



REPORT

Report Date: November 9, 2021
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Meeting Date: December 1, 2021
[Submit comments to Council](#)

TO: Vancouver City Council
FROM: General Manager of Engineering Services
SUBJECT: 2022 False Creek Neighbourhood Energy Utility (“NEU”) 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 2022 customer rates and fees, with a 3.2% increase over 2021 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. the initial connection levy, with a 5% increase over 2021 rates to provide for cost escalation to deliver an Energy Transfer Station at the building level; and
 - iii. miscellaneous amendments to clarify billing practices and allow for further conditions related to energy transfer stations.
- 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.

REPORT SUMMARY

This report seeks Council approval of the recommended 2022 Neighbourhood Energy Utility (“NEU”) customer rates, which incorporate a 3.2% net increase over 2021. 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 ~\$33 per year (from \$991 to \$1,024 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.

Staff also seek Council approval for a 5% increase in the Initial Connection Levy. This is to reflect significant market price cost increases, in the order of 15%, experienced in 2021 to deliver an Energy Transfer Station at the building level. Staff has verified with municipal partners and other district energy providers that this increase is industry wide, and the assumption is that the increases are linked to COVID-19 and supply chain pressures.

The report also proposes By-law amendments that clarify billing practices and allow for new conditions related to the location of energy transfer stations.

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).

In December 2018, Council approved updated KPIs to accommodate the NEU service area expansion. Council also approved the addition of an Initial Connection Levy for new buildings connecting to the system. Similar to connection fees used for water and sewer utilities, this levy recovers the cost of connecting new buildings to the NEU distribution network.

In November 2020, Council approved the Climate Emergency Action Plan. This plan included adoption of a target to convert the NEU to 100% renewable energy by 2030, subject to evaluation and competitiveness with other low carbon energy options for buildings. By 2023, staff will make recommendations to Council on a roadmap to convert the City-owned NEU to 100% renewable energy for all connected buildings by or before 2030.

CITY MANAGER’S COMMENTS

The City Manager supports the above recommendations.

REPORT

Background/Context

The NEU provides low carbon thermal energy (heat and hot water) to buildings in the False Creek area of the City. NEU Customer Rates are set via a commercial utility model and are reviewed annually. Key performance indicators (“KPIs”) and targets, adopted by Council, guide rate setting for the NEU under the commercial utility rate model.

The NEU currently targets producing 70% of its energy from renewable sources, such as sewage waste heat and renewable natural gas (RNG). This results in substantial GHG emission reductions compared to traditional methods of providing heat and hot water to buildings. While non-NEU approaches to achieve low-carbon building outcomes do not require any direct City investment, the NEU offers the following unique benefits:

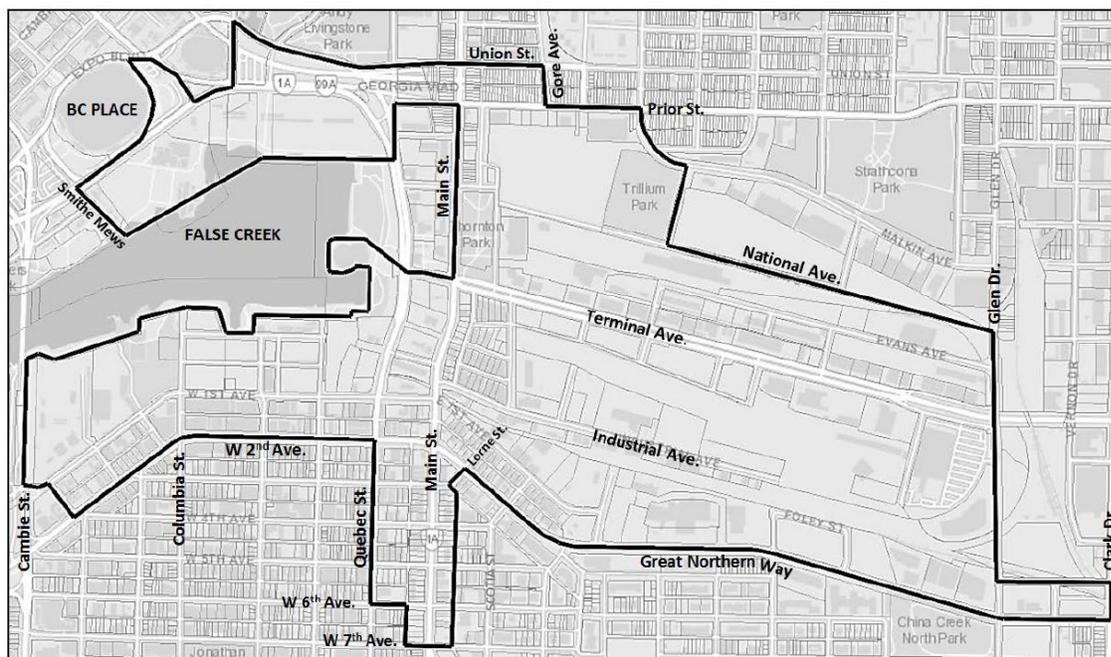
- it provides the City with direct long-term control to secure the 100% renewable energy target for connected buildings;
- it increases the local supply of renewable energy and reduces reliance on new renewable energy from more remote locations;
- it provides long-term flexibility to adapt to new low-carbon technologies; and
- it provides a cost-effective opportunity to retrofit existing gas-heated buildings with renewable energy.

The NEU began operation in January 2010. The NEU services 43 residential, commercial and institutional customers, which equates to 603,000 square metres (6,491,000 square feet) of floor area. In accordance with the 2018 NEU expansion plan, over time, the NEU will continue to expand to serve new developments in Southeast False Creek, Mount Pleasant, the False Creek Flats and Northeast False Creek (See Figure 1). The total build-out is currently forecast at 2,050,000 square metres (22,100,000 square feet) of floor area – approximately 3.4 times greater than projected in the original business case.

As part of the City’s Climate Emergency Action Plan, staff have been tasked with evaluating options to transition the NEU’s energy supply from its current target of 70% to a new target of 100% renewable energy sources by 2030. A Roadmap to 100% renewable energy will be presented to Council in 2023. Note that all forecast costs and rate assumptions provided in this report are based on the current target of 70% renewable energy.

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

FIGURE 1. MAP OF NEU SERVICE AREA



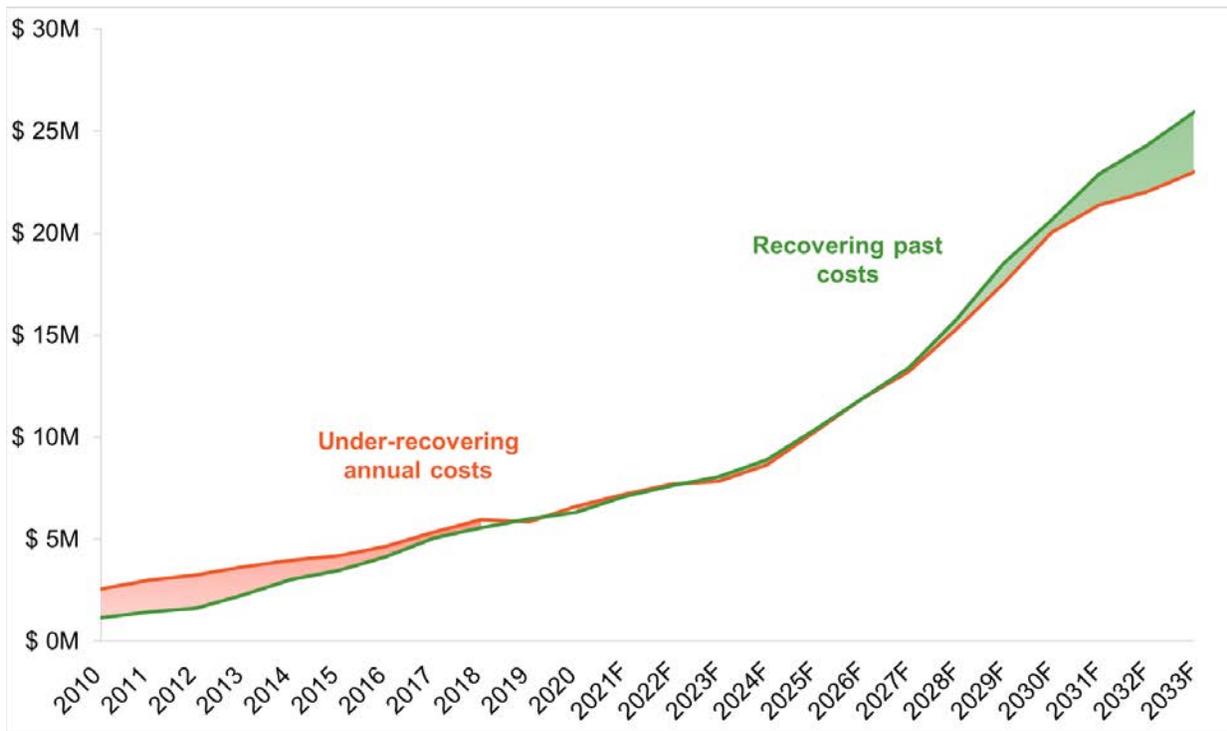
Levelized Rate Structure

To provide competitive and stable rates for the NEU customers, rates are established based on a levelized rate approach. NEU customer rates are comprised of two components:

- i. A Fixed Capacity Levy (related to the fixed capital and operating costs associated with the NEU); and
- ii. A Variable Energy Use Charge (related to customers' actual energy consumption).

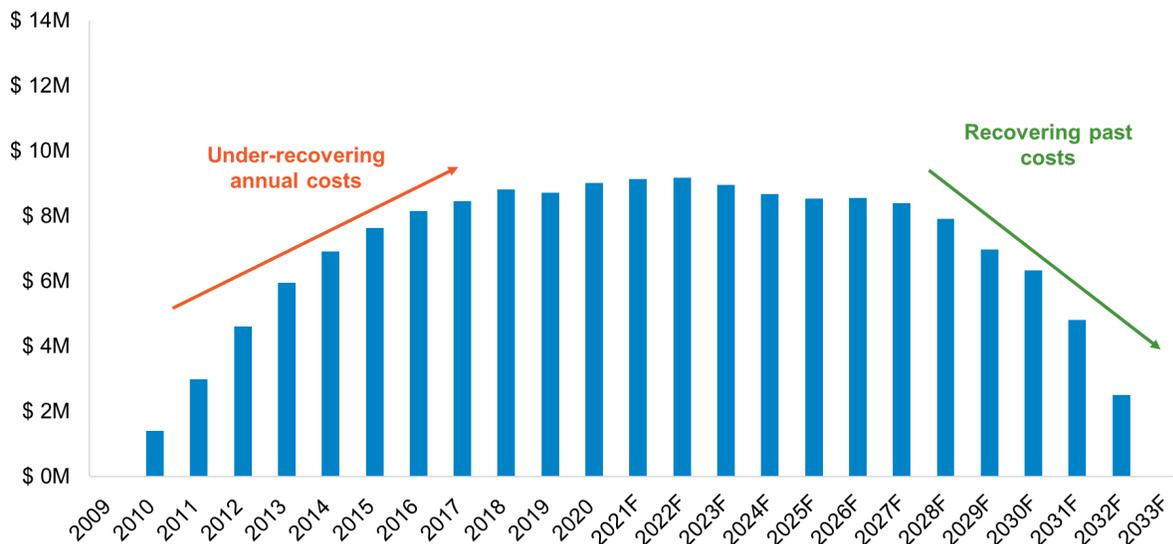
To ensure fair and appropriate rates, an independent Expert Panel reviews all annual rate changes. As illustrated in Figure 2 below, rates are set to under-recover annual costs in the early years of the NEU's operation when the customer base is small, and to gradually recover past costs and a modest 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 above inflation, to ensure all of the system costs under the NEU’s commercial utility model are met over the long-term. Using this approach enables the NEU to maintain rates that are competitive and predictable.

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



Strategic Analysis

The NEU recovers its costs using three different rate classes:

- i. Residential and Mixed Use Residential Buildings within the Southeast False Creek (“SEFC”) Official Development Plan area;
- ii. Residential and Mixed Use Residential buildings outside of SEFC; and
- iii. 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 2021 rates, as shown in Table 1. Consistent with Council policy to improve the energy conservation price signal, staff recommend 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 the system’s long-term inflation forecast of 2%. This 1.2% above inflation value is the Rate Escalation Factor, which enables the NEU to maintain rates that are predictable 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 ~\$33 per year (from \$991 to \$1,024 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 2021 AND RECOMMENDED 2022 CUSTOMER RATES¹

	2021	2022 PROPOSED	% CHANGE
<u>Class 1 (Residential and Mixed Use Residential within SEFC)</u>			
Fixed Capacity Levy	\$0.598 per m ² per month	\$0.613 per m² per month	2.6%
Variable Energy Use Charge	\$55.236 per MW.hr	\$57.446 per MW.hr	4.0%
Net Effective Rate²	\$120.8 per MW.hr	\$124.6 per MW.hr	3.2%
<u>Class 2 (Residential and Mixed Use Residential Outside SEFC) and Class 3 (Non-Residential)</u>			
Fixed Capacity Levy	\$8.992 per KW peak demand per month	\$9.225 per KW peak demand per month	2.6%
Variable Energy Use Charge	\$55.236 per MW.hr	\$57.446 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% 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 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 in 2010, provides objective expert advice to ensure that the rate structure, annual rates and any new rate policy for the NEU are consistent with Council’s approved rate setting principles. The Expert Panel operates under Terms of Reference (updated and approved by Council April 2, 2019). In their annual letter to Council, as attached in Appendix D, the Panel has endorsed the 2022 rate increase of 3.2%.

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 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. One KPI (maximum balance of under-recovered costs) was updated in December 2018 to accommodate NEU expansion areas approved by Council in February 2018.

There were two main changes in 2021 that impacted the NEU financials and the associated KPIs:

1. Updates to Carbon Tax assumptions: Updates were made to the NEU’s financial model to align with the Federal carbon tax plan announced in December 2020. The pricing of both Natural Gas and RNG will increase because of this carbon tax increase, which increases energy expenditures for the NEU.
2. Updates to development forecasts: Delays in development timelines, in the order of 2-3 years, are expected. These development delays are assumed to be COVID-related. Delays in development timelines results in delays in building connections, and thus delays in energy revenue for the NEU.

Table 2 below compares the KPIs associated with the levelized rate approach under the original forecast included in the 2010 rate report, the forecast in 2018 after the expansion plan, the last forecast, and the current forecast. The NEU remains on target for all KPIs.

TABLE 2: NEU KPIs

	Original Forecast Feb '09²	Forecast Nov'18^{3,4}	Last Forecast Nov '21⁴	Current Forecast⁴
Maximum Balance of Under-Recovered Costs <i>Target: not to exceed \$15.0 M</i>	\$ 7.3 M	\$12.5 M	\$ 9.9 M	\$ 9.1 M
Recovery Timeline for Under-Recovered Costs <i>Target: not to exceed 25 years</i>	22 years (2031)	20 years (2029)	20 years (2029)	24 years (2033)
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 2023	3.2% thru 2022	3.2% thru 2022

Notes to table

1. Includes mid-term average inflation of 2%
2. Original forecast maintained escalated rate increase over entire timeline, until 2035
3. Forecast from NEU 2019 Customer Rates (RTS 12728) following February 2018 expansion plan
4. Includes expansion areas added in February 2018 that were not factored into original forecast

Actual vs. Budgeted 2021 Costs and Revenues

Table 3 compares 2021 revenues and expenses as forecast at the end of August for the 2021 Operating and Capital Budgets under the commercial utility model. The main causes for the difference between 2021 budget and the 2021 actuals projected to year-end are as follows:

1. *Energy Use Charges*: These revenues are 8% under budget due to lower than expected energy demand in the late winter and early spring. Temperatures at this time were significantly higher than normal.
2. *Lower than Anticipated Capital Costs*: The sewage heat recovery project was delayed due to global supply issues and manufacturing delays relating to the heat pump.
3. *Flood Expenses and Related Recoveries*: Work related to the October 28, 2019 flooding event at the False Creek Energy Centre is substantially complete. Insurance contributions are estimated at 90% of expenses.

In all, the NEU is forecasted to have an operating shortfall of \$0.1M, \$0.4M lower than budgeted.

TABLE 3. 2021 NEU REVENUES AND EXPENSES, BUDGET COMPARED TO YEAR-END FORECAST BASED ON THE COMMERCIAL UTILITY RATE MODEL (\$ MILLIONS)

	2021 Budget	2021 Forecast	\$ Variance	% Variance	2022 Proposed
Revenues and Recoveries					
Capacity Levies	\$ 4.1	\$ 4.1	\$ 0.0		\$ 4.4
Energy Use Charges	3.2	2.9	(0.2)		3.2
Pump Station Recoveries	0.0	0.0	0.0		0.0
Total Revenues	\$ 7.3	\$ 7.1	\$ (0.2)	-3%	\$ 7.6
Insurance Proceeds	-	0.1	0.1		
Total Revenues	\$ 7.3	\$ 7.2	\$ (0.1)	-1%	\$ 7.6
Operating Expenses					
Natural Gas & Electricity ¹	\$ 2.6	\$ 2.5	\$ (0.2)		\$ 2.4
Staff, Maintenance, Overhead & Other ²	1.4	1.3	(0.1)		1.4
Total Non Flood-Related	\$ 4.0	\$ 3.8	\$ (0.2)	-6%	\$ 3.8
Flood-Related	-	0.2	0.2		-
Total Operating Expenses	\$ 4.0	\$ 4.0	\$ (0.1)	-2%	\$ 3.8
Financing Expenses²					
Interest Expense	\$ 1.0	\$ 0.9	\$ (0.1)		\$ 1.0
Return on Equity	1.6	1.4	(0.2)		1.6
Depreciation	1.2	1.1	(0.1)		1.3
Total Financing Expense	\$ 3.8	\$ 3.4	\$ (0.4)	-11%	\$ 3.9
Total Expenses	\$ 7.8	\$ 7.3	\$ (0.5)	-6%	\$ 7.7
Operating Shortfall	\$ 0.5	\$ 0.1	\$ (0.4)	-80%	0.1
System Expansion Costs	\$ 11.7	\$ 7.0	\$ (4.7)	-40%	\$ 13.4

¹ Other than flood-related

² Reflects costs under the commercial utility model

Table may not sum due to rounding.

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." When the NEU started operation in 2010, a target was set to limit its rates to no greater than a 10% premium above the BC Hydro rate.

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 2022 effective rate for the NEU is \$125 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 proposed 2022 NEU rate is 5% higher than the forecast 2022 BC Hydro effective rate. The NEU effective rate continues to be within the target maximum 10% premium over BC Hydro.

TABLE 4. COMPARISON OF 2022 EFFECTIVE RATES, NEU WITH OTHER PROVIDERS

Energy Provider	GHG Emission Intensity (kg CO ₂ /MW.h)	Estimated Effective Rate ¹ (\$/MW.h)	Notes
NEU (Hot Water)	70	\$125	The NEU bills strata corporations, not individual suites; any incremental strata sub-metering costs incurred by NEU consumers are not included here.
BC Hydro ² (Electricity)	24	\$119	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 basic charge.
FortisBC ³ (Natural Gas)	220	\$100	Fuel costs, based on FortisBC Lower Mainland Rate 3, with high efficiency boiler and factoring in conversion losses = \$50 per MW.h. Installation and replacement of boiler equipment plus maintenance = \$50 per MW.h. Total effective cost = \$100 per MW.h
Creative Energy Ltd. (Steam)	268	\$70 ⁴	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 DES (Hot Water)	220	\$113 ⁵	UBC Neighbourhood DES operations began in 2015, using temporary natural gas boilers, and plans to use waste heat from the Triumf particle accelerator facility once the customer base is sufficiently established.
SFU UniverCity Energy (Hot Water)	44	\$154 ⁵	SFU UniverCity Energy operations began 2012, using temporary natural gas boilers. This commissioned a biomass facility for low carbon energy supply in late 2021
River District Energy (Hot Water)	220	\$108	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	\$107	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.
Surrey City Energy (Hot Water)	132	\$120	Surrey City Energy operations began in 2015, using temporary natural gas boilers and plans to use Sewer Heat Recovery once customer base is sufficiently established. The system is currently achieving emission reductions with the use of RNG.
PCI Marine Gateway (Heating & Cooling)	58	\$128 ⁵	The PCI Marine Gateway development utilizes a geo-exchange heating and cooling system provided by FortisBC Alternative Energy Services.

NOTES TO TABLE

1. 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. Effective rate estimates may be based on proposed 2022 rates that are pending regulatory or Council approvals and are thereby subject to change.
2. 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% of the building heat demand.

3. FortisBC rates (and rates of other providers listed that rely on natural gas supply) are largely dependent on the commodity cost of natural gas and are subject to 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. While Fortis conventional natural gas rates are listed in the table, note that under the current Green Buildings Policy for Re-zonings and recent updates to Vancouver’s Building Bylaw, a typical building connecting to the NEU has a GHG intensity performance limit that effectively requires the use of electricity or a low carbon energy system to supply space heating.
4. Effective rate provided by Creative Energy accounts for losses upstream of the steam meter (entry point into the building), but does not account for the efficiency of the building side systems and equipment.
5. 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

In December 2018, Council approved the adoption of an Initial Connection Levy to recover the cost of connecting new buildings to the NEU. 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. 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. The Initial Connection Levy helps to distribute this cost savings between the building developer and the end-user, who ultimately pays for NEU infrastructure costs via NEU rates.

The Initial Connection Levy introduced in December 2018, and became effective for any new NEU customers who submit a building permit or NEU connection application after September 1, 2019. In 2020 and 2021 rate setting process, Council approved an inflationary increase of 2% to the Initial Connection Levy.

In 2021, the NEU experienced a significant increase of 15% in the cost to deliver an Energy Transfer Station. Staff has verified with municipal partners and other district energy providers that this increase is industry wide, and the assumption is the increases are linked to COVID-19 and supply chain pressures.

For 2022, staff recommend that the Initial Connection Levy be increased by 5%. Staff will continue to monitor ETS costs, and determine if the increase is temporary (COVID related) or permanent in nature.

TABLE 5. NEU CONNECTION LEVY STRUCTURE

COMPONENT	2021 Rates	Proposed 2022 Rates	RATIONALE
Fixed Portion	\$88,434	\$92,856	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	\$104/kW of peak energy demand required for a building	\$109/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

COVID-19 Customer Response

In response to the COVID-19 crisis and the state of emergency declared by the Province, the NEU put temporary measures in place to support customers. The duration of these temporary support measures was tied to the provincial state of emergency. After the provincial state of emergency was lifted on July 1, 2021, the support measures were removed.

ENVIRONMENTAL PERFORMANCE UPDATE

This section provides an update on the environmental performance of the NEU. The NEU currently targets to produce 70% of its energy from renewable sources, such as sewage waste heat and RNG. In 2018, the NEU entered a supply agreement with FortisBC for the supply of RNG; however, this supply was curtailed in 2019 and 2020. Fortis announced an end to the curtailment in 2021 and is forecasting full delivery of the expected volumes of RNG to the NEU this year.

In 2020, the NEU successfully implemented its first application of heat recovery from a building and this successful pilot continued in 2021 in which the NEU is forecasting to recover 700 MW.h of energy, which accounts for 1% of total energy.

In 2021, the NEU is projecting to achieve 69% renewable energy.

Implications/Related Issues/Risk

Financial

The information presented in this report assumes that the NEU will continue to implement the approved 2018 expansion plan. To support the NEU expansion plan, capital investments will be required. Capital cost ranges are estimated based on base/high/low scenario assumptions. To support the NEU expansion plan to year 2038, capital investments in the distribution system will be required in the range of \$40 to \$50 million (2019\$); however, an estimated \$12 million is expected to be recovered from developers through the initial connection levy. New energy generation requires a capital investment in the range of \$45 to \$70 million (2019\$), bringing the total for expansion to \$85 to \$120 million (2019\$). \$20 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.

The City's future investment will be determined through the approved 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.

Environmental Performance

Since 2018, two events resulted in a significant temporary reduction in NEU environmental performance:

1. On October 28, 2018, flooding triggered by a 1-in-25-year rainfall event caused a prolonged outage of the sewage heat recovery system at the False Creek Energy Centre. Although this event did not disrupt service to customers, it did cause the NEU's forecast renewable energy supply to drop to 33%. The sewage heat recovery system was repaired in Q1 2020 and has been fully operational in 2021.
2. On August 1, 2019, the City received notice from FortisBC that the supply of RNG would be halted for the remainder of the year because of production shortages. RNG supply in 2020 will be limited to 40% of the volume of the supply agreement. Fortis announced an end to the curtailment in 2021 and is forecasting full deliver of the expected volumes of RNG to the NEU this year.

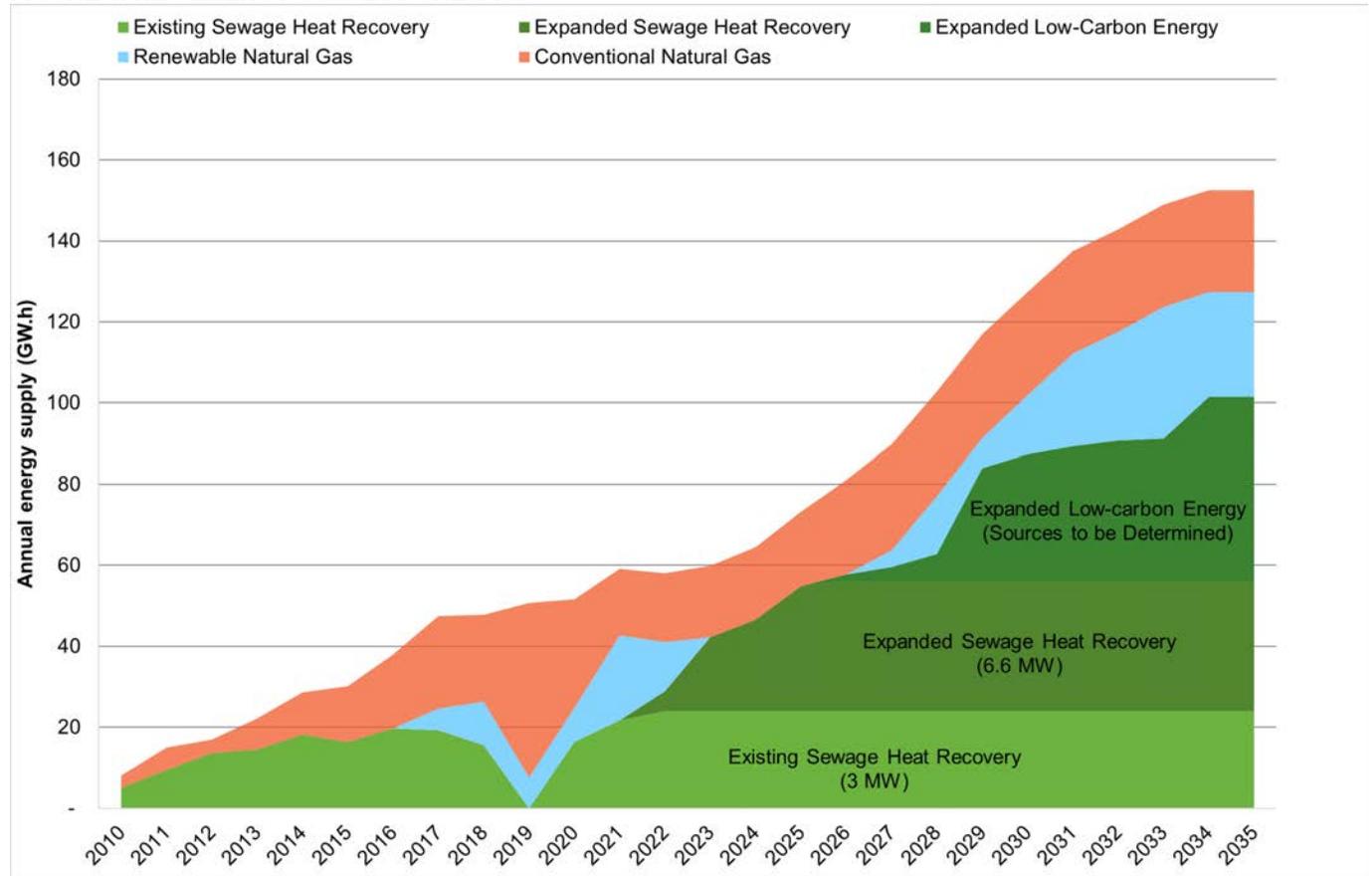
In 2021, the NEU is projected to achieve 69% renewable energy.

The NEU has a growing customer base and energy demand. At the time of build-out of the customer base, the NEU is forecast to provide low carbon heating and hot water to approximately 2,050,000 square metres (22,100,000 square feet) of floor area of mixed use floor area. Figure 4 below illustrates the forecast sources of energy supplied to meet customer loads and the projected annual renewable energy performance.

Projects/initiatives underway to maintain environmental performance of 70% renewable energy while meeting increased customer loads include:

- Expansion of the sewage heat recovery system: This project will add 6.6MW of renewable capacity and is targeted to be online in Q4 2022. This project secured up to \$10.2 million in grant funding and is now at Detailed Engineering stage. This expansion will enable the NEU to achieve its long-term GHG performance targets while reducing dependence on RNG.
- Long-term RNG agreement: Fortis has removed the RNG curtailment in place since August 2019. In addition, the Vancouver Landfill gas project is expected to be online in 2023-24 and the City will have first right of refusal for those RNG quantities.
- Private sector renewable energy capacity: The NEU is currently procuring an Energy Purchase Agreement for low carbon energy in Northeast False Creek, targeting supply in 2025.

FIGURE 4: NEU ENERGY SUPPLY FORECAST



The NEU's GHG reduction forecast for 2021 is 6,300t CO₂, compared to a 2007 baseline. Beyond the greenhouse gas emissions benefits, the NEU also provides environmental co-benefits:

- the economies of scale associated with NEU allow the utility to tap into local renewable heat sources that would otherwise not be available to an individual building, such as waste heat recovery from sewage, commercial cooling, and data centres;
- the NEU offers a platform for the recovery of waste heat from customer buildings, providing an opportunity for customers to earn a modest revenue stream by selling their waste heat into the NEU system while allowing the waste heat to be reused locally by the neighbourhood;
- the recovery of waste heat from building air conditioning systems also provides an opportunity to reduce potable water consumption compared to conventional evaporative cooling systems (e.g. the recovery of waste heat from a commercial building will reduce potable water consumption by approximately 1 million litres annually);
- 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; and

- with continued urban growth and the electrification of buildings and transportation, the provision of thermal energy through the NEU reduces future burden on the electrical grid and contributes to the resiliency of our broader energy systems.

CONCLUSION

This report recommends that NEU rates be increased by 3.2% in 2022. 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 rate increase has been endorsed by the Neighbourhood Energy Expert Panel, which provides the City with independent, expert advice on NEU rate setting. 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 a 5% increase to the initial connection levy to provide for significant cost escalation to deliver an Energy Transfer Station at the building level, observed across the district energy sector in 2021.

In 2021, the NEU is forecast to achieve 69% renewable energy. The NEU’s GHG reduction forecast for 2021 is 6,300t CO₂, compared to a 2007 baseline.

The NEU continues to be an important contributor to the City’s work in achieving Climate Emergency and Greenest City goals of transitioning Vancouver’s buildings to zero emissions and securing a 100% renewable energy future.

* * * * *

**“SCHEDULE C
LEVIES AND CHARGES**

PART 1 – Connection levy

Fixed Portion per Energy Transfer Station	\$92,856
Variable Portion per Energy Transfer Station	\$109 per KW of the peak heat energy demand as approved under section 4.3

PART 2 – Monthly capacity levy

Class 1 - SEFC residential or mixed use residential building	\$0.613 per m ²
Class 2 - Residential or mixed use residential building located outside SEFC	\$9.225 per KW of peak heat energy demand
Class 3 - Non-residential building	\$9.225 per KW of peak heat energy demand

PART 3 – Monthly charge

Monthly charge	\$57.446 per MW per hour
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PART 4 – Credit

Credit for heat energy returned to energy transfer station	\$57.446 per each MW per hour multiplied by 50%
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Bills are to be issued monthly and should be sent out within 60 days of the end of the billing period.

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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.

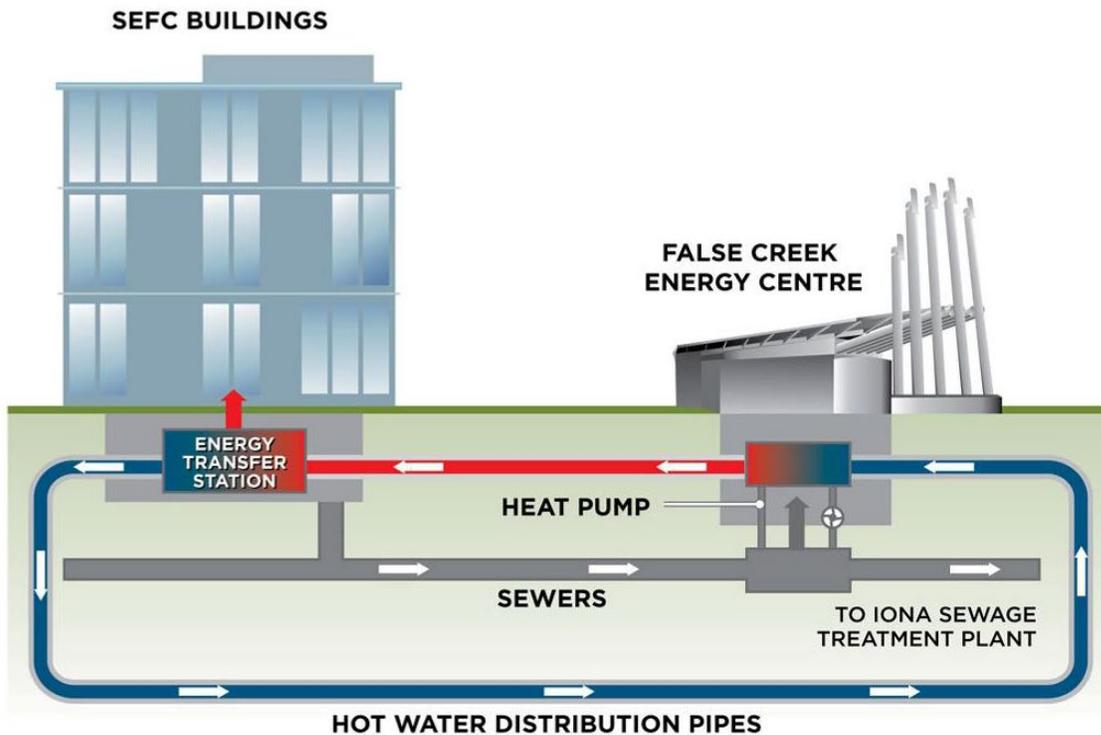
Metering is incorporated in the ETS's for energy measurement and billing purposes. Three of the ETS's also enable customer-generated solar thermal energy to be distributed to the wider neighbourhood.

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.

* * * * *

November 02, 2021

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

RE: False Creek Neighbourhood Energy Utility ("NEU") 2022 Customer Rates

Dear Mayor Stewart and Councilors:

The purpose of this letter is to advise City Council as to the opinion of the independent Neighbourhood Energy Utility Expert Panel ("NEU Expert Panel, Panel") on the rates proposed to be charged by the NEU to its customers for the 2022 calendar year.

The Panel met with City staff by way of Webex teleconferences on October 13, 2021 and October 26, 2021. The meetings were held in order for the Panel to review the operations of the NEU over the past year, in terms of its financial performance, environmental goals, customer growth and future expansion plans, as well as proposed rates for 2022, with City staff. The Panel has also reviewed a draft Administrative Report to Council respecting the proposed customer rates for 2022.

As noted in prior years, the Panel's mandate is to provide independent expert advice on the rates and rate structures proposed for the NEU, taking into consideration established rate-setting principles and viewed in the context of certain parameters or targets, specific to the NEU, known as "key performance indicators" ("KPIs"). These KPIs are intended to ensure that the NEU can remain viable, in terms of total cost recovery, and recover its costs over a reasonable timeline.

Based on the information provided in the draft Administrative Report to Council and discussions with City staff, the Panel endorses the proposed 3.2% increase to customer rates, allocated to the fixed and variable rate components as proposed by City staff.

As discussed in the draft Report, the rates proposed for 2022 include an inflationary increase of 2% as well as an escalation factor of 1.2% above 2021 rates for all customer classes, and an increase to the Initial Connection Levy of 5%. The intent of the escalation factor is to allow the NEU to collect extra monies, beyond inflationary increases, in the early years, to enable it to recover its operating costs and its capital investment over the life of the utility, without putting unfair cost pressure on early users, when the customer base is smaller.

The Panel is of the view that there is some uncertainty concerning the true current rate of inflation in Canada and whether it is “transitory” in nature. This is apparent from the 15% increase in Energy Transfer Station costs experienced by the NEU and other utilities in 2021, resulting in the requested increase of 5% to the Initial Connection Levy. The Panel is satisfied that the 2% inflation rate which is used in the NEU’s financial model remains consistent with the long term inflationary goal of the Bank of Canada at present, and can be reviewed in the future, if necessary.

The Panel approves the proposed 5% increase to the Initial Connection Levy, as it will serve to reduce the risk associated with the increased Energy Transfer Station costs.

As noted in the draft Report, the NEU uses a “levelized cost approach”, which is common in utility rate-setting. Under this approach, as noted above, rates are designed to under-recover costs in the early years of operation, when the customer base is small, and over-recover in later years, when it is larger, so that all costs are recovered over a reasonable length of time. The KPIs for the NEU are designed to keep the utility on track to recover its total costs over a 25 year time frame, while charging rates which remain fair and reasonable, and not subject to undue variation from year to year.

The Panel notes that the proposed 2022 rates will allow the NEU to continue to operate within the boundaries set by its KPIs. In particular, the Maximum Balance of Under-Recovered Costs is now forecast to reach \$9.1 Million, well within the target balance of \$15.0 Million, while the Timeline for Recovery of Under-Recovered Costs is 24 years, which is just slightly under the maximum of 25 years. These KPIs continue to be achieved using rate increases of 3.2% (as discussed above) through 2022. After 2022, annual revenues are forecast to exceed annual costs, such that the escalation factor will no longer be required, and can therefore be eliminated.

From the Panel’s review of the material provided and discussions with staff it is apparent that the potential expansion of the area served by the NEU and related generation capacity has created considerable uncertainty in terms of timing and future costs. These issues affect future rates, cost recovery and the KPIs. As noted above, the KPI for the timeline for recovery of unrecovered costs is nearing its boundary. The Panel notes that a comprehensive review, which was originally intended to be conducted every five years, has been delayed, in large measure due to the pandemic and its effect on City staff’s work plan as well as the uncertainty surrounding the expansion and related generation source. The Panel believes that a comprehensive review of rates and rate design in the coming year would be beneficial.

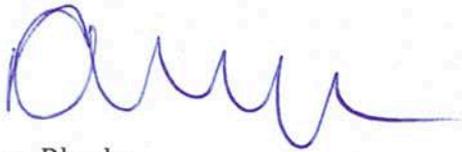
The Panel has also reviewed the information provided concerning the rates charged by other neighbourhood energy systems in the Lower Mainland, as well as those charged by FortisBC and BC Hydro. The Panel finds that the NEU’s proposed rates for 2022 are not inconsistent with those charged by other comparable utilities, and

remain within the target maximum 10% premium over those charged by BC Hydro, which continue to offer a useful comparison.

In summary, the Panel finds that the proposed rate increases of 3.2% across all customer classes, allocated as recommended by staff, together with the 5% increase in the Initial Connection Levy are reasonable. The Panel also finds that the rates themselves remain reasonable, stable and predictable, and compare favourably with those charged by other, similar neighbourhood energy systems.

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

Yours very truly,



Alison Rhodes
Chair, NEU Expert Panel