



City of Richmond

Report to Committee

To: Public Works and Transportation Committee **Date:** September 15, 2016
From: John Irving, P.Eng. MPA **File:** 10-6600-10-02/2016-
Director, Engineering Vol 01
Re: **Alexandra District Energy Utility Bylaw No. 8641, Amendment Bylaw No. 9617**

Staff Recommendation

That the Alexandra District Energy Utility Bylaw No. 8641, Amendment Bylaw No. 9617 be introduced and given first, second and third readings.

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

Att. 3

REPORT CONCURRENCE		
ROUTED TO:	CONCURRENCE	CONCURRENCE OF GENERAL MANAGER
Finance Department	<input checked="" type="checkbox"/>	
Law	<input checked="" type="checkbox"/>	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	INITIALS: DW	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 2017 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 3 expansion in November 2015. This expansion more than doubled the capacity of ADEU's renewable energy generation capacity by adding a second geo-exchange field. Additionally, it increased the size of the energy centre building while adding two 2,550 kW evaporative fluid coolers and three 1,500 kW condensing boilers. The Phase 3 expansion is projected to ensure the ADEU system will meet the energy demands of the neighbourhood as it continues to grow.

The system currently provides energy to six developments (Mayfair Place, Remy, Omega, Alexandra Court, Richmond Jamatkhana and Townline Oxford Lane) connecting over 1100 residential units and over 1 million square feet of floor area. ADEU's first commercial customers, with more than 280,000 ft² of serviced floor area, will be connected before the end of 2016. See Attachment 2 for informational map.

As of June 30, 2016 (end of the second billing quarter), the ADEU system has delivered 7279 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 100% 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 1348 tonnes of GHG emissions¹ to the community (see Attachment 1) and are currently evaluating these reductions as GHG reductions as eligible offsets for neutralizing corporate GHG emissions.

In October 2016, City Council authorized the transfer of ownership of all City owned district energy assets to the Lulu Island Energy Company (LIEC). All of the ADEU assets and infrastructure were included in this transfer. The transfer of these assets will allow LIEC to fulfill its Council directed mandate to manage all district energy utilities on the City's behalf. LIEC will look to continue building on the strong operational, environmental and financial performance that ADEU has shown in its first few years of operation, while Council will continue to have sole authority on rate setting.

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 2016 rate for customers in the ADEU service area, excluding Area A, is comprised of:

1. Capacity Charge (Fixed) - monthly charge of \$0.087 per square foot of the building gross floor area, and a monthly charge of \$1.170 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 \$3.743 per megawatt hour of energy consumed by the building.

The 2016 rate in effect for Area A is comprised of:

1. Volumetric charge – a charge of \$66.92 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 2017 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.

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.

- **Cost Recovery:** ADEU was established on the basis that all capital and operating costs would ultimately be recovered through revenues from user fees. The financial model includes recovery of the capital investment over time and built in a rate increase year over year to cover the fuel cost increases, inflation, etc. to ensure the financial viability of the system.
- **Forecasted Utility Costs:** Utility cost (electricity and natural gas) increases are outside the City's control. However, these commodity costs directly impact the operation cost of ADEU. BC Hydro's 10 year plan projects an electricity rate increase of 3.5% in fiscal year 2017. Natural gas costs are increasing from October 1, 2016 by approximately 11.9% for a typical residential customer in Lower Mainland according to the British Columbia Utilities Commission Order Number G-145-16.
- **Consumer and Municipal Price Indexes:** Other factors to consider include various price indexes. For example, the Consumer Price Index (CPI) is estimated by the Finance Department at 2.1% based on the Conference Board of Canada Metropolitan Outlook 1 Spring 2016, while the Municipal Price Index (MPI) is estimated at 2.7%, also estimated by the City's Finance Department.

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

Option 1 – No increase to ADEU rate for services (Not recommended)

Under the Option 1, the rate would not change from the 2016 rate.

ADEU remains a young utility; early in its operational life. The development of the West Cambie neighbourhood is still in progress and ADEU is continuously expanding. Collection and analysis of actual data about ADEU's connected buildings' energy loads and consumption, operation and maintenance costs is on-going; however, the data is still limited due to constant expansion and system change. As a result, ADEU's utility (electricity and natural gas), operational, and maintenance costs are still largely based on the projections of the financial model. Variation from the model will affect the long term performance of ADEU. For example, actual revenue will vary from the projected revenue in the financial model depending on the speed of the neighbourhood's development and occupancy.

The ADEU financial model has taken into consideration modest rate increases similar to the projected rate increases for the conventional utility providers' energy. A zero rate increase could have a negative impact on the financial performance of ADEU. For example, it may cause an extension of the payback period, reduction of internal rate of return, etc. As a result, this option is not recommended.

Option 2 – 2% increase to ADEU rate for services (Not recommended)

Under this option, the rate would increase modestly to slightly less than the Consumer Price Index (CPI – projected at 2.1%). While a 2% rate increase will partially cover the estimated utility (electricity and natural gas), operation, and maintenance cost increases, it is less than the "business as usual" (BAU) cost of energy commodity (electricity and natural gas) increases that customers not

served by ADEU would face. Similarly it is below the increase projected in the ADEU financial business model. Due to the fact that Business As Usual costs are expected to increase more than the Consumer Price Index (CPI) and it is still very early in ADEU's operational life, this option is not recommended.

Option 3 – 4% increase to ADEU rate for services (Recommended)

The proposed 4% rate increase under this option follows the ADEU financial model and is well below the estimated rate increase of around 7% that customers would pay for the energy from the conventional utility system. This 7% blended increase is based on 3.5% increase of electricity cost and 11.9% increase of natural gas cost. The BAU scenario assumes 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 CPI.

The ADEU financial model follows the principle of full cost recovery. To mitigate potential financial risks, it is recommended that the City follow the financial model in the early years of the utility operation and annually adjust the rates accordingly. As more data is collected about the connected building's energy loads and consumption and operation and maintenance costs, the model will be continuously updated and annual rate adjustment may follow closer year to year financial indicators, to ensure that the business is sustainable, economically viable and beneficial for LIEC and its customers.

Table 1: Proposed Rates for Services, excluding Area A

	2016	2017 Option 1 0% Increase	2017 Option 2 2% Increase	2017 Option 3 4% Increase
Capacity Charge One: Monthly charge per square foot of the building gross floor area	\$0.087	\$0.087	\$0.089	\$0.090
Capacity Charge Two: Monthly charge per kilowatt of the annual peak heating load supplied by DEU	\$1.170	\$1.170	\$1.193	\$1.217
Volumetric Charge: Charge per megawatt hour of energy consumed by the building	\$3.743	\$3.743	\$3.818	\$3.893

Table 2: Proposed Rates for Services, Area A

	2016	2017 Option 1 0% Increase	2017 Option 2 2% Increase	2017 Option 3 4% Increase
Volumetric Charge: Charge per megawatt hour of energy consumed	\$66.92	\$66.92	\$68.26	\$69.60


The recommended rate outlined in the proposed Alexandra District Energy Utility Bylaw No. 8641, Amendment Bylaw No. 9617 (Attachment 3), represents full cost recovery for the delivery of energy within the ADEU service area.


Financial Impact

None. The 4% rate increase will result in the revenue increase which will offset the operating and capital costs following the principle of full cost recovery as modeled in the ADEU financial model.

Conclusion

The recommended 4% increase (Option 3) for the 2017 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. As a comparison to conventional system energy costs, the 4% rate increase is below the combined estimated 7% rate increase for BC Hydro and Fortis. The rate increase also ensures cost recovery to offset the City's capital investment and operating costs. Staff will continuously monitor energy costs and review the rate to ensure rate fairness for consumers and cost recovery for the City.

For: 
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 Manager, District Energy
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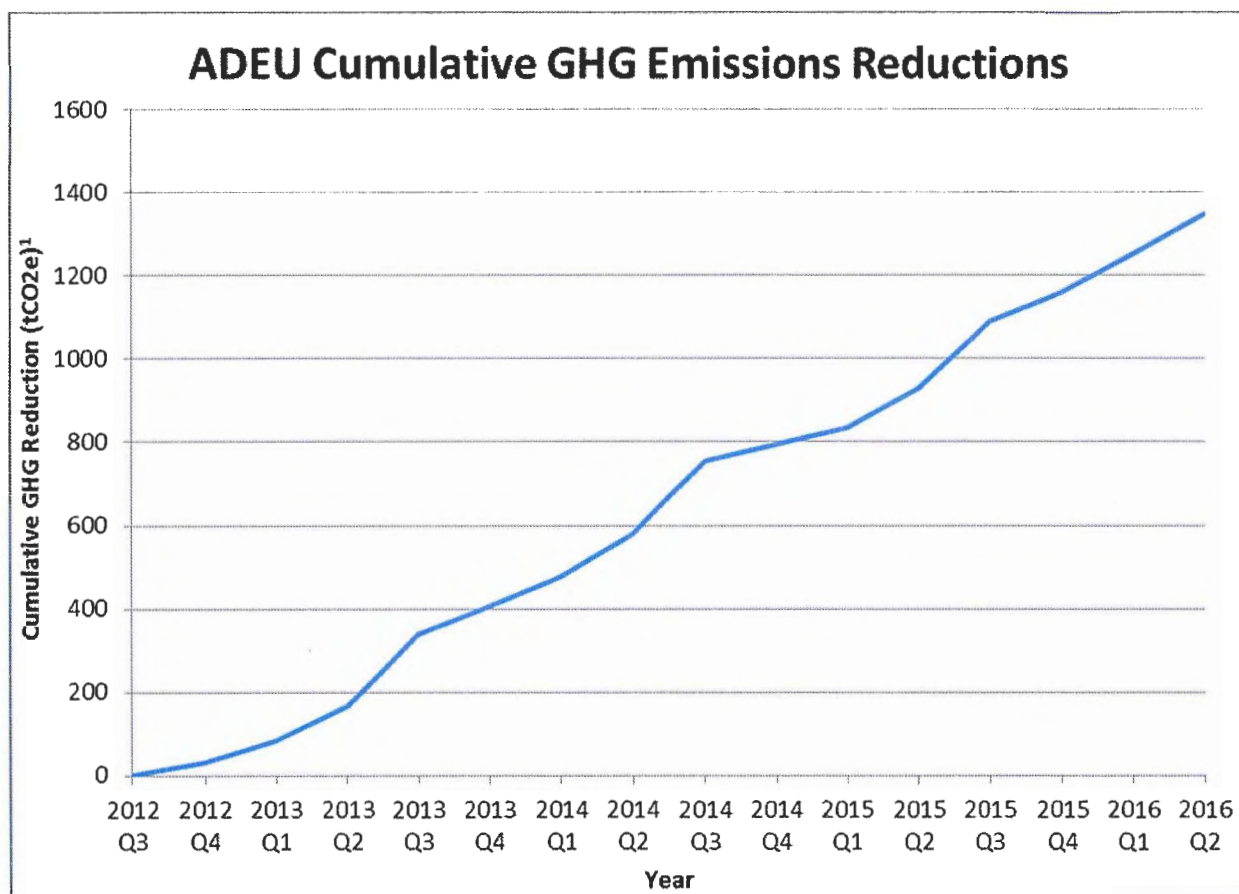
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Att.1: Green House Gas Emissions Reduction Graph

Att.2: Lower Mainland DEU Provider – Rate Comparison Graph

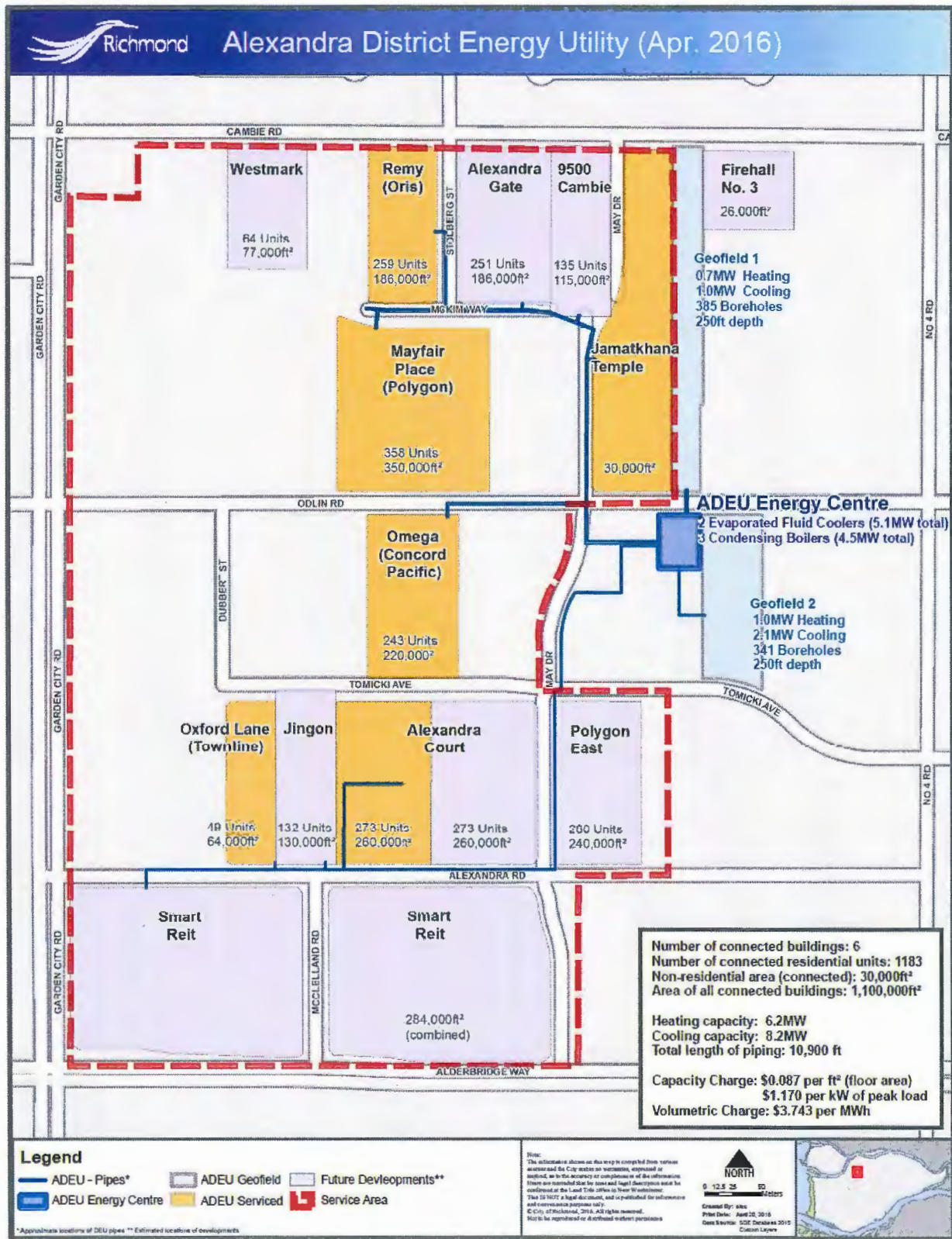
Att.3: Alexandra District Energy Utility Bylaw No. 8641 Amendment Bylaw No. 9617

Attachment 1 – 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.

Attachment 2 – Alexandra Neighbourhood and ADEU Service Area Informational Map





City of
Richmond

Bylaw 9617

**Alexandra District Energy Utility Bylaw No. 8641
Amendment Bylaw No. 9617**

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. 9617**".

FIRST READING

SECOND READING

THIRD READING

ADOPTED

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

MAYOR

CORPORATE OFFICER

Schedule A to Amendment Bylaw No. 9617***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 \$0.090 per square foot of 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*
- (b) Volumetric charge – a charge of \$3.893 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 \$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.*