



City of Richmond

Report to Committee

To: Public Works and Transportation Committee **Date:** September 25, 2017
From: John Irving, P.Eng. MPA **File:** 10-6600-10-02/2017-
 Director, Engineering Vol 01
Re: **Alexandra District Energy Utility Bylaw No. 8641, Amendment Bylaw No. 9777**

Staff Recommendation

1. That the staff recommendation to amend the Alexandra District Energy Utility rate for services as presented in Option 2 of the report titled "Alexandra District Energy Utility Bylaw No. 8641, Amendment Bylaw No. 9777" be endorsed; and
2. That the Alexandra District Energy Utility Bylaw No. 8641, Amendment Bylaw No. 9777 be introduced and given first, second and third readings.

John Irving, P.Eng. MPA
 Director, Engineering
 (604-276-4140)

Att. 4

| REPORT CONCURRENCE | | |
|--|--|---------------------------------------|
| ROUTED TO: | CONCURRENCE | CONCURRENCE OF GENERAL MANAGER |
| Finance Department Law | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | |
| REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE | INITIALS: CS | APPROVED BY CAO |

Staff Report

Origin

In 2010, Council adopted the Alexandra District Energy Utility Bylaw No. 8641 establishing the rate for the delivery of energy for space heating, cooling and domestic hot water heating within the Alexandra District Energy Utility (ADEU) service area.

The purpose of this report is to recommend 2018 ADEU service rates.

This report supports Council's 2014-2018 Term Goal #4 Leadership in Sustainability:

Continue advancement of the City's sustainability framework and initiatives to improve the short and long term livability of our City, and that maintain Richmond's position as a leader in sustainable programs, practices and innovations.

4.1. Continued implementation of the sustainability framework.

4.2. Innovative projects and initiatives to advance sustainability.

Background

ADEU has been operating since 2012 as a sustainable energy system which provides a centralized energy source for heating, cooling and domestic hot water heating for residential and commercial customers located in the Alexandra/West Cambie neighbourhood. ADEU assists in meeting the community-wide greenhouse gas emission reduction targets adopted as part of Richmond's Sustainability Framework by providing buildings with renewable low carbon energy through geo-exchange technology.

Since 2012, the West Cambie neighbourhood has seen rapid redevelopment. ADEU has also been growing to meet this increased energy demand, most recently cumulating in the completion of the construction and commissioning of the Phase 4 expansion at the end of 2016. This expansion included the construction of a new satellite energy plant designed primarily to meet the energy demands of the ADEU's first commercial customers. Using efficient air source heat pump technology as an energy source, this new energy plant is also interconnected with the main ADEU system providing customers with another low carbon energy source in addition to the existing geo-exchange fields when there is an excess of energy produced. This expansion, coupled with 2015's Phase 3 expansion, has ensured the ADEU system will meet the energy demands of the neighbourhood as it continues its rapid growth.

The system currently provides energy to six residential buildings, the "Central at Garden City" commercial development, the Richmond Jamatkhana temple and Fire Hall #3, in total connecting over 1450 residential units and over 1.6 million square feet of floor area. See Attachment 1 for a map of the service area.

As of September 2017 (the end of the third billing quarter), the ADEU system has delivered 13,425 MWh of energy to customers for space heating, cooling and domestic hot water heating.

While some electricity is consumed for pumping and equipment operations, almost all of this energy was produced locally from the geo-exchange fields located in the greenway corridor and West Cambie Park. The backup and peaking natural gas boilers and cooling towers in the energy centre have operated only for a few days throughout the system's operation to date. Staff estimate that ADEU has eliminated 2336 tonnes of GHG emissions¹ to the community (see Attachment 2).

Analysis

The ADEU service area is comprised of two different use areas: the main service area which is mostly residential and Area A which contains large format retail buildings. The rate for each of the areas was established to ensure that ADEU costs reflect Council's objective to implement low carbon solutions and maintain annual energy costs that are competitive with conventional system energy costs, based on the same level of service. At the same time, the rates ensure cost recovery to offset the City's capital investment and ongoing operating costs.

The 2017 rate for customers in the ADEU service area, excluding Area A, is comprised of:

1. Capacity Charge (Fixed) - monthly charge of \$0.09 per square foot of the building gross floor area, and a monthly charge of \$1.217 per kilowatt of the annual peak heating load supplied by DEU, as shown in the energy modeling report required under Section 21.1.(c); and
2. Volumetric Charge (Variable) - charge of \$3.893 per megawatt hour of energy consumed by the building.

The 2017 rate in effect for Area A is comprised of:

1. Volumetric charge – a charge of \$69.60 per megawatt hour of Energy returned from the Heat Exchanger and Meter Set at the Designated Property calculated on each of (i) an energy use of 2644 MWh per annum ("Basic Supply Amount"), and (ii) any energy use in excess of the Basic Supply Amount.

Factors that were considered when developing the 2018 ADEU rate options include:

- **Competitive Rate:** The rate should provide end users with annual energy costs that are less than or equal to conventional system energy costs, based on the same level of service. It is estimated that customers using energy from a conventional utility system in a Business as Usual (BAU) scenario would see a blended rate increase of around 1.4% in 2018².

¹ Assume that all energy was provided for heating. The business-as-usual (BAU) assumed that 40% of the building heating load would be provided from electricity and the remaining 60% would be from gas make-up air units.

² 1.4% blended increase for 2018 is based on an estimated 0% increase of electricity cost and a 1.9% increase in natural gas cost assuming that all energy was provided for heating. Also, the business-as-usual (BAU) scenario assumption is that 40% of the building heating load would be provided from electricity and the remaining 60% would be from gas make-up air units. Non-fuel BAU costs are assumed to be 25% of total costs and that they increase by the CPI (2.1%).

- **Financial Sustainability:** ADEU was established on the basis that all capital and operating costs would ultimately be recovered through revenues from user fees. The financial model has built in a rate increase of 4% year over year to recover the capital investment as well as the fuel cost increases, inflation, etc. to ensure the financial viability of the system.
- **Forecasted Utility Costs:** BC Hydro's rates will have a 0% increase in 2018. Natural gas costs are increasing from January 1, 2018 by approximately 0.1% for a typical residential customer in Lower Mainland according to Fortis BC's filing with the British Columbia Utilities Commission for their 2018 rates (Order Number G-138-14). However, the recently announced increase in carbon tax to \$35/tonne in April 2018 will be an additional increase of 1.8% to the annual bill for a typical Fortis BC customer, resulting in a total estimated increase for the 2018 calendar year of 1.9%.
- **Consumer and Municipal Price Indexes:** Other factors considered include various price indexes. For example, the 2018 Consumer Price Index (CPI) is estimated to be 2.1%, while the 2018 Municipal Price Index (MPI) is estimated at 3.2%, both as estimated by the City's Finance Department.

Taking into consideration the above factors, two options are presented here for consideration.

Option 1 – 2.1% increase to ADEU rate for services (Not recommended)

Under this option, the rate would increase modestly to match the Consumer Price Index (CPI – projected at 2.1%), but it would be below 4% increase as built in the financial model. The ADEU remains a young utility that is early in its operational life. The development of the West Cambie neighbourhood is still in progress and the ADEU is continuously expanding. As a result, the ADEU's utility (electricity and natural gas), operational, and maintenance costs are still largely based on the projections of the financial model. Additionally, the initial capital investments required to start up the ADEU were significant and future equity and investments must be made in order to ensure future repayments and long term viability.

The ADEU financial model has taken into consideration modest rate increases similar to the projected rate increases for the conventional utility providers' energy. A CPI based rate increase at this point in the utility life would have a negative impact on the financial performance of the ADEU and returns on investment may be impacted. As a result, this option is not recommended.

Option 2 – 4% increase to ADEU rate for services (Recommended)

The proposed 4% rate increase under this option follows the ADEU financial model. The ADEU financial model follows the principle of full cost recovery; all capital and operating costs need to be recovered through revenues from user fees, making the ADEU a financially self-sustaining utility. The recommended rate increase ensures the revenue necessary to recover all the capital and operating costs. Not following these calculated rate increases could result in deferring payback or delaying capital cost recovery.

Even with no projected increase in 2018 rates for BC Hydro, the 4% rate increase is below the five year average rate increase of the conventional utilities (see Table 1 below). This is due to the fact that the ADEU customer rates have been increasing less than those of conventional utilities. A 4% rate increase keeps the ADEU rate competitive when compared to conventional system energy costs, based on the same level of service.

Table 1: Annual Percent Increase Comparison

| | 2014 | 2015 | 2016 | 2017 | 2018 | 5 Year Avg. |
|-------------------------|------|------|------|------|------|-------------|
| ADEU Rate | 4.0% | 4.0% | 4.0% | 4.0% | 4.0% | 4.0% |
| Blended BAU Rate | 6.5% | 3.3% | 4.5% | 6.9% | 1.4% | 4.5% |

A table summarizing the above proposed rate for service options is displayed in Attachment 3.

LIEC is a service provider appointed by Council to provide energy services to ADEU customers on behalf of the City. City Council is the regulator and the rate setting body for the ADEU service area. In accordance with this structure, LIEC staff have prepared the above rate analysis, and LIEC's Board of Directors has reviewed and approved the recommended 2018 ADEU rates for services.

The recommended rate outlined in the proposed Alexandra District Energy Utility Bylaw No. 8641, Amendment Bylaw No. 9777 (Attachment 4), represents full cost recovery for the delivery of energy within the ADEU service area.

Financial Impact

None. The 4% rate increase will help offset the operating and capital costs following the principle of full cost recovery as modeled in the ADEU financial model and ensures the ADEU rate increase is below the five year average rate increase of the BAU scenario.

Conclusion

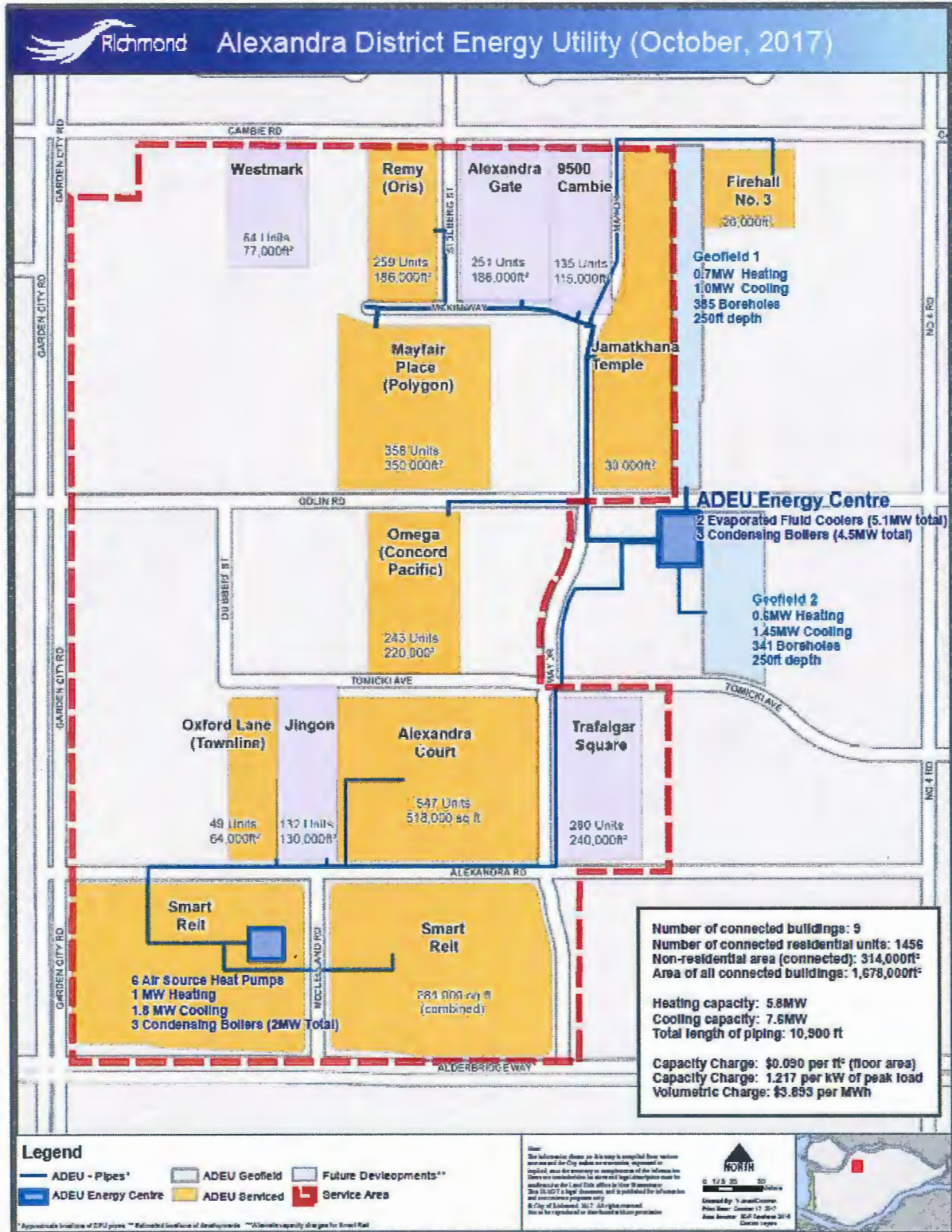
The recommended 4% increase (Option 2) for the 2018 ADEU service rate supports Council's objective to keep the annual energy costs for ADEU customers competitive with conventional energy costs, based on the same level of service. This rate increase also ensures sufficient revenues to offset the capital investment and operating costs. Staff will continuously monitor energy costs and review the rate to ensure fairness for consumers and cost recovery for the City.



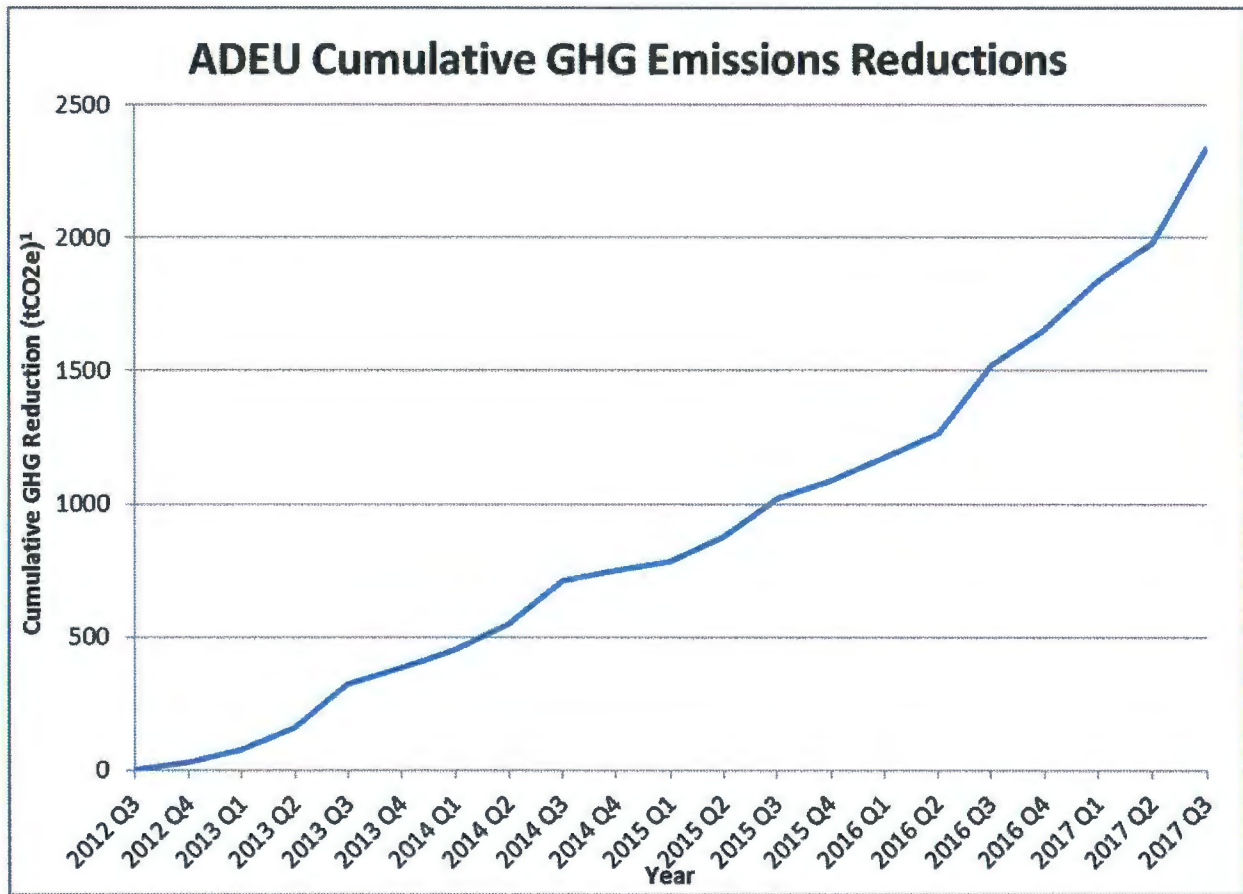
Peter Russell, BAsc MSc MCIP RPP
Senior Manager, Sustainability & District Energy
(604-276-4130)

- Att.1: Alexandra Neighbourhood and ADEU Service Area Informational Map
- Att.2: Green House Gas Emissions Reduction Graph
- Att.3: Summary of Options: Proposed Rates for Services
- Att.4: Alexandra District Energy Utility Bylaw No. 8641 Amendment Bylaw No.9777

Attachment 1 – Alexandra Neighbourhood and ADEU Service Area Informational Map



Attachment 2 – ADEU Green House Gas (GHG) Emission Informational Graph



¹ Assumed that all energy was provided for heating. The business-as-usual (BAU) assumed that 40% of the building heating load would be provided from electricity and the remaining 60% would be from gas make-up air units.

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Attachment 3 – Summary of Options: Proposed Rates for Services**Table 1: Proposed Rates for Services, excluding Area A**

| | 2017 | 2018 Option 1 2.1% Increase | 2018 Option 2 4% Increase (Recommended) |
|---|---------|-----------------------------------|--|
| Capacity Charge One: Monthly charge per square foot of the building gross floor area | \$0.090 | \$0.092 | \$0.094 |
| Capacity Charge Two: Monthly charge per kilowatt of the annual peak heating load supplied by DEU | \$1.217 | \$1.243 | \$1.266 |
| Volumetric Charge: Charge per megawatt hour of energy consumed by the building | \$3.893 | \$3.975 | \$4.049 |

Table 2: Proposed Rates for Services, Area A

| | 2017 | 2018 Option 1 2.1% Increase | 2018 Option 2 4% Increase |
|---|---------|-----------------------------------|---------------------------------|
| Volumetric Charge: Charge per megawatt hour of energy consumed | \$69.60 | \$71.06 | \$72.38 |



City of Richmond

Bylaw 9777

Alexandra District Energy Utility Bylaw No. 8641 Amendment Bylaw No. 9777

The Council of the City of Richmond enacts as follows:

1. The **Alexandra District Energy Utility Bylaw No. 8641**, as amended, is further amended:
 - a) by deleting Schedule C (Rates and Charges) in its entirety and replacing with a new Schedule C attached as Schedule A to this Amendment Bylaw.
2. This Bylaw is cited as “**Alexandra District Energy Utility Bylaw No. 8641, Amendment Bylaw No. 9777**”.

FIRST READING

SECOND READING

THIRD READING

ADOPTED

| |
|---|
| CITY OF RICHMOND |
| APPROVED for content by originating dept. |
| <i>KL</i> |
| APPROVED for legality by Solicitor |
| <i>SA</i> |

MAYOR

CORPORATE OFFICER

Schedule A to Amendment Bylaw No. 9777***SCHEDULE C to BYLAW NO. 8641******Rates and Charges*****PART 1 - RATES FOR SERVICES**

The following charges will constitute the Rates for Services for the Service Area excluding shaded Area A as shown in Schedule A to this Bylaw:

- (a) Capacity charge – a monthly charge of \$0.094 per square foot of Gross Floor Area, and a monthly charge of \$1.266 per kilowatt of the annual peak heating load supplied by DEU as shown in the energy modeling report required under Section 21.1(c); and*
- (b) Volumetric charge – a charge of \$4.049 per megawatt hour of Energy returned from the Heat Exchanger and Meter Set at the Designated Property.*

PART 2 - RATES FOR SERVICES APPLICABLE TO AREA A

The following charges will constitute the Rates for Services applicable only to the Designated Properties identified within the shaded area (Area A) shown in Schedule A to this bylaw:

- (a) Volumetric charge – a charge of \$72.38 per megawatt hour of Energy returned from the Heat Exchanger and Meter Set at the Designated Property calculated on each of (i) an energy use of 2644 MWh per annum (“Basic Supply Amount”), and (ii) any energy use in excess of the Basic Supply Amount.*