff also recommends elimination of the excess demand fee, which is no longer required as it could result in some new customers paying twice for a portion of the connection cost. Staff will come forward to Council on an annual basis with recommended inflationary increases to the Initial Connection Levy as part of the annual NEU rate report. Payment of the Initial Connection Levy will occur at the time that an initial connection application form is submitted to the City, and will be based on the rate that is effective at that time.

The Expert Panel supports the proposed Initial Connection Levy rate design, as well as approach taken to gain the concurrence of the development community. The Expert Panel also agrees that the introduction of the levy is a suitable and timely evolution of the NEU rate design.

TABLE 6. SUMMARY OF THE RESULTS OF DEVELOPMENT INDUSTRY CONSULTATION RELATING TO THE PROPOSED CONNECTION LEVY

TOPIC	DEVELOPMENT COMMUNITY FEEDBACK	STAFF RECOMMENDATION
Levy Structure	<ul style="list-style-type: none"> There is general support for a levy structure that incorporates both a fixed and variable component, the latter based on the amount of peak energy demand specified for a building. Levy should recover cost of building connection only (i.e. pipes and energy transfer station), not NEU distribution and plant infrastructure costs. 	<ul style="list-style-type: none"> Staff are recommending a fixed and variable levy structure as supported by the development industry.
Cost & Energy Load Estimates	<ul style="list-style-type: none"> There are concerns that the mechanical consultants working for developers tend to over-estimate the peak energy demand requirements for a building, which would result in an increased connection levy cost. 	<ul style="list-style-type: none"> The proposed levy is designed to recover the cost of connecting a building to the NEU and is based on historical connection cost data. Staff will engage the mechanical engineering community to encourage more realistic peak demand estimates by building engineers (e.g. information bulletin) to ensure that the levy amount is based on the most realistic peak energy demand for a building, without additional safety factors. Staff to review levy annually to ensure that capacity levy is recovering appropriate connection costs.
Implementation Schedule	<ul style="list-style-type: none"> Financial commitments are made by developers early in the development process and adjustments become increasingly difficult to make as a building development project progresses over time. There is strong interest in a grand-fathering mechanism for in-stream applications. 	<ul style="list-style-type: none"> In early consultation, staff had originally proposed an implementation date of January 1, 2019. Based on feedback received, staff recommends delaying implementation until September 1, 2019. All building permit applications submitted prior to September 1, 2019 will be exempt from the levy. Beyond the consultation completed to date, staff will directly notify all new and early-stage in-stream developments of the pending connection levy changes.

Proposed Amendments to the By-law to Increase Design Flexibility for Buildings

Staff, in consultation with development community stakeholders, have identified opportunities for amendments to the By-law to provide greater flexibility to customers of the system. The proposed amendments are included in Appendix A, with a summary as follows:

- ***Use of Electric Heat in Limited Areas:*** The By-law currently requires that buildings utilize the NEU for 100.0% of the space heat and hot water demand, with allowance for the use of waste heat recovery and solar thermal systems. The purpose of this requirement is to secure low-carbon performance for buildings and maximize the cost-effectiveness of the NEU service. However, some developers have requested the ability to use electric heat in areas that are expensive to service with NEU-based hydronic heat, including spaces such as stairwells, parkade bike and storage rooms. Staff have evaluated the implications of allowing electric heat in these limited areas, and have determined that it would result in negligible impact to customer rates or GHG performance. Staff also evaluated the use of electrical heat in rental suites as a potential construction cost saving opportunity for developers, but concluded that doing so would likely result in an increase to the cost of service for NEU customers and an increase in cost of energy for rental unit residents.
- ***Use of Distributed Heat Pump and Variable Refrigerant Flow Systems:*** These systems utilize heat pumps distributed throughout a building for heating and cooling, and a portion of the heat used by the building is sourced from electricity (with the remainder from the NEU). Some developers have expressed a desire to use this type of system to recover waste heat from cooling within a building, and increasing the range of design options for heating and cooling systems. As above, staff have determined that the impact to NEU customer rates and GHG performance would be negligible.

These proposed changes have received positive support from development community stakeholders. Staff will continue to consult with this group to evaluate other potential optimization opportunities in the coming year.

Additional Proposed Minor By-law Amendments

In addition, staff recommends a number of minor by-law amendments in Appendix A:

- ***Adjustments to the Peak Capacity Levy:*** For residential buildings outside of SEFC, and non-residential buildings in all areas, the monthly Peak Capacity Levy charged to a building is based on the peak energy supply requested by a developer prior to connection of the building. In some cases, the amount of peak energy capacity reserved for a building will be greater than what is needed post-occupancy. Staff recommends amendments to the By-law to provide clarity around the requirements for post-occupancy reductions to the peak capacity levy.
- ***Billing Adjustments for Malfunctioning Energy Meter:*** Consistent with the Waterworks utility, staff recommend amendment to the By-law to enable recovery of lost revenues in the event of a malfunctioning customer energy meter, up to a maximum retroactive period of 3 months from the time that it is determined that the energy meter is malfunctioning.
- ***Other Minor Wording Amendments for Clarity:*** In Appendix A, staff recommends a number of minor wording adjustments to the By-law to provide greater clarity, without changing the material substance of the by-law.

Implications/Related Issues/Risk

Financial

As noted above, staff recommends a 3.2% increase to the NEU customer rates for 2018 to be achieved by increasing the Fixed Capacity Levy by 2.6% and the Variable Energy Charge by 4.0%. This recommended increase is in accordance with the Council approved rate setting framework established in July 2015, and is also consistent with the rate forecasts from previous years.

Sensitivity Analysis on Key Variables in the NEU Business Case

Table 7 below summarizes the potential capital requirements for the distribution system and energy centres for the expanded NEU service area, and the forecast levelized cost of service to end users under three scenarios – base case, high cost and low cost.

TABLE 7. SCENARIO ANALYSIS – CAPITAL INVESTMENT FOR NEU EXPANSION & LEVELIZED COSTS

Scenario	Total Capital Requirements to 2038, in 2018 \$\$*	Levelized Cost of Service to End User (30 year project life)
Forecast “Base Case” Scenario	\$42M – Distribution \$66M – Generation \$108M - Total	\$129 per MW.hr
High Cost Scenario (30.0% increase in total capital costs, a 3 year delay in customer development, and a 6.0% borrowing rate)	\$53M – Distribution \$85M – Generation \$138M - Total	\$167 per MW.hr
Low Cost Scenario (\$15M grant, and a 4.0% borrowing rate)	\$35M – Distribution \$58M – Generation \$93M - Total	\$119 per MW.hr

**Note: New generation facilities can potentially be supplied by the private sector, reducing the direct debt funding requirements associated with NEU infrastructure expansion.*

To support the NEU expansion plan, over the next 20 years the distribution system requires a capital investment in the range of \$35 to \$53 million (2018\$), and new energy centres require a capital investment in the range of \$58 to \$85 million (2018\$), totalling \$93 to \$138 million (2018\$). \$42 million of this total is already included in the 2019-2022 Capital Plan, and the remainder will be subject to Council approval of future capital plans.

Under the NEU commercial utility rate model, the levelized cost of service to end users could range from \$119 to \$167 per MW.hr, in comparison to BC Hydro's cost of service for a residential building which could range from \$155 to \$190 per MW.hr depending on input assumptions.

The City's future investment will be determined through the NEU expansion decision framework which, at each major investment decision point, considers the optimal NEU business, ownership and operating model with respect to energy generation and distribution; emerging technology and options to best achieve desired GHG outcomes; and funding availability in future Capital Plans.

Proposed Initial Connection Levy

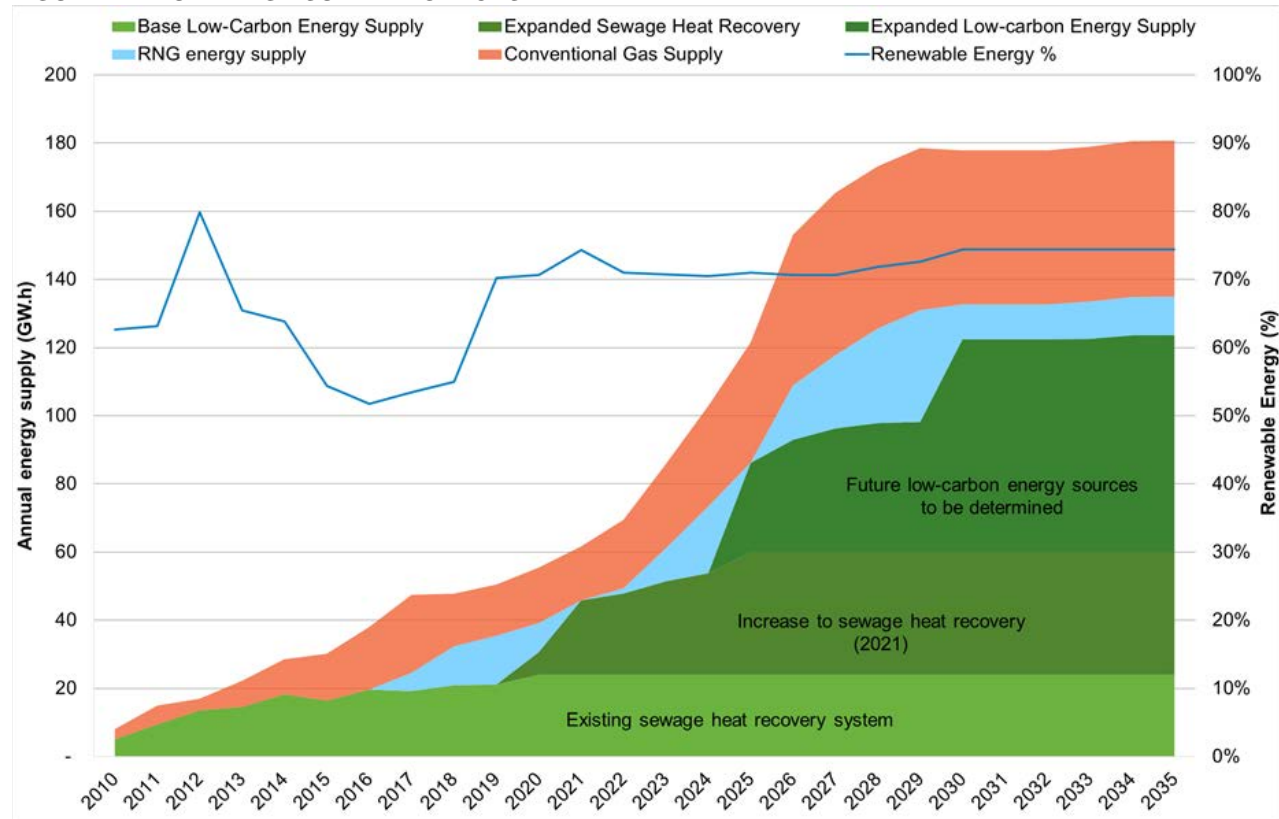
Connecting to the NEU provides developers with a cost-effective means to achieve the Zero Emissions Building Plan GHG limits, as it results in mechanical system and building envelope savings for new developments. Adoption of an Initial Connection Levy would help to distribute this cost savings between the building developer and the end-user, who ultimately pays for NEU infrastructure costs via NEU rates. In addition, implementation of an Initial Connection Levy would reduce the City's debt financing requirements for NEU infrastructure.

Environmental

At the end of Q3, the NEU was on track to meet environmental targets by deriving 65.0% of its thermal energy from renewable energy sources (42.0% from sewage heat recovery and 23.0% from renewable natural gas).

On October 28, 2018, flooding caused by a 1-in-25 year rainfall event has resulted in a prolonged outage of the sewage heat recovery system, which is currently undergoing remediation. While this flooding event has not disrupted the delivery of energy to customers, the NEU will be fully reliant on its natural gas boilers until the sewage heat recovery system is operational again. As a result, the NEU has been using more conventional natural gas than planned, and staff is working with Fortis to try to increase the amount of renewable natural gas available to the system. Staff forecasts that the NEU at year-end will source 56.0% of its energy from renewable sources (target is 66.0% renewable energy), with 33.0% coming from sewage heat recovery and 23.0% from renewable natural gas.

Engineering design work is now underway to expand the sewage heat recovery capacity at the False Creek Energy Centre, which will enable the NEU to achieve its long-term GHG performance targets while reducing dependence on renewable natural gas ("RNG"). Figure 4 below illustrates the forecast sources of energy supplied to meet customer loads and the projected annual renewable energy performance.

FIGURE 4: NEU ENERGY SUPPLY FORECAST

At the time of build-out of the customer base, the NEU is forecast to provide low carbon heating and hot water to approximately 2,100,000 square metres (22,600,000 square feet) of mixed use floor area. GHG savings, at build-out, are forecast at approximately 14,000 tonnes of CO₂ per year, compared to buildings that would otherwise be constructed with no NEU and would need to comply with applicable green building rezoning policies¹. In a hypothetical case where buildings were simply constructed to comply with building code, the GHG benefit would increase to 24,000 tonnes CO₂ at build-out. These estimates are based on a 70.0% renewable energy target for the NEU and GHG emissions would be further lowered when transitioning to 100.0% renewable energy at a future date.

Beyond the renewable energy and greenhouse gas emissions benefits, the NEU also provides environmental co-benefits:

- the recovery of waste heat from building air conditioning systems also provides a modest reduction in potable water use compared to conventional evaporative cooling systems (e.g. the recovery of waste heat from the new Mountain Equipment Co-op store in Southeast False Creek will reduce water consumption by approximately 1 million litres annually); and

¹ Buildings with rezoning applications filed on or after May 2017 are required to meet the GHG performance targets associated with the Zero Emissions Building Plan, and sites with earlier rezoning applications are assumed to achieve less stringent standards. This estimate also factors in the proposed St. Paul's Hospital, which is early in the development process and has a high degree of uncertainty regarding GHG emissions with or without an NEU connection.

- the NEU allows buildings to avoid the need to locate heating equipment on roof-tops, leaving more space for green roofs which help to reduce rainwater run-off and the heat island effect.

CONCLUSION

This report recommends that NEU rates be increased by 3.2% in 2018. This proposed increase is consistent with Council's approved rate-setting principles and methodology, and enables the NEU to recover its long-term costs under the commercial utility rate model while providing stable and competitive energy rates for customers. This increase will be allocated to the Capacity Levy and the Energy Charge in a manner consistent with the conservation rate setting policy approved by Council in April 2014.

This report also recommends an update to one of the KPIs to factor in the expanded service area of the NEU, establishes an Initial Connection Levy for new customer buildings, and recommends amendments to the Energy Utility System By-law to provide more design flexibility for customer buildings and minor wording changes to improve clarity of the By-law.

The NEU continues to be an important contributor to the City's work in achieving the Greenest City and goals and securing a 100.0% renewable energy future.

* * * * *

ENERGY UTILITY SYSTEM BY-LAW DRAFT AMENDMENT

BY-LAW NO. _____

**A By-law to amend Energy Utility System By-law No. 9552
regarding fees and other miscellaneous matters**

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

1. This By-law amends the indicated provisions of the Energy Utility System By-law.
2. Council inserts the following new definitions in section 1.2 in correct alphabetical order:

““capacity levy” means:

- (a) for any residential or mixed use residential building located in Southeast False Creek, a fixed capacity fee based on net floor area determined by the city at the time of issuance of the building permit for that building, and
- (b) for any residential or mixed use residential building not located in Southeast False Creek, and for any non-residential building, a fixed capacity fee based on the greater of the estimated peak heat energy demand of the building approved by the City Engineer pursuant to section 4.3 of this By-law at the time of application for service, or the actual peak heat energy demand of the building determined by the city by reading the meter;”;

““connection levy” means a charge or levy imposed upon an owner to compensate the City for installing an initial connection to the energy utility system, including all the necessary and incidental infrastructure;”;

““distributed water-to-air heat pump system” means electricity driven refrigerant vapor compression cycle equipment installed as terminal units throughout the building and which extract thermal energy from a common water heat source and reject it into indoor air in heating mode, and extract thermal energy from indoor air and reject it into a common water heat sink in cooling mode;”;

““water-source variable refrigerant flow (VRF) system” means central electricity driven heat pump units, which extract heat from or reject heat into a water source and provide heating and cooling to the building by circulating refrigerant to distributed refrigerant-to-air fan coils in multiple thermal zones.”

3. Council strikes the definition of “levy” from section 1.2
4. Council strikes the period”.” at the end of the definition of “Southeast False Creek” in section 1.2 and replaces it with “; and”.
5. Council strikes subsection 3.2(a) and replaces it with:

“(a) community energy centres in locations approved by the City Engineer;”

6. Council strikes subsection 4.1(c) and replaces it with:

“(c) a cheque in the amount of the connection fee referred to in section 8.2”

7. Council strikes sections 5.2, 5.3 and 5.4 and replaces them with:

“Prohibited components

5.2 A building mechanical system must utilize the energy utility system for all the space heating and domestic hot water requirements for a designated building, and must not incorporate any heat production equipment including boilers, furnaces, hot water heaters or make-up air heaters, air-source or ground-source heat pumps, except that:

- (a) an owner who is constructing a new building or altering an existing building may, as part of the building mechanical system and for the purpose of supplementing the heat energy provided by the energy utility system, incorporate:
 - (i) a solar system to generate heat energy,
 - (ii) distributed water-to-air pump systems where the source of heat is the energy utility system or waste heat recovered inside the building,
 - (iii) water-source variable refrigerant flow systems (VRF) where the source of heat is the energy utility system or waste heat recovered inside the building,
 - (iv) electric resistance heating in stairwells and isolated below-grade bike lockers and storage rooms, and
 - (v) equipment to recover waste heat energy from the refrigeration or cooling system of the building; and
- (b) a person who is altering an existing building may retain components otherwise prohibited under this section 5.2 to the extent permitted by the Chief Building Official under the Building By-law or by the Chief Building Official and City Engineer under this By-law.

Design and technical requirements

5.3 The building mechanical system must comply with the following design and technical requirements:

- (a) the design must not incorporate features that increase the difficulty of efficiently integrating the building mechanical system and energy utility system;

- (b) the energy utility system must provide the heat energy requirements for all domestic hot water and space heating for the designated building supplied from the energy transfer station within the designated building;
- (c) the building mechanical system must achieve a minimum water temperature drop across the heat exchanger interface with the energy utility system to ensure the temperature drop between the energy utility system hot water supply and return pipes is at least 15°C as recorded at the meter;
- (d) the building space heating system must include a variable flow operation with variable speed pumps to minimize the pumping power requirements, and to achieve the minimum water temperature drop;
- (e) all building mechanical system control valves, being terminal units and zone valves, must be the 2-way modulating type or the on/off type for fan coil units;
- (f) the building mechanical system must not include 3-way valves that allow flow to by-pass the heating elements except for safety requirements; and
- (g) the building mechanical system must require a supply temperature of no greater than 50°C when the outdoor ambient temperature is greater than 0°C.

Installation of valves

5.4 The city is to install the isolation valves on the building side of the heat exchangers at the energy transfer station."

8. Council strikes 5.9 and replaces it with:

"No occupancy permit

5.9 An owner is not entitled to issuance of an occupancy permit under the Building By-law for a designated building until the City Engineer has given approval under section 5.7, and the owner has paid the city the connection levy under section 8.2 and any shortfall under section 5.8(a)."

9. Council strikes sections 7.6 to 7.12 and replaces them with the following section 7.6 to 7.15:

"Application for service

7.6 An owner must apply to the City Engineer in accordance with section 4 to commence service to a designated building by the earlier of:

- (a) six months prior to the date the owner requires service; and
- (b) the date of application for Building Permit.

Meter test

7.7 The City Engineer may test any meter at any time.

Application for meter test

7.8 An owner may apply to the City Engineer to test a meter at the energy transfer station upon payment of a fee in Schedule D.

Conduct of meter test

7.9 The City Engineer is to notify an owner referred to in section 7.8 of the date and time the meter test is to occur, and the owner is entitled to be present.

Results of meter test

7.10 If the City Engineer finds that a meter, upon testing, is inaccurate in its measurement of heat energy by more than 2%:

- (a) and the meter is over registering heat energy, the owner is entitled to return of the meter testing fee paid under section 7.8; and
- (b) the Collector is to estimate the resulting overpayment or shortfall in accordance with section 7.11 or 7.12.

Adjustment for inaccurate meter

7.11 If a test of under section 7.7 or section 7.8 demonstrates that a meter is inaccurate by more than 2% as the result of a malfunctioning, damaged or broken meter, the Collector must:

- (a) estimate actual heat consumption based on:
 - (i) the average previous heat energy consumption adjusted to take into account seasonal variations, changes in occupancy, or other factors which, in the opinion of the Collector, may affect the consumption of heat energy in the designated building, or
 - (ii) if there is no heat energy consumption history, median consumption rates for similar properties; and
- (b) issue a bill or refund for the estimated heat energy consumption for a period up to the 3 months from the date of the last bill before the test.

Adjustment for Tampering

7.12 If a test of under section 7.7 or section 7.8 demonstrates that a meter is inaccurate by more than 2% as the result of tampering, the Collector must:

- (a) estimate actual heat consumption based on:

- (i) the average previous heat energy consumption adjusted to take into account seasonal variations, changes in occupancy, or other factors which, in the opinion of the Collector, may affect the consumption of heat energy in the designated building, or
 - (ii) if there is no heat energy consumption history, median consumption rates for similar properties; and
- (b) issue a bill for:
 - (i) estimated heat energy consumption for the entire period of the tampering, as determined by the Collector, and
 - (ii) all costs incurred in estimating heat energy consumption and repairing the City's energy utility system.

Service calls

7.13 An owner may apply to the City Engineer to temporarily interrupt service to a designated building by closing the appropriate valves or by such other means as the City Engineer may find appropriate, and upon paying the appropriate fee set out in Schedule D.

Changes to energy transfer station or distribution system extension

7.14 An owner may apply to the City Engineer to remove, relocate, or alter the energy transfer station or distribution system extension servicing a designated building, and must pay the application fee set out in Schedule D.

Cost of changes to energy transfer station or distribution system extension

7.15 If the City Engineer agrees to remove, relocate, or alter the energy transfer station or distribution system extension referred to in section 7.14:

- (a) the City Engineer is to give the owner an estimate of the cost;
- (b) the owner must pay the city the amount of the estimate before commencement of the work;
- (c) after completion of the work, the City Engineer is to notify the owner of the actual cost;
- (d) if the actual cost is more than the estimated cost, the owner must pay the city the shortfall within 30 days after demand by the city; and
- (e) if the actual cost is less than the estimated cost, the city must pay the owner the excess except that if the owner owes the city money under this By-law at that time, the city may apply the excess against such debt."

10. Council strikes sections 8.1 to 8.4 and replaces them with:

“Imposition of capacity levy

8.1 From the date the owner requires service, as indicated in the application referred to in section 7.6(a), the owner must pay the city the levy set out in part 2 of Schedule C.

Imposition of a connection levy

8.2 Every owner shall pay to the City a connection levy including the fixed portion and variable portion accordance with Schedule “C” prior to issuance of the building permit.

Imposition of energy charge

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.

Billing for capacity levy or energy charge

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 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.”

11. Council strikes sections 8.9 to 8.11 and replaces them with:

“Variation in matters affecting levy

8.9 With respect to a designated building:

- (a) an owner may apply, no sooner than the end of the second February after full occupancy of the designated building to increase or reduce peak heat energy demand subscription as submitted under section 4.1(b) (i), (ii), and (iii), but may make no more than one such application every three years;
- (b) any approval under 8.9 (a) is subject to review and approval by the City Engineer to ensure that the energy utility system can accommodate the requested adjustment based on system capacity and the financial impact to the utility; and
- (c) the City Engineer may notify the owner that the City Engineer is varying the estimated peak heat energy demand; and, if the City Engineer is of the opinion that, as a result of any such variation, the amount of the levy

for the designated building should increase or decrease, the City Engineer may order such increase or decrease to take effect on a date specified by the City Engineer after taking into account the incremental costs to the city as a consequence of the variation.

Calculation of city's costs

8.10 Calculation of the costs or estimated costs the city incurs or expects to incur under this By-law is to include, without duplication, amounts spent by the city using its own work force or engaging an independent contractor for gross wages, employee fringe benefits, materials, equipment rentals at rates paid by the city or set by the city for its own equipment, and fees and other charges payable to an independent contractor, plus an amount equal to 20% of those costs to cover the city's overhead and administrative expenses."

12. 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.

13. Council strikes Schedule C and Schedule D of the By-law and replaces them with the Schedule C and Schedule D attached to this by-law.

14. This By-law is to come into force and take effect on January 1, 2019 except for section 8.2, which comes into effect on September 1, 2019.

ENACTED by Council this day of , 2018

Mayor

City Clerk

SCHEDULE C

LEVIES AND CHARGES

PART 1 – Connection levy

Fixed Portion	\$85,000
Variable Portion	\$100 per KW of the peak heat energy demand as approved under section 4.32

PART 2 – Monthly capacity levy

Class 1 - SEFC residential or mixed use residential building	\$0.568 per m ²
Class 2 - Residential or mixed use residential building located outside SEFC	\$8.542 per KW of peak heat energy demand
Class 3 - Non-residential building	\$8.542 per KW of peak heat energy demand

PART 3 – Monthly charge

Monthly charge	\$51.068 per MW per hour
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PART 4 – Credit

Credit for heat energy returned to energy transfer station	\$51.068 per each MW per hour multiplied by 50%
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SCHEDULE D

APPLICATION AND MISCELLANEOUS FEES

Section	Application	Fee
7.8	Application for meter test	\$200.00
7.13	Service call during city's normal business hours	\$50.00
7.13	Service call outside city's normal business hours	\$200.00
7.14	Application to remove, relocate, or alter energy transfer station or distribution system extension servicing	\$500.00
9.3	Cheque returned to the city	\$35.00

EXPLANATION

**A By-law to amend Energy Utility System By-law No. 9552
regarding fees**

Enactment of the attached By-law will implement Council's resolution of December xx, 2018 respecting new levies and charges, to be effective from January 1, 2019.

Director of Legal Services
, 2018

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.

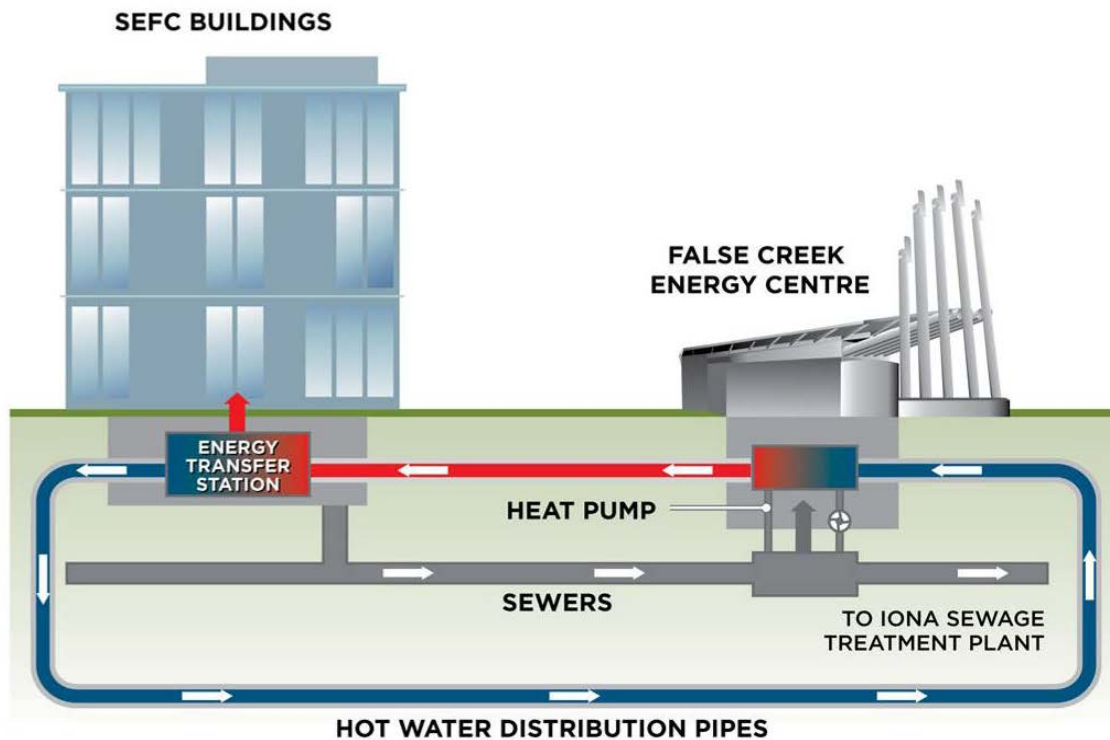
Metering is incorporated in the ETS's for energy measurement and billing purposes. Three of the ETS's also enable customer-generated solar thermal energy to be distributed to the wider neighbourhood.

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 (which use a blend of renewable and conventional natural gas). 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). In June 2012 this service area was expanded to also include the Great Northern Way Campus and Adjacent Lands in the False Creek Flats South area.

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.

Energy Utility System By-law

On November 15, 2007, Council enacted the Energy Utility System By-law No. 9552. On March 5, 2009, Council approved amendments to the By-law, including the establishment of 2009 rates and fees for the NEU.

In June 2012, Council approved the amendment to the By-law to expand the NEU service area to include the Great Northern Way Campus Lands and adjacent lands in the False Creek Flats South Area.

In April 2018, Council approved the amendment to the By-law to expand the NEU service area to include parts of Mount Pleasant, the False Creek Flats, and Northeast False Creek.

**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 customers:

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.

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APPENDIX D
LETTER FROM THE CITY OF VANCOUVER NEIGHBOURHOOD ENERGY
EXPERT PANEL, REGARDING 2019 PROPOSED NEU RATES

November 21, 2018

Mayor and Council
City of Vancouver
453 West 12th Ave.
Vancouver, B.C. V5Y 1V4

RE: False Creek Neighbourhood Energy Utility (SEFC NEU) 2019 Customer Rates

Dear Mayor Stewart and Councilors:

The purpose of this letter is to advise Council as to the opinion of the independent Neighbourhood Energy Expert Panel (Panel) on the rates proposed to be charged by the SEFC NEU to its customers for the 2019 calendar year.

The Panel met with City staff on October 25 and November 16, 2018 to review the operations of the utility for calendar 2018 in terms of its financial and environmental performance, customer growth, future expansion opportunities under consideration by City staff, as well as to consider proposed customer rates for 2019. The Panel has also reviewed a draft Administrative Report to Council (draft Report).

The Panel's mandate is to provide independent expert advice on SEFC NEU's rates and rate structures, taking into consideration established rate-setting principles and viewed in the context of certain parameters or targets specific to SEFC NEU's operations, known as "key performance indicators" (KPIs). The Panel has also considered the recent change in the SEFC NEU business strategy to one involving a significant and fairly rapid expansion of the utility in terms of build-out and customer base. This general expansion policy, endorsed by Council in February of 2018, is subject to future Council approvals of funding for proposed major capital additions, over time.

Based on the information provided in the draft Report and discussions with City staff, and subject to Council's approval of an increase to the target KPI for the "Maximum Balance of Under-Recovered Costs" deferral account to at least \$12.5 M, the Panel supports the proposed rates for 2019.

The rates proposed for 2019 reflect a total rate increase of 3.2% above 2018 rates for all customer classes. These rate increases include a 1.2% Rate Escalation Factor as well as an inflationary adjustment of 2%. These increases are consistent with those approved for 2017 and 2018. As in those prior years, the rate increases will be split between the fixed and variable rate components with a greater allocation to the variable component to continue to improve the conservation price signal. The Panel agrees with staff's proposed allocation.

The Panel also endorses the new, proposed One-Time Connection Levy to be charged to developers as a contribution to capital, based on the requested peak energy demand for a new building. The Panel is of the view that, given the utility's expansion strategy, this levy is a suitable and timely evolution of the rate design and represents a sensible approach to managing the potential risk of constructing excess capacity. The Panel also concurs with the approach taken by City staff to gain the concurrence of the development community in advance of seeking this new levy.

Under the levelized cost approach, which is common to utility rate-setting, rates are designed to under-recover costs in the early growth years of utility operations and over-recover in later years, when the utility is mature and the customer base is larger and established. In this way, rates are more stable and predictable and early customers are not as burdened with more than their fair share of the significant up-front costs of building and operating a young utility with only a small customer base.

The additional 1.2% Rate Escalation Factor noted above allows SEFC NEU to recover additional costs beyond inflation in the early years when it is under-recovering its costs, to ensure that it is able to stay within its target key performance indicators for recovery of its total revenue requirements (i.e. all costs plus a return on investment) over a reasonable time frame. In this regard, the current plans for expansion necessarily increase the up front capital costs to be incurred in advance of the utility being able to supply additional customers, affecting several KPIs. In particular, the time frame for the KPI relating to the "early years" of under-recovery is extended, the deferral account balance of under-recovered costs is increased and the timeline for total cost recovery is lengthened. Specifically, the KPI related to the time period for under-recovery of costs is extended by 2 years from the most recent forecast, from 18 to 20 years, but remains within the KPI parameter of 25 years. As well, the timeline for recovery of all costs is lengthened by 4 years, to 2023 but remains within the original target KPI of 2035. However, and as noted above, the KPI parameter for the Maximum Balance of Under-Recovered Costs deferral account of \$9 M. will be exceeded by 2020, and will need to be increased as a consequence. Staff expects the peak balance in the deferral account, now forecast at \$12.5 M., to be reached in 2023. Therefore, this KPI will need to be amended in order for the proposed rates to continue to allow the utility to remain within the parameters represented by its KPIs.

The Panel has reviewed the information provided as to rates charged by other potential providers of thermal heat as well as rates charged by other, similar district energy systems. The Panel finds that the rates proposed by SEFC NEU are not inconsistent with those charged by other district energy systems and remain below BC Hydro rates, which continue to represent a useful comparator, at this point in time.

In summary, the Panel finds that the proposed rate increase of 3.2%, including inflation, represents a reasonable increase and that the proposed rates themselves are also reasonable, stable and predictable, and relate favourably to rates charged by other providers of thermal heat. As noted above, the Panel's endorsement of the proposed rates is conditional upon an increase in the KPI for the Maximum Balance of Under-Recovered Costs.

The Panel would like to take this opportunity to thank City staff for its thorough preparation, cooperation and assistance during the review process.

Yours truly,



Alison Rhodes,
Chair, SEFC NEU Expert Panel