Blatchford Renewable Energy Utility

City of Edmonton

Alternatives for Establishing Initial Customer Rates

Final Report

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Contents

Executive Summary

The City of Edmonton (the City or COE) engaged Grant Thornton LLP (Grant Thornton) to assist in establishing the regulatory framework for the setting of end use customer rates in the first year of operation of the Blatchford District Energy Utility, and also as the Utility grows and develops thereafter. The report contained herein discusses the approach used to determine the initial year customer rates based on inputs from the City of Edmonton's Business Decision Model (COE Financial Model), the principles contained in the Blatchford District Energy Utility Fiscal Policy (Policy Number C597, March 22, 2018), discussions held with the City of Edmonton, and primary and secondary research as it pertains to establishing rates in a district energy system. Based on the information provided and obtained, Grant Thornton has concluded on the rates to be used in the initial year of Blatchford operations.

The initial step taken for this engagement was to establish an appropriate rate setting methodology. Traditionally, utility rates are determined by using a cost of service approach. This approach establishes rates based on the allocation and recovery of a utility's annual costs, referred to as its revenue requirement. However, the small number of customers forecast in Blatchford over the initial years would likely be unable to pay the full cost of service during this time. Moreover, as prescribed in the Blatchford Fiscal Policy, customer rates cannot exceed their Business as Usual (BAU) equivalent defined as what they would pay elsewhere in the City of Edmonton through their energy utility bills and annual maintenance costs. As such, alternative approaches were considered to establish an appropriate initial year rate given these factors.

Three options were identified that were used in establishing rates for similar district energy systems: levelized lifecycle costs, pegged rates, and a hybrid approach. The lifecycle cost approach is similar to the levelized rate calculation presented in the COE Financial Model. This approach calculates an initial year rate with a fixed annual growth percentage, which over time, is able to recover the utility's long-term revenue requirement. Over initial years, customer rates do not cover the annual cost of service, while in future years, customers pay greater than their annual cost of service in order to recover the initial shortfalls as the utility grows. The COE Financial Model forecasted that a $93.3 million external cash injection earmarked to fund initial years' capital (and a working capital deferral account to fund initial years' operating shortfalls) would be required in order for the Utility to recover its revenue requirement under the constraint that customer rates and operating and maintenance costs would be similar to a BAU comparison. As the Blatchford District Energy Utility is still in its infancy, and changes may occur to long-term future assumptions (e.g. build-out timing, etc.), the levelized lifecycle rate setting approach was not recommended to be most suitable for the initial year rate design.

A pegged approach whereby Blatchford customer bills are pegged to their BAU equivalent bills was determined to be most suitable for application in the Blatchford District energy rate design. This is largely due to its consideration for the BAU (and thereby its alignment to the Fiscal Policy), as well as its simplicity to implement and be understood by customers. The hybrid approach incorporates a variable rate for consumption based on an equivalent BAU published rate (e.g. variable rate for electricity or gas), as well as a fixed rate calculated based on the utility's fixed lifecycle costs. Unlike the lifecycle cost and hybrid approaches, a pegged approach does not use long-term assumptions based on the Utility's future, which are subject to change. All options considered were evaluated based on James C. Bonbright's Rate Setting Principles: commonly referenced principles in the utility industry for cost allocation and rate design.

While only one traditional end use customer type (i.e. residential customers) is forecast to be present for the initial years in Blatchford, for the purposes of the analysis, Grant Thornton subcategorized residential customers into four sub classes: simple town homes, strata town homes, 4-6 story condos, and 7-10 story condos. Using assumptions present in the COE Financial Model, Grant Thornton calculated BAU annual utility bills for each of the four residential customer sub classes. BAU utility bills were calculated using estimated usage for electricity and gas to meet customers' heating, cooling, and domestic hot water requirements. In concert with the Fiscal Policy, differences in annualized customer maintenance costs to be paid by BAU and Blatchford customers were also included as adjustments to BAU bills. This annual BAU bill adjusted for the maintenance differential was created for all four customer sub classes, and was considered to be the amount that customers in Blatchford should also pay for their annual utility bills.

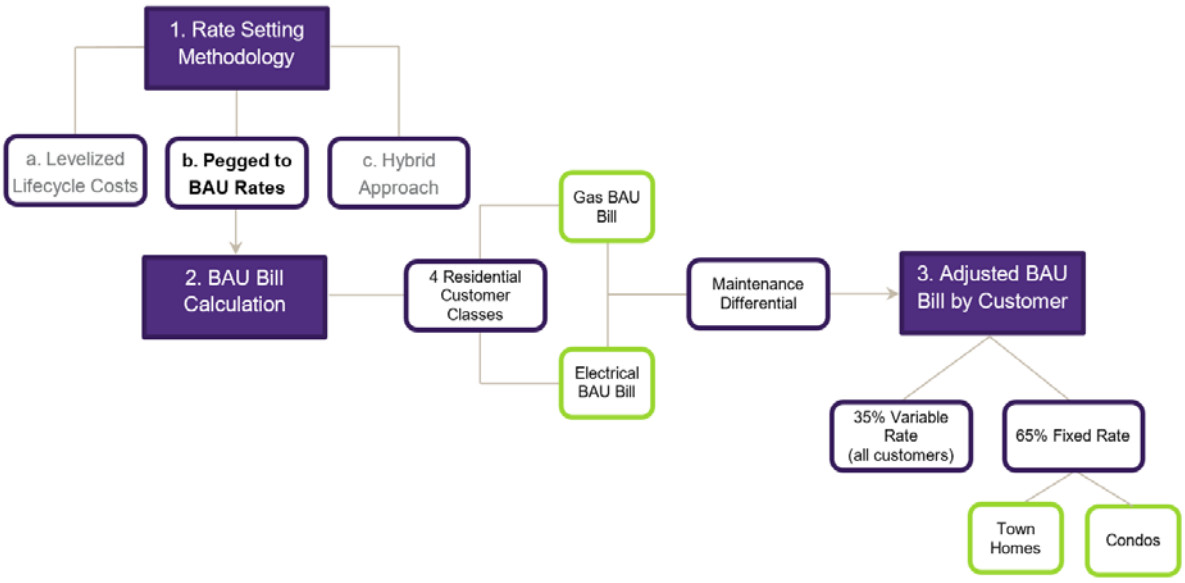
A number of options were examined to take the adjusted BAU bill for each customer and determine fixed and variable rates to charge each customer. It was determined that a 35/65 variable/fixed ratio reasonably mirrors the cost structure of the Utility to support predictability in revenues, while maintaining fairness to customers in high and low use scenarios. In order to calculate the variable rate, the total required variable charge (i.e. representing 35% of the adjusted BAU bill), was divided by the anticipated usage across all customer classes. The fixed charge assigned the remaining 65% of the adjusted BAU bill amounts. In order to maintain fairness in rates and support practical rate implementation and billing over initial years, two fixed rates were calculated: one for town homes, and one for condos. Specifically, the remaining fixed charges (i.e. BAU bills less the deemed variable charge) were averaged between the two town home and condo types in order to determine fixed charges. These annual fixed charges were then divided by 365 to determine daily fixed rates. Total bills as compared to BAU (including the maintenance adjustment) are presented below for the forecast year 2019. Note that the low variances support that Blatchford customers would be expected to pay similar utility bills (after adjusting for maintenance costs) to that of their BAU counterparts elsewhere in the City.

Customer Class:	Blatchford DE Bill	BAU Bill	Variance
Simple Town Home	$1,253	$1,267	(1.1)%
Strata Town Home	$1,260	$1,259	0.1%
4-6 Story Condo	$1,067	$1,018	4.8%
7-10 Story Condo	$1,110	$1,161	(4.3)%

Using the described methodology we have calculated a variable rate which is to be applied to thermal energy usage incurred by all customers, regardless of class, as well as two separate fixed rates, one for each of town home customers and condo customers. The calculated rates for the first year of operations are summarized in the following table:

Customer Class:	Variable Rate	Fixed Rate
Town Homes	$0.0248/kWh	$1.43/day
Condos	$0.0248/kWh	$1.12/day

Sensitivity analysis was performed which examined (1) the impact of these rates on higher and lower use customers, and (2) the impact of using alternative fixed/variable ratios. This analysis suggested that Blatchford customers' bills would be within a reasonable degree of variance as compared to their adjusted BAU bill equivalents. The following illustration presents the steps taken for the rate methodology described above.



As noted, both the pegged rate approach and the levelized approach used in the COE Financial Model result in a deferral amount over initial years (i.e. rate revenues over initial years are forecast to be unable to fully recover annual revenue requirements). This is in addition to the $93.3 million external cash injection earmarked as contributed capital to the Utility. The deferral amount is not anticipated to differ significantly under the two approaches. This analysis is based on input assumptions taken from the COE Financial Model, and updated expenditure forecasts from the 2019-2022 Blatchford Business Plan. The provided assumptions include forecasts for the Utility's customer growth, which is required to reduce and eliminate reliance on deferrals, and allow for their future recovery.

This rate setting methodology was deemed to be appropriate for initial year rate setting, however, we have recommended additional considerations to be made as the Utility matures and additional information becomes available. Broadly, these considerations include the introduction of customer classes, specific heating and cooling rates, seasonality factors, and alternative rate setting methodologies as further information and usage metrics become available.

Authorship and Document Purpose

This report is prepared by Grant Thornton LLP (Grant Thornton) for the City of Edmonton (the City or COE). This report is based on information and documentation that was made available to Grant Thornton as well as information obtained from third party sources prior to the time of drafting the report. Much of the information was gathered from interviews with and documents provided by COE management and key staff. As such, Grant Thornton assumes no responsibility and makes no representations with respect to the accuracy or completeness of any information provided to us. We are not guarantors of the information which we have relied upon in preparing our report, and except as stated, we have not attempted to verify any of the underlying information or data contained in this report. It is understood and agreed that all decisions in connection with the information as presented in this report shall be the responsibility of, and be made by the City.

This report is confidential. It was prepared for the City in relation to establishing initial year customer rates for the Blatchford District Energy Utility. This report is not to be used for any other purpose, and we specifically disclaim any responsibility for losses or damages incurred through use of this report for a purpose other than as described. Calculations presented in this report are based on information available during the time of creating the report. As such, appropriate considerations should be made as to update the calculations should new and updated information become available. We reserve the right, but are under no obligation, to review all calculations included in or referred to in this report and, if we consider it necessary, to revise calculations in light of any information existing at the date of issue that subsequently becomes known to us.

Introduction

Background

The City of Edmonton engaged Grant Thornton to assist in establishing the regulatory framework in the setting of end use customer rates in the first year of operation of the Blatchford District Energy Utility (Blatchford, District Energy Utility, or the Utility) and also as the Utility grows and develops thereafter. The engagement includes two phases: an identification of alternative approaches to be utilized in the establishment of end use customer rates for Blatchford, and the development of a model to be utilized in the calculation of end use customer rates in the first years of operations.

Approach

Grant Thornton assessed rate setting requirements through discussions with City of Edmonton management, review of relevant policies, reports, bylaws and utilities act, the 2019-2022 Blatchford Business Plan, and analysis of the City of Edmonton's Business Decision Model (COE Financial Model). Our approach was guided by the rate setting framework established in the Blatchford District Energy Utility Fiscal Policy (Policy Number C597, March 22, 2018). Based on the above, the following key items were identified related to rate setting methodology:

1) Selection of appropriate rate setting methodology;
2) Defining a "Business as Usual (BAU)" Comparison; and
3) Determination of customer costs to be included;

In answering these questions, Grant Thornton conducted interviews with key personnel at comparable district energy utilities across Canada. Further, Grant Thornton conducted secondary research through review of publically available reports for various district energy utilities. Results of this research is summarized in Appendices 1 and 2. All input variables (e.g. build-out projections, forecast energy consumptions, etc.) used in the calculation of initial year customer rates have come from the COE Financial Model, further information provided by City of Edmonton management, and information sourced from the public domain.

Phase I: Rate Setting Methodologies

Approaches Identified

Levelized Lifecycle Costs

This approach involves calculating the present value of costs expected to be incurred by a utility over a long-term forecast horizon (typically 20 to 40 years). Annualized costs (i.e. revenue requirements) are determined and discounted to determine the Net Present Value (NPV) of the expenditures. The NPV of these expenditures represents the present value of the utility's long-term revenue requirement. A levelized rate is set to recover this revenue requirement given a fixed annual growth in the calculated rates. Using the calculated annual levelized rate, some utilities compare the total lifecycle costs (capital, operating, and maintenance) for a customer using the district energy as compared to the total lifecycle costs for a BAU customer. This approach was used in the COE Financial Model using forecast revenue requirements of the District Energy Utility over a 30 year period.

Pegged Rates

A pegged rate approach involves basing district energy rates on the prevalent rates expected under the BAU case. Several variations of pegged rates were identified under this category, including the use of published electricity and/or natural gas rates, or pegging to total expected customer billings for equivalent services. When using published rates, utilities identified would set their district energy rates to be identical to the pegged rate, such as published electricity rates, or alternatively, would apply a premium to these published rates. When pegging to a bill amount, Grant Thornton identified cases in which a "virtual boiler/chiller" was created. In these cases, a virtual boiler/chiller is defined as a hypothetical boiler/chiller which would deliver the same amount of

output heating, cooling, and heat for hot water as would be provided by the district energy utility. The function of the virtual boiler/chiller is to convert the usage incurred in the district energy utility to its equivalent usage under a BAU scenario, accounting for any added efficiencies present in the district energy utility. This conversion would allow the utility to bill customers directly based on what their bill otherwise would have been using traditional BAU means (i.e. boilers/chillers fuelled by natural gas and electricity provided by their respective utilities).

In the cases Grant Thornton has analyzed, rate increases after the initial year rate setting may continue to be pegged to external rates or bills, or alternatively, increased based on operational results, or an external index such as CPI.

Hybrid Approach

This approach adopts elements from the two approaches discussed above. Variable rates that account for consumption are applied using equivalent BAU published rates. In addition, a fixed rate is charged which encompasses any lifecycle costs associated with the utility, such as capital and maintenance costs which are not captured through the variable rate component.

The following table outlines the pros and cons of the three identified approaches.

Scenario	Pros	Cons
Levelized Lifecycle Costs	• Considers all costs which are expected to be incurred by customers. • Used by other established District Energy utilities.	• Complex calculation requiring significant input assumptions for extended period. • Present value may range significantly based on variations in assumptions.
Pegged Rates	• Simple to understand and draw comparisons. • Greater consistency with Blatchford District Energy Utility Fiscal Policy (C597), which states that “end user (customer) [pays] at most what they would elsewhere in the City of Edmonton through their energy utility bills and annual maintenance costs.”	• No direct consideration made for additional costs incurred over and above those included in utility bills.
Hybrid Approach	• Captures all fixed costs expected to be incurred by the utility. • Removes significant assumptions surrounding utility bill costs outside of the immediate future.	• Complex assumptions and discount rate inputs required in calculation of fixed capital lifecycle costs.

BAU Definition

As mentioned above, detailed research was performed in order to determine appropriate definitions of “Business as Usual” to be used in rate comparison. In order to do this, Grant Thornton performed research on several precedent cases, noting the BAU comparison used. Descriptions of the cases analyzed can be found in Appendix 1. Detailed information on the cases can be found in Appendix 2.

In the comparable district energy utilities identified, the BAU was generally defined as follows: the total costs incurred to a customer for equivalent services provided by standard utility providers. For most other district energy utilities, this definition assumes that customers have the same utility requirements, and are located in the same (or similar) building, and in the same (or similar) region.

The definition of BAU used in the COE Financial Model is similar to that of the entities identified in our study, however, the assumption expands to include *any* potential customer in Edmonton. This takes into account the existing housing base within Edmonton, including differences in building codes, which impact the energy consumption. Using this assumption, an adjustment is made to energy use requirements under the BAU, as the average Edmontonian house is expected to be built under prior building codes which lack the same energy efficiency of homes constructed in the Blatchford region[1]. BAU homes are expected to have an energy use intensity of 3.57 times that of newly built Blatchford developments for heating, 1.07 times for cooling, and 1.21 times for domestic hot water.

This definition coincides with the requirement set out in the Fiscal Policy which refers to the comparison point as customers *"elsewhere in the City of Edmonton"*. This would require that assumptions for energy usage and costs of BAU customers take into account prevailing conditions experienced by typical City of Edmonton homes, including relevant building codes, energy use intensities, etc.

Qualitative Analysis

In qualitatively analyzing the rate setting methodology, we have used the criteria set out in "Bonbright's Rate Setting Principles[2]", which include:

- **Rate attributes**: simplicity, understandability, public acceptability, and feasibility of application;
- Freedom from controversies as to proper **interpretation**;
- Effectiveness of yielding total **revenue requirements**;
- **Revenue (and cash flow) stability** from year to year;
- **Stability of rates** themselves, minimal unexpected changes that are seriously adverse to existing customers;
- **Fairness** in apportioning cost of service among different consumers;
- Avoidance of "**undue discrimination**" amongst customer classes; and
- **Efficiency**, promoting efficient use of energy and competing products and services.

The rate setting methods identified have been individually assessed under each of the criteria in the table below.

[1] BAU buildings are assumed to be constructed using the previous to the current Alberta Building Code, and Blatchford buildings are assumed to be constructed using the ASHREA energy efficiency standard plus 50%. This assumption is based on the rationale that people will be moving from all over the city to Blatchford, from a mix of housing with different building codes. (Source: COE Financial Model Assumption's List; Byrnes, Andrew, Pinchin Ltd., September 25, 2018).
[2] Totten, Jess, Public Utility Commission of Texas, February, 2008.
Original Source: James C. Bonbright, Albert L. Danielsen, David R. Kamerschen, The Principles of Public Utility Rates (Second Edition), 1988.

Principle:	Levelized Lifecycle Costs	Pegged Rates	Hybrid Approach
Rate Attributes	▪ Internal calculation requiring long-term forecast contributes to complication and lack of understandability	▪ Equivalent rates and bill amounts may be directly pointed to ▪ Comparability leads to simplicity and potentially perceived fairness	▪ Incorporates elements of both levelized lifecycle costs, and pegged rates, resulting in simplicity of variable rates, but more complicated fixed rates
Interpretations	▪ Definitions required in the calculation are fairly straightforward, limited room for misinterpretation	▪ Requirement in setting definition of BAU, and specifics to be included. Some room for misinterpretation	▪ Requirement in setting definition of BAU, and specifics to be included. Some room for misinterpretation
Revenue Requirements	▪ Revenue requirement considered directly in rates, resulting in recovering costs over long-term	▪ Revenue requirements not directly considered, dependent on BAU rates as compared to levelized rates	▪ Revenue from rates are dependent on BAU case ▪ Capital and maintenance requirements directly considered in fixed component
Revenue/Rate Stability	▪ Increases in rates implicitly considered in rate setting	▪ Dependent on fluctuations in BAU ▪ Can be capped to offset this risk, and limit large fluctuations	▪ Dependent on fluctuations in BAU ▪ Can be capped to offset this risk, and limit large fluctuations
Service Cost Fairness/Undue Discrimination	▪ Dependent on considerations for fixed/variable portion of rates, and individual usage ▪ Considerations may be made for factors such as space size among different classes of users		
Efficiency	▪ Dependent on considerations for fixed/variable portion of rates, and individual usage ▪ Rates should be set in such a way that users are rewarded for limited undue energy use while avoiding discriminating against classes of users who will implicitly use higher amounts of energy		

Based on analysis performed we believe that in the initial year of Blatchford operations, a pegged rate approach is most appropriate in rate setting. This is largely due to the simplicity of application and inputs, allowing for customer understandability and perceived fairness in rates. It is recommended that these options be revisited as the utility matures and more information on inputs used in projecting operations become available. In particular, based on the benchmarking undertaken, lifecycle costs analyses with levelized rates is commonly undertaken for more established district energy utilities.

Quantitative Analysis

Based on the COE Financial Model, a basic analysis of the quantitative impact of the pegged approach identified above has been completed. This analysis was performed in order to ensure that options considered aligned with the requirements under the Fiscal Policy. Specifically, we considered whether the rate setting methodology would result in:

> *"…end user[s] (customer[s]) paying at most a comparable fee to what they would elsewhere in the City of Edmonton through their energy utility bills and annual maintenance costs."*

Grant Thornton has calculated bills under a pegged approach, which have resulted in values within a reasonable range of BAU equivalents. As such, we have concluded that this rate setting methodology is sufficiently aligned with the above criteria set out in the Blatchford District Energy Utility Fiscal Policy.

Phase II: Initial Year Rate Setting

Selected Approach

Based on the analysis performed we believe that in the initial year of Blatchford operations a pegged rate approach is most appropriate in rate setting, in which **customer bills are pegged directly to their BAU counterparts.** Under this approach, rates are to be calculated such that the total bill amount should approximately equate to the BAU bill. The selection of this methodology is largely due to the simplicity of application and inputs, allowing for customer understandability, perceived fairness in rates, and alignment with the Blatchford Fiscal Policy.

Customer Classes

Based on the Blatchford build-out projection assumptions noted in the COE Financial Model, only one traditional end use customer type (i.e. residential customers) has been considered for the initial year rate. During the initial five years of the build-out projection, there are only residential customers forecast to be present in Blatchford. For the purposes of our analysis, residential customers have been subcategorized into four sub classes: simple town homes, strata town homes, 4-6 story condos, and 7-10 story condos. This subcategorization allows for greater detailed analysis as town homes and condos have different maintenance costs. Further, this level of specificity is consistent with COE Financial Model, and allows for appropriate BAU bill comparisons.

BAU Build-Up

In order to apply a pegged rate approach, we must first make a determination as to BAU equivalent bills for each customer type (simple town homes, strata town homes, 4-6 story condos, and 7-10 story condos)[3]. BAU bills take into account assumed electricity and natural gas requirements to achieve equivalent heating, cooling, and domestic hot water outputs to that provided by the District Energy Utility. Inputs and assumptions are largely taken from the COE Financial Model, as well as regulatory posted rates, and publically available rate information for utility companies. Detailed inputs and sources are outlined in Appendix 3. BAU rates used include the 5 year contract rates for electricity as per Direct Energy, low use gas rates for town homes, and high use gas rates for condos[4]. In 2019, the estimated variable electricity rate under a 5 year contract is approximately $0.12/kWh of electricity usage, expected gas rates are $0.02/kWh ($4.80/GJ) of gas usage for low use customers, and $0.01kWh ($3.13/GJ) for high use customers[5].

In building up to the total bill, we first multiplied the expected electricity usage by expected electricity rates, and expected gas usage by expected gas rates. Usage estimates are consistent with those used in the COE Financial Model and only include the usage associated with heating, cooling and domestic hot water (i.e. electrical usage associated with other uses such as lighting, operating appliances, etc. is not included as this is not provided by the District Energy Utility). Expected annual electricity and gas usage in 2019 for a simple town home for example, are 388 kWh and 22,240 kWh respectively under the BAU scenario. Gas usage was also used to determine the equivalent CO_2 emissions in order to calculate required carbon tax payments. Gas usage was converted at a rate of 0.18 tonnes of CO_2/MWh of gas, resulting in emissions of 4.08 tonnes in 2019. At $35/tonne, this results in a carbon tax charge of $143[6]. The sum of these variable costs was taken to determine a total variable component of BAU bills.

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[3] While this engagement's scope is on initial year customer rates, a five year time horizon was used for the calculations and analysis. Within this period there are four customer types identified in the City's build-out forecast for Blatchford. Based on the build-out forecast, office space is anticipated in forecast year six, and NAIT education and residential buildings are forecast to come online in forecast year seven.

[4] Rates as per ATCO Gas and Direct Energy Regulatory services, detailed rate build up is shown in Appendix 3H (source: ATCO Gas Current Rates, accessed July 2018, Direct Energy Regulatory Services Current Natural Gas Rates, accessed July 2017).

[5] As further detailed in Appendix 3, variable gas rates are converted from $/GJ to $/kWh using a factor of 277.78. This was done as thermal rates charged by the District Energy utility are measured in $/kWh.

[6] Carbon tax is only applied to natural gas bills; no carbon tax is applied to electricity bills (source: COE Financial Model Assumption's List; Carbon Levy and Rebates, Government of Alberta, accessed August, 2018).

To determine the fixed component of bills, daily fixed rates for electricity and gas connections (reduced to incorporate any inclusion adjustments, please refer to Appendix 3D) were multiplied by 365 to determine their annual impact. The annual 2019 fixed charge for electricity is expected to be $300 per connection, with each customer assumed to have 1 connection, regardless of class, as per the COE Financial Model. Gas fixed charges are estimated at $1.47/connection/day for low use customers, for a fixed charge of $537 per customer annually. For high use customers, this charge increases to $7.84/connection/day, which is reduced on a per customer basis based on the number of customers served by each connection. In a 4-6 story condo, each gas connection is to serve 60 units, while in a 7-10 story condo 5 connections will serve every 85 customers. As a result of this adjustment, the fixed charge for natural gas is $48 per year for a single 4-6 story condo unit, and $167 per year for a single 7-10 story condo unit. This fixed component is added to the variable component calculated above to determine a total billed amount. A build-up of an estimated typical simple town home annual bill is shown below for reference.

Usage, Fees, and Charges			
Description		**Amount**	
Gas Usage		22,240	kWh
Current Gas Rates	$	0.0173	/kWh
Variable Gas Charge	**$**	**384**	
Equivalent Gas CO2 Rate		0.1836	tonnes/MWh
Equivalent CO2		4	tonnes
Carbon Tax Rate	$	35	/tonne
Carbon Tax	**$**	**143**	
Electricity Usage		388	kWh
Current Electricity Rates	$	0.1160	/kWh
Variable Electricity Charge	**$**	**45**	
Total Variable Charges	**$**	**572**	
Fixed Gas Rate	$	1.4725	/day
Fixed Electricity Rate	$	0.8228	/day
Fixed Charge	**$**	**838**	
Total Due	**$**	**1,410**	

Maintenance Cost Differential

The bill above is not adjusted for any associated maintenance costs. The Fiscal Policy makes reference to the inclusion of maintenance costs, and as such, bill amounts should be adjusted to reflect any differential in maintenance costs between the Blatchford and BAU customers. For instance, a simple town home in Blatchford is expected to incur on average $425 in maintenance costs each year, while under the BAU these maintenance costs are only $283[7]. Therefore, the annual bill of $1,410 above must be reduced by the differential of $(143) to achieve the same total annual utility bill and maintenance costs for a town home. For condos, estimated customer maintenance costs are expected to be higher under the BAU than within Blatchford, and as such, bills are adjusted upwards in order to achieve equivalent all in costs. For example, both 4-6 Story and 7-10 Story Condo bills are increased by $147 to reflect the reduction in maintenance costs to $297 in Blatchford as compared to $444 under the BAU[8]. Similar adjustments are made to all customer classes in order to determine the respective BAU bills. Maintenance costs referenced are taken from the COE Financial Model, which details

[7] Maintenance costs are based on the average annual nominal maintenance cost for each customer class over the projection period included in the COE Financial Model. (Source: COE Financial Model)
[8] Maintenance costs are taken directly from the COE Financial Model. Under the model's assumptions end user maintenance costs are not expected to differ between different types of condo units in either the BAU scenario or within Blatchford. (Source: COE Financial Model).

end user maintenance costs expected[9]. The following table details the adjustments made to bills for each customer class.

Customer Class:	Unadjusted BAU Bill	BAU Maintenance	DESS Maintenance	Maintenance Adjustment	Adjusted BAU
Simple Town Home	$1,410	$283	$425	$(143)	$1,267
Strata Town Home	$1,420	$294	$455	$(160)	$1,259
4-6 Story Condo	$871	$444	$297	$147	$1,018
7-10 Story Condo	$1,014	$444	$297	$147	$1,161

As demonstrated in the above table, Blatchford customers that pay an annual bill in the amount of the "Adjusted BAU" column will effectively pay the same amount as a BAU equivalent customer for the total of utility costs including the maintenance adjustment.

Rate Design

This section discusses the alternatives considered to determine fixed and variable rates based on the adjusted BAU bill for each customer. We have considered three options to determine the fixed and variable components of customer billings: (1) using published electricity rates as variable thermal rates, and setting fixed rates to achieve an equivalent BAU bill; (2) using published natural gas rates as variable thermal rates, and setting fixed rates to achieve and equivalent BAU bill; and, (3) determining a fixed-variable split based on a stated ratio. Considerations under each of these options is discussed in further detail below.

Posted Electricity Rates

Under this methodology, all variable charges (thermal and electricity) incurred under the district energy are to be charged at the prevailing electricity rates available to customers. In order to reach a BAU bill amount, a fixed charge is determined for each customer class to achieve equivalent adjusted BAU billing amounts. In our analysis of this option it was determined that prevailing electricity rates are too high for this methodology to be fair to all customers. Given the total bill is pegged to BAU bills, the variable component using electricity rates resulted in bills that are nearly entirely variable. Fixed charges under this methodology are near zero, and in some cases, are negative values. This rate setting methodology would result in a lack of perceived fairness from customers, as high use customer bills would be disproportionately higher as compared to low use customers. Further, BAU customers receive proportionately more energy from natural gas usage than electricity usage. In 2019, gas is expected to contribute to 88.4% of kWh usage by BAU customers based on usage values included in the COE Financial Model. As electricity represents a smaller proportion of total customer energy, using the prevailing electricity rate would be less appropriate.

[9] As noted, end user maintenance for townhome customers are forecast to be higher for Blatchford customers as compared to BAU customers, while condo customers' maintenance costs are forecasts to be lower in Blatchford. BAU townhomes have lower cost mechanical systems compared to Blatchford townhomes, and maintenance expense forecasts used in the COE Financial Model are largely based on capital costs. Furthermore, heat pump water heaters, for example, would have more routine maintenance as compared to a gas hot water tank. For condo buildings, end user maintenance costs are lower largely because mechanical room equipment (referred to as Group 2 assets in the COE Financial Model) are owned and maintained by the Utility, rather than the customers. Thus, from the customer perspective, maintenance costs are lower. (Source: COE Financial Model; Byrnes, Andrew, Pinchin Ltd., August 21, 2018).

Posted Natural Gas Rates

This rate setting methodology is calculated much in the same way as using the posted electricity rates, with variable thermal rates instead being charged using prevailing natural gas rates. A key difference in applying gas rates is noted, however, as gas rates are calculated on a $/GJ basis, while thermal energy is based on kWh. In our discussions and analysis, we have noted that a required conversion may lead to a lack of simplicity in customer billings which may not be appropriate under our required criteria.

Fixed/Variable Ratios

A fixed/variable ratio rate setting methodology would involve fixing total bill amounts to the estimated BAU equivalent bill for each customer, and applying a constant variable/fixed ratio across rate classes to determine the proportional amounts to be billed as part of either fixed or variable rates. Using the BAU equivalent bill as a starting point, we would remove the variable and fixed charges associated with electricity required to operate heat pumps, etc. The remaining amount would be used to inform the variable and fixed rates for the thermal energy provided by the Blatchford District Energy Utility.

This methodology is simple to understand and apply, and allows for an initial assessment of various ratios to determine a fixed and variable breakdown that does not treat any individual customer class unfairly. As this methodology has been determined to be the most appropriate based on our criteria, additional details on calculating rates using this methodology is presented below. Further, sensitivity analyses have been performed in order to determine the fairness of applying these rates for varying customer classes and usages.

In selecting an appropriate fixed/variable ratio, we considered Utility's cost structure. Many cost elements of a utility's revenue requirements can be identified to be fixed, variable, or a combination of both. Fixed components generally include depreciation, interest, and the return on rate base. Variable components are primarily associated with operations, such as delivery charges. For most heating and cooling utilities, this evaluation results in a large proportion of costs identified to be fixed in nature. A "straight-fixed variable" rate design is used when the fixed charge is set to fully recover the portion of costs that are fixed. However, when translating this amount to fixed rates, customers often push back due to the limited perceived control they have on their bills. Moreover, external stakeholders argue that higher proportion of fixed charges do not incentivize reduced consumption. Based on an analysis previously conducted within the COE financial model, it was determined that fixed costs represent approximately 80% of costs, while 20% of the costs (primarily associated with Utility's cost of energy) are variable[10].

In analysing assumed BAU ratios per the COE Financial Model this ratio ranged from approximately 40/60 variable/fixed for simple town homes, to approximately 60/40 for 4-6 Story Condos, and average approximately 50/50 across all classes (see Appendix 4 for more details). Variances in BAU cost structure largely relate to reduced fixed charges for natural gas present in condo units as a result of sharing a single connection amongst multiple units. After considering the above, and performing our sensitivity analysis it was determined that a 35/65 variable/fixed ratio reasonably mirrors the cost structure to support predictability in revenues, while maintaining fairness to customers in high and low use scenarios. The results of the sensitivity analysis are included in the Rate Sensitivity Analysis below. Moreover, using this slightly higher variable cost allocation than the Utility's cost structure would also incentivise user conservation behaviour to a greater degree.

Variable Component

Bills for each customer class as calculated in the BAU Build-Up above were multiplied by the estimated build-out of units for the respective customer class to calculate a total expected billing amount under the BAU scenario. This amount was calculated as $132,405 in 2019 (2020 - $275,744). Given that the Fiscal Policy requires customers to pay no more than BAU rates and maintenance costs, the total expected billing above is adjusted for the differential in maintenance costs in the BAU as compared to Blatchford customers. Amongst all customers types, this differential results in an increase to total rates of $10,312 in 2019 (2020 - $20,624), for a total of

[10] While some operating and maintenance costs may be variable in nature, they have been assigned to be fixed costs within COE Financial Model groupings.

$142,717 of required charges in 2019 (2020 - $296,368). This requirement was then multiplied by 35% to arrive at a variable rate component of $49,951 in 2019 (2020 - $103,729).

A portion of the variable component of the Utility's bills is made up of electricity charges (associated costs paid to the electric utility, rather than to the Blatchford District Energy Utility). To determine the thermal component (associated with services provided Blatchford District Energy Utility for heating, cooling, and heat for domestic hot water) of the total variable charge, the electricity component must first be calculated, and deducted from the total calculated variable charge. The total variable electricity charge across all customer classes was determined by taking the product of all electricity usage (2019 – 259,842 kWh, 2020 – 519,685 kWh) and electricity rates (2019 - $0.116/kWh, 2020 - $0.118/kWh). As the total variable charge is made up of both a variable electricity component, and a variable thermal component, the above calculated variable electric charge is deducted from the total variable charges to arrive at the variable thermal charge. This expected amount is $19,822 in 2019, and $42,648 in 2020.

Next, to determine a variable thermal rate, the required variable thermal charge was divided by the anticipated usage across all customer classes. In 2019, estimated usage of 99,900 kWh (2020 – 199,799 kWh) of thermal energy results in an effective thermal rate of $0.0248/kWh (2020 - $0.0267/kWh). This rate was then applied to each of the customer classes based on their estimated usage to determine the variable component of each bill.

Fixed Component

The fixed component of bills was determined by multiplying each individual BAU bill (adjusted for maintenance) for each customer class by 65%. Fixed requirements by class are detailed below:

Customer Class:	2019	2020
Simple Town Home	$823.82	$865.83
Strata Town Home	$818.54	$861.01
4-6 Story Condo	$661.48	$683.79
7-10 Story Condo	$754.33	$779.20

In order to maintain fairness in rates and support practical rate implementation and billing over initial years, two fixed rate averages were calculated: one for town homes, and one for condos. This calculation involved taking an average required fixed component for Simple and Strata town homes, and a separate average of fixed components for 4-6 Story Condos, and 7-10 Story Condos. The resulting annual fixed requirements for town homes are $821 in 2019, and $863 in 2020. For condos, the annual fixed requirements are $708 in 2019, and $732 in 2020. This calculation represents a simple average for fixed charges, however, a weighted average based on number of units expected was also considered. Using a weighted average had no consolidated material impact on the total variances to BAU bills amongst all customers. Moreover, the analysis shown focuses on the impacts to each customer type against its own BAU scenario, regardless of the portfolio of building types forecast in certain years in Blatchford. Therefore, the fixed charge, has been calculated using a simple average.

A portion of the fixed component of the Utility's bills is made up of fixed electricity charges (associated costs paid to the electric utility, rather than to the Blatchford District Energy Utility). To determine the thermal component (associated with services provided Blatchford District Energy Utility for heating, cooling, and heat for domestic hot water) of the total fixed charge, the electricity component must first be calculated, and deducted from the total calculated fixed charge. The total electricity fixed charge was calculated using assumed fixed electricity rates (consistent with those used in the BAU bill calculation) and multiplying by the estimated build-out under the DESS in each year. The total fixed electricity charge across all classes was $39,297 in 2019, and $80,873 in 2020 ($300/customer and $309/customer respectively). These amounts were deducted from the total fixed requirements above to arrive at the required fixed thermal charges. For town homes, the fixed thermal charge is $521 in 2019, and $554 in 2020. For condos, the fixed thermal charge is $408 in 2019, and $422 in 2020. These annual fixed charges were then divided by 365 to determine daily fixed rates.

This methodology lends itself to creating variances between the pegged bill and estimated BAU bill, however, all rates calculated were within +/- 10% of the BAU scenario. Additionally, this methodology results in values that are slightly, but not significantly varied from the targeted 35/65 variable to fixed ratio. Given our analysis, it has been concluded that this variance does not have a material impact on customers or utility revenues.

Total bills as compared to BAU (less maintenance adjustment) are presented below:

2019

Customer Class:	Calculated Bill	BAU Bill	Variance
Simple Town Home	$1,253.31	$1,267.41	(1.1)%
Strata Town Home	$1,260.40	$1,259.29	0.1%
4-6 Story Condo	$1,067.01	$1,017.66	4.8%
7-10 Story Condo	$1,110.44	$1,160.51	(4.3)%

2020

Customer Class:	Calculated Bill	BAU Bill	Variance
Simple Town Home	$1,311.87	$1,332.05	(1.5)%
Strata Town Home	$1,319.23	$1,324.63	(0.4)%
4-6 Story Condo	$1,104.27	$1,051.98	4.8%
7-10 Story Condo	$1,150.33	$1,198.77	(4.0)%

Rate Conclusions

Using the above calculation methodology we have calculated a variable rate which is to be applied to thermal energy usage incurred by all customers, regardless of class, as well as two separate fixed rates, one for each of town home customers and condo customers. The calculated rates for the first two years of operations are summarized in the following chart. This details the outputs from the methodology described above. Alternatively, the City may wish to escalate 2019 rates based on a constant multiplier to arrive at 2020 rates.

2019

Customer Class:	Variable Rate	Fixed Rate
Town Homes	$0.0248/kWh	$1.43/day
Condos	$0.0248/kWh	$1.12/day

2020

Customer Class:	Variable Rate	Fixed Rate
Town Homes	$ 0.0267 /kWh	$1.52/day
Condos	$ 0.0267 /kWh	$1.16/day

Rate Analysis

To analyze the appropriateness of the rate setting methodology, comparisons have been made based on different usage intensities within customer groupings, as well as to initial rate analysis contained in the COE Financial Model.

Alternate Ratios

In selecting an appropriate variable/fixed ratio, analysis was performed on the use of alternative ratios, namely, a 50/50 variable to fixed ratio, and a 20/80 variable to fixed ratio. These ratios were determined based on the analysis of BAU ratios and the utilities expense structure as discussed in the Fixed/Variable Ratios section above.

In the base case, variances to BAU do not differ significantly when using a 35/65, 20/80, or 50/50 ratio, however, in general, the higher the variable component, the lower the absolute variance to BAU. Variances across all scenarios were below a reasonable threshold, and no material differences in these scenarios were noted.

A 20/80 ratio did not function appropriately, as the fixed component made up too significant a portion bills. As a result of large fixed portions the calculated thermal component of variable rates ended up as a negative value, which is not appropriate in rate setting.

Using a 50/50 ratio did not result in extensive variations from the BAU case. This is as a result of a 50/50 ratio closely mirroring the actual ratio present for customer bills within the BAU scenario. Although this ratio functions appropriately as compared to the BAU, it is noted that a 50/50 ratio does not closely mirror the cost structure of the Utility, which may result in greater revenue predictability risk for the Utility. While there are other examples where a 50/50 ratio was used (such as Dockside Green Energy as detailed in Appendices 1 and 2), there is merit in taking the Utility's cost structure into consideration as well.

At this time, it is suggested that initially, a 35/65 ratio be used as it is believed that this ratio balances the considerations required in selecting an appropriate ratio. This fixed/variable split does not significantly disparage any customer class as compared to the BAU, while maintaining some parallel with the utility's cost structure. This should be revisited as the Utility evolves and more information around customer consumption patterns is gained, and the risk appetite for the Utility with respect to its cost recovery is fully confirmed.

Rate Sensitivity Analysis

Rates calculated in this report are calculated such that the average customer is in a comparative situation to their BAU equivalent. In order to test the reasonability of this rate setting methodology it is prudent to apply these rates to usage by customers with higher and lower annual energy use requirements within each broad rate class. To perform this sensitivity analysis we have held rates constant and compared calculated customer bills to the BAU in a high use and low use scenario. Specifically, these scenarios include a plus and minus 25% energy use requirement adjustment from baseline usage estimates as per the COE Financial Model.

When comparing the low usage we have reduced the energy use requirements by 25%. To determine commodity requirements (i.e. gas, electricity, thermal), we have determined the required energy input to deliver the reduced energy outputs under this scenario. Using the COE Financial model, we have divided the base case energy outputs (i.e. heating, cooling, hot water) by the base case commodity requirements (i.e. gas, electricity, thermal) to determine commodity-to-output ratios. These ratios were applied against the reduced energy use requirements to yield an updated requirement for gas and electricity usage under the BAU, and electricity and thermal usage for Blatchford customers. Holding rates constant with the base case, each customer class bill was calculated and compared to the BAU. All variances were within +/- 10%, with the exception of 4-6 Story Condos, which are at 10.2% in 2019. Given the nature of forecasts and sensitivity analyses, a reasonable +/- range is acceptable as per industry practice. The variance is largely due to differences in fixed and variable rates, as variable components of the calculated Blatchford Utility bill for this customer class make up a smaller portion of the total, and as such, a lower use customer would be expected to pay more as compared to the BAU. Total bills (including maintenance) for low use customers are shown in the charts below for years 1 and 2.

2019 – Low Use

Customer Class:	Calculated Bill	BAU Bill	Variance
Simple Town Home	$1,145.28	$1,124.33	1.9%
Strata Town Home	$1,150.60	$1,113.86	3.3%
4-6 Story Condo	$977.23	$886.92	10.2%
7-10 Story Condo	$1,009.81	$1,023.86	(1.4)%

2020 – Low Use

Customer Class:	Calculated Bill	BAU Bill	Variance
Simple Town Home	$1,199.76	$1,178.35	1.8%
Strata Town Home	$1,205.28	$1,168.39	3.2%
4-6 Story Condo	$1,011.08	$915.14	10.5%
7-10 Story Condo	$1,045.62	$1,055.77	(1.0)%

The process for comparing high usage customers was much the same as above, but instead increased energy use requirements by 25%. This analysis provided no customers outside of a reasonable +/- range during the first 5 years. Total bills (including maintenance) for high use customers are shown in the charts below for years 1 and 2.

2019 – High Use

Customer Class:	Calculated Bill	BAU Bill	Variance
Simple Town Home	$1,361.34	$1,410.50	(3.5)%
Strata Town Home	$1,370.21	$1,404.72	(2.5)%
4-6 Story Condo	$1,156.79	$1,148.40	0.7%
7-10 Story Condo	$1,211.08	$1,297.17	(6.6)%

2020 – High Use

Customer Class:	Calculated Bill	BAU Bill	Variance
Simple Town Home	$1,423.98	$1,485.76	(4.2)%
Strata Town Home	$1,433.19	$1,480.86	(3.2)%
4-6 Story Condo	$1,197.47	$1,188.83	0.7%
7-10 Story Condo	$1,255.03	$1,341.77	(6.5)%

Levelized Comparison

The COE Financial Model calculated a bill based on a levelized rate structure using anticipated costs of operating the District Energy Utility (the Levelized Bill). The Levelized Bill incorporated this levelized rate and compared to the BAU customer over a 50 year lifecycle. Since the development of the COE Financial Model, updates have been made to forecasted costs expected by the Blatchford Utility. These updated figures impact any calculated levelized rates, and the total amount included on a Levelized Bill.

Using the COE Financial Model, we have recalculated levelized rates as well as updated Levelized Bills, and compared these bills to the BAU Bills. The Levelized Bill was also used as a comparison point for the rates calculated under the Grant Thornton model, as the Levelized Bill is what initially informed decisions surrounding the Blatchford project. Updated values did not differ materially in any respect from original Levelized Bills (<0.1% variance.

The following table shows a comparison of updated Levelized Bills to BAU equivalents (adjusted for maintenance).

2019

Customer Class:	Updated Levelized Bill	BAU Bill	Variance
Simple Town Home	$1,406.05	$1,267.41	10.9%
Strata Town Home	$1,412.86	$1,259.29	12.2%
4-6 Story Condo	$1,134.25	$1,017.66	11.5%
7-10 Story Condo	$1,174.31	$1,160.51	1.2%

2020

Customer Class:	Updated Levelized Bill	BAU Bill	Variance
Simple Town Home	$1,441.09	$1,332.05	8.2%
Strata Town Home	$1,448.02	$1,324.63	9.3%
4-6 Story Condo	$1,162.57	$1,051.98	10.5%
7-10 Story Condo	$1,203.57	$1,198.77	0.4%

The table below shows a comparison of updated Levelized Bills to bills as calculated under this report.

2019

Customer Class:	Updated Levelized Bill	Calculated Bill	Variance
Simple Town Home	$1,406.05	$1,253.31	10.9%
Strata Town Home	$1,412.86	$1,260.40	10.8%
4-6 Story Condo	$1,134.25	$1,067.01	5.9%
7-10 Story Condo	$1,174.31	$1,110.44	5.4%

2020

Customer Class:	Updated Levelized Bill	Calculated Bill	Variance
Simple Town Home	$1,441.09	$1,311.87	9.0%
Strata Town Home	$1,448.02	$1,319.23	8.9%
4-6 Story Condo	$1,162.57	$1,104.27	5.0%
7-10 Story Condo	$1,203.57	$1,150.33	4.4%

While similar, the calculated BAU bills are slightly lower than the bill amounts calculated using the levelized methodology in the COE Financial Model. This influences the deferral amount required for the Utility over initial years. However, as there are a limited customers over initial years, the absolute impact to the overall rate revenue is minimal between the two approaches. Once the utility is more established, it is feasible that other rate setting methodologies are used which may reduce these variances. Further, the recommended rates do not materially change the considerations included in the originally modelled scenario within the COE Financial Model.

Utility Perspective

Over initial years of operations, the deferral amount is not expected to differ significantly under the BAU rate setting methodology calculated in this report and levelized rate setting approach used in the COE Financial Model.

Additionally considered in the COE Financial Model is the approximately $93M external cash injection amount from the City of Edmonton / grants over the first nine years of operations. It was noted that this investment amount relates only to capital expenditures required to operate the Utility. As such, the deferrals noted above are in addition to this amount. It will be important to track the cumulative deferral and for the City to be prepared to provide the Utility with a working capital loan to fund these shortfall amounts. While out of scope of this engagement, the City can consider how the Utility is to recoup this initial working capital requirement from future rate payers.

Future Considerations

As the Utility matures, additional information and certainty surrounding forecast assumptions will become available. This added ability to project operations will allow the Utility to make new considerations for alternative rate setting methodologies that are more appropriate in a mature, developed Utility. Some considerations that will likely be made moving forward are:

1) Customer classes
2) Heating and cooling rates
3) Seasonality
4) Alternative rate setting methodology

Customer Classes

The current recommended rate setting methodology contained in this report suggests broad rate classes based on the initial assumptions held through the modelling process. As actual usage metrics become available, the utility should revisit the classification of users. Making a more in depth consideration for usage patterns will allow for more tailored rates which can result in more fair rates across customer classes, and the elimination of any potential cross subsidisation that may be present in the current initial rate design. Further analysis with a Cost of Service Study can reveal whether cross subsidisation amongst customer classes exists.

Heating and Cooling Rates

Given the assumptions noted in the COE Financial Model, there may be different thermal energy and electrical requirements to provide similar level of heating and cooling outputs. As a result, there may be merit to charge different rates for heating and cooling to customers.

Seasonality/Peak Rates

After several years of usage data is available the utility may consider adjusting rates during the year based on seasonality of usage. This would involve raising or lowering rates during parts of the year based on the expected load, to encourage or discourage additional usage. A similar approach can be taken in setting peak rates to apply based on the time of day.

Alternative Rate Setting Methodology

As is noted in this report, there are several other viable options for rate setting methods available to the City in establishing rates. A large drawback of these alternative options, including levelized rate setting, is the lack of available information on Blatchford's performance to allow for accurate projections. As more information becomes available, and the City is able to make more accurate projections rate setting methodologies such as levelized rates, or a hybrid approach may become more viable, and should be considered once again. These methods are consistent with methodologies used in several more mature district energy cases analyzed in benchmarking research, and as such, should be considered when this utility has matured.

Appendices

Appendix 1 – Benchmarking Study Summary

City	Services Provided	BAU Comparison	BAU Comparison Methodology	Fixed Cost Methodology
City of Edmonton **Blatchford District Energy (Modelled Scenario)**	▪ Thermal heat ▪ Cooling ▪ Hot water	▪ Heating, cooling, and hot water costs incurred by average City of Edmonton Customers ▪ Customers using gas and electricity for heating, cooling, and hot water	▪ NPV of lifecycle costs over a 25 year period ▪ Includes utility costs, maintenance costs, and capital costs.	▪ Levelized costs allocated on a m^2 basis
City of Whitehorse **District Energy Pre-Feasibility Study**	▪ Biomass heat	▪ Customers in the Whitehorse region using fuel oil to meet heating requirements ▪ BAU customers are assumed to purchase fuel oil at commercial rates.	▪ NPV of lifecycle costs over a 25 year period ▪ Includes utility costs, maintenance costs, and capital costs ▪ Rates set using a premium on BAU energy charges and compared on an NPV basis	▪ A monthly connection charge based on floor area set to recover the DES utility's fixed costs
City of Vancouver **Southeast False Creek Neighbourhood Energy Utility**	▪ Heating ▪ Hot water	▪ Costs of space heating and domestic hot water in the City of Vancouver ▪ Assumes utility delivery installed for a typical Vancouver mixed-use development	▪ Levelized operating and capital costs	▪ Fixed capacity levy charged to recover the amortized capital cost of the utility's construction, CAPEX, ROE, dept interest service, proportional share of the city's administrative corporate overhead,

City	Services Provided	BAU Comparison	BAU Comparison Methodology	Fixed Cost Methodology
				maintenance, direct costs of staffing, insurance, rent, and property taxes ▪ The fixed levy is a monthly charge based on square footage, set to increase annually at a real rate of 1.15% above inflation
City of Revelstoke **Revelstoke District Energy**	▪ Biomass heat ▪ Hot water	▪ Full cost of generating thermal energy within the City of Revelstoke ▪ Space heating is assumed to be provided using a mix of electric baseboard heating with propane hot water and ventilation air ▪ Electricity costs are based on BC Hydro prices, while propane costs are estimated based on the US Energy Administration's Annual Energy Outlook price forecast	▪ Levelized life cycle cost including the costs of annualized capital, fuel, and non-fuel operating costs	▪ Limited information available ▪ Costs compared are only on a /MWh basis
City of Sapperton **Sapperton District Energy System**	▪ Heating using wood chip combustion or sewer heat extraction	▪ Costs associated with forecasted community heating demands using conventional heating methods	▪ Levelized lifecycle costs over a 30 year period ▪ Includes all operating and capital costs	▪ A fixed charge should be charged to recover the city's fixed costs

City	Services Provided	BAU Comparison	BAU Comparison Methodology	Fixed Cost Methodology
		▪ The conventional heating method considered is the use of natural gas		
City of Surrey **City of Surrey District Energy System**	▪ Thermal heating	▪ Cost of electric baseboard heating to deliver heat to Surrey City Centre customers	▪ Costs of generating thermal energy are compared directly to current electricity rates ▪ Capital, operation, maintenance, operating, and other costs are added to determine an total all in cost per MWh ▪ District energy capital cost premium is calculated, as well as the payback period	▪ Fixed charge based on an allowance to recover fixed costs, and is based on occupied square feet
City of Victoria **Dockside Green Energy**	▪ Thermal heating and domestic hot water	▪ Costs incurred under Tarasen Natural Gas and Lonsdale DES Natural Gas	▪ 20 levelized costs comparison including fixed and variable energy charges, gas cost recovery charges, and boiler cost and maintenance	▪ Fixed cost charged on a per m^2 basis
City of Halifax **Cogswell Redevelopment District Energy System**	▪ Space heating ▪ Domestic hot water ▪ Space cooling	▪ 3 BAU options considered, including electric heating, water-source heat pump with natural gas heat, and water-source heat pump with oil heat	▪ Present value of costs over a 20 year lifecycle comparison performed ▪ Costs focus on fuel costs	▪ Limited information available

City	Services Provided	BAU Comparison	BAU Comparison Methodology	Fixed Cost Methodology
Corix Multi-Utility Services, Simon Fraser University (SFU) **UniverCity Neighbourhood Utility Service (NUS)**	▪ Biomass heating ▪ Hot water	▪ Rates per MWh compared to those that customers would otherwise bay using natural gas to deliver services	▪ 30 year levelized rate is used as a comparison point	▪ Fixed monthly capacity charge on a basis of $/MW of nominated capacity/month ▪ Based on the annual cost of service allocated to SFU
City of Whistler **Whistler Cheakamus Crossing District Energy System**	▪ Heating ▪ Hot water	▪ BAU options considered include electric hydronic heating systems, or electric baseboard heating ▪ Total ownership costs of each system are considered	▪ Lifecycle costs using an estimated 20 year lifecycle ▪ Total costs include energy costs, maintenance costs, and capital costs	▪ All energy costs are charged on a fixed basis per m^2 under the DESS
City of Langford **Westhills Langford District Energy Sharing System**	▪ Geoexchange heat and hot water	▪ Direct rate comparison	▪ Initial rates are set based on current prevailing BC Hydro rates ▪ In subsequent years, rates are to increase by up to 10% a year	▪ Monthly charge based on the size of the connection ▪ Service charges may increase based on the CPI published for the Greater Victoria region

Appendix 2 – Detailed Benchmark Research

Precedent	BAU Reference Point	Business as Usual Calculation
Base Case: Model[11]	City of Edmonton Customers	**Definition Summary** The 25 year net present value of customer lifecycle costs. The business as usual ("BAU") scenario includes costs associated with utility bills, as well as capital and maintenance costs associated with equipment necessary to provide heating, cooling, and domestic hot water for a customer. All of these costs are estimated over a 25 year period and discounted to present value when compared to similar expenses incurred under the Blatchford District Energy ("DE"). **Energy Cost** Under the BAU, electricity is assumed used to provide space heating and cooling, and gas is used to provide space heating, and domestic water heating. Under the DE, electricity and thermal energy are used to provide all three services. Costs included are variable and fixed electricity costs, variable and fixed gas costs, carbon tax (BAU only), and variable and fixed thermal energy costs (DE only). These represent the various types of energy used to deliver heating, cooling, and domestic hot water services in the two cases being compared. Electricity and costs are determined using effective rates in the City of Edmonton, and typical usage in several groups of customers including: simple town homes, strata town homes, 4-6 story condo units, 7-10 story mixed use units, NAIT educational facilities, NAIT residential units, and office spaces. Usage intensity is scaled up to equal the "Standard Green Building" in Edmonton. Specifically, under the assumption that a BAU customer is in a property constructed under the prior version of the Alberta building code, the model assumes a 357% energy use intensity factor. This means that BAU customers are assumed to consume 3.57 times the amount of energy as compared to DE customers given energy efficiency improvements in the Alberta building code. Rates are increased annually based on forecast growth rates. For 2019, the electricity variable rate is estimated at $0.118/kWh, which is subsequently escalated at 10.7% per year until 2031, and 3.0% thereafter. The fixed rate for electricity starts at $0.863 per day in 2019 and grows at 2.9% annually. For simple town houses, BAU usage is estimated at 11 MWh per unit per year, resulting in total electricity costs of $343 per customer. This compares to $567 for a simple town house in the DE area which assumes 67 MWh of usage at the same rates as the BAU. For gas, the variable rate in 2019 is $0.024/kWh, with a fixed rate of $1.618/day/meter. Each

[11] All information and assumptions pertaining to the base case model precedent are taken from the COE Financial Model.

Precedent	BAU Reference Point	Business as Usual Calculation
		simple town home is expected to use the equivalent of 657 kWh of gas. The total expected simple town house gas bill in 2019 is $1,131 for a BAU customer, compared to nil under the DE area. Estimates for annual increases in the carbon tax are made, and an estimate of applicable carbon tax is applied based on the anticipated usage. The carbon tax of $30/tonne is expected to grow to $50/tonne in 2022, and 3.0% annually thereafter. This tax is applied to the CO2 equivalent generated from gas usage only (the tax does not apply to electricity). A typical simple town home is expected to incur an additional $143 in 2019 on carbon taxes in the BAU scenario over and above the cost of gas charged. This expense would not be incurred under the DE. Additional energy costs incurred under the DE include variable thermal energy cost, and fixed thermal energy cost, which are estimated at a total of $840 for a simple town house in 2019. This billing is based on thermal energy rates of $0.022/kWh, increasing at 2.7% annually. An average simple townhouse is expected to use 200 MWh in 2019. Based on the above, total energy billings in 2019 for an average simple town home is expected to be $1,618 under BAU, compared to $1,407 under DE. **Maintenance Cost** Annual maintenance fees required on capital equipment are estimated on an aggregate basis as a percentage of total value of capital assets. The maintenance fees are applied against each customer sub class pro-rata on a basis of number of development units. Over a 25 year period, maintenance costs are estimated at $110,134,968 in a BAU scenario, compared to $78,749,473 under the district energy. **Capital Cost** Required capital expenditures are estimated based on estimated costs of specific development phases. These costs are applied to individual years based on estimated completion of each phase, and grossed up by expected inflation values. No value is allocated for an expected terminal value on disposal of equipment. Over a 25 year period, capital costs are estimated at $548,315,533 under the BAU, and $574,086,073 under the district energy. A summary of key inputs and totals is included in Appendix 2.

Precedent	BAU Reference Point	Business as Usual Calculation
Blatchford Business Plan and Fiscal Policy	City of Edmonton Customer	Rates are to be set to be comparable to the annual utility bills and maintenance costs for customers living elsewhere in Edmonton for the initial years of operations. Rates are to be set based on a full cost accounting approach which is to be capped based on the energy utility bills and maintenance costs which would be expected by customers outside of Blatchford. Scope of Work: A cost recovery analysis assuming 100% of the annual revenue requirement/cost of service will be recovered via the proposed rates or, to the extent this is not possible, recommend a strategy and mechanism to track and flow through the annual revenue excess/shortfall in the future.
Whitehorse, Yukon Pre-Feasibility Study[12]	City of Whitehorse Customers	**Definition Summary** The total costs incurred for customers including fuel, and capital costs over a 25 year period expressed in real 2009 (current period of study) dollars. **Energy Costs** Costs including fuel oil, electricity, and biomass are projected over the 25 year lifespan of the analysis. In the BAU scenario, customers are assumed to purchase at commercial rates, while under the district energy system the DE would be able to purchase at wholesale rates. Electricity rates and biomass rates are projected to remain relatively consistent over the forecast period. Given added efficiencies expected in the district energy scenario, energy costs per MWh are assumed to be equal to costs under the BAU scenario for fuel burn. A premium of 10% has been assigned to district energy rates in order to keep initial year losses reasonable. Based on this premium, customers are expected to pay an additional $3.75/$m^2$ in fuel costs under the district energy system, for an additional $2.00/$m^2$ in total costs, a 6% increment. **O&M Costs** Owner costs for the replacement of boilers, and operating and maintenance costs are not directly accounted for in the analysis. It is noted that these costs would be relevant, however, were not calculated as a result of the pre-feasibility stage of the project. In a full detailed study these costs would further be investigated to analyze their impact. **Rates**

[12] http://www.energy.gov.yk.ca/pdf/whitehorse_des_prefeasibility_study.pdf

Precedent	BAU Reference Point	Business as Usual Calculation
		Energy charges are set using the BAU case as a basis and adding a premium, as noted in discussion of energy costs.
Southeast False Creek Neighborhood Energy Utility ("NEU")[13], [14]	Space and hot water delivery installed in typical Vancouver mixed-use developments.	**Definition Summary** The BAU scenario is the relevant lifecycle cost of heating and domestic hot water systems that would be installed in typical local construction in the absence of the NEU. It assumes electric baseboard heat for residential houses and natural gas for ventilation air, domestic hot water and commercial spaces. **Energy Cost** The fixed and variable energy rates under the NEU are compared to the energy rates charged to customers under the BAU case. Under the NEU, a fixed charged based on the square meter floor area of each building is charged in order to recover fixed costs associated with constructing and operating the utility. This charge was initially set at $0.454/m^2 and is set to increase at approximately 3.15% per annum. The variable rate is based on actual energy used by the individual buildings and is designed to cover the variable cost of operating the NEU which includes only the natural gas purchased for the boilers, electricity for the heat pumps, and other small variable costs. The variable rate was initially set at $0.038166/kWh and is set to increase at similar rates to the fixed charge. Under the BAU, BC Hydro customers are a per day fixed charge of $0.1448 and a variable usage charge of $0.0667/kWh up to 2,240 kWh, and $0.0962/kWh beyond that level. For comparison, in a 65 m^2 condo (700 sq. ft.) the NEU's fixed change for the consumer is $29.50/month. Based on the building's expected energy intensity of 109.5 kWh/m^2/year, the condo will use 593 kWh/month at 0.038166/kWh, with the variable charge being $22.64, which is a total of $52.13/month for 593 kWh of energy used. For comparison, the NEU's effective rate would be $0.088/kWh – which is nearly the same rate as BC Hydro's 2011 forecasted effective rate of $0.087/kWh. Based on this analysis, NEU customers appear to be receiving competitive rates for energy. **Capital Costs**

[13] http://www.sauder.ubc.ca/Faculty/Research_Centres/Centre_for_Social_Innovation_and_Impact_Investing/Core_Themes/Low_Carbon_Economy/~/media/Files/ISIS/Reports/Carbon%20Management%20Reports/QUEST-ICES-Business-Case-Southeast-False-Creek-Neighbourhood-Energy-Utility.ashx

[14] https://council.vancouver.ca/20151209/documents/spec1b.pdf

Precedent	BAU Reference Point	Business as Usual Calculation
		Additional capital costs associated with the build-out of the NEU are considered in the additional fixed charge included in customer billings. No direct comparison is made in maintenance costs and other capital equipment purchases required by customers. **Total Lifecycle Costs** The total lifecycle costs of the NEU system are expected to be less or equal to than the BAU. This is due to the combined fixed and variable rates of the NEU are approx. equal to the BAU energy rate in Vancouver, but with the buildings operating more efficiently.
City of Revelstoke District Energy[15], [16]	City of Revelstoke – potential customers	**Definition Summary** Rates are calculated based on a levelized life cycle cost. The levelized life cycle includes the full cost of generating thermal energy (annualized capital, fuel, non-fuel operating costs) on an MWh basis. Additional costs not directly compared are property taxes, financing impacts, and depreciation. **Energy Cost** In multi-unit buildings BAU space heating is a mix of electric baseboard heating along with propane domestic hot water and ventilation air. Electricity costs are calculated based on BC Hydro purchase prices, which range from a low of $120/MWh based on BC Hydro's most recent clean power call, to $150/MWh based on the upper bound set under the Community-based biomass call. Propane costs are based on the US Energy Information Administration's Annual Energy Outlook price forecast. Levelized propane costs are estimated at $71-$73/MWh. Biomass energy is based on the availability of bone dry tonnes of biomass. Additional biomass over and above the current supply would cost approximately $10/MWh. Current usage of biomass energy is approximately 2,000 bone dry tonnes per year. Several scenarios involving different variations of increase biomass usage are considered under a potential DE with levelized costs per MWh estimated at $80-$110. As stated above, the levelized cost also considers capital costs and non-fuel operating costs associated with the alternatives. **Capital Cost**

[15] https://revelstoke.ca/DocumentCenter/View/180/District-Energy-Expansion-Pre-feasibility-Study?bidId
[16] http://www.questcanada.org/maps/city-of-revelstoke-energy-system

Precedent	BAU Reference Point	Business as Usual Calculation
		BAU capital cost estimates for non-residential buildings are based on term sheets for buildings that have been recently connected to the Revelstoke Community Energy Corporation system. BAU capital cost estimates for multi-family residential buildings are based on studies completed in the lower mainland of a similar equipment mix. Using a 10% discount rate, capital costs are discounted and annualized and converted to a MWh basis for comparative purposes. Capital costs are estimated at $42/MWh for non-residential units, and $27/MWh for multi-family residential units under the BAU scenario. **Maintenance Cost** BAU maintenance costs are calculated at 20% of capital. These costs are based on term sheets for recent RCEC connections.
Sapperton, BC District Energy System[17], [18]	Sapperton community customers	Business as usual is defined as using natural gas to meet all of the forecast community heating demand (this is a conventional heating scenario). The lifecycle studies are for a 30 year period. Levelized costs are calculated for the DE to cover the costs of all operating and capital costs. These rates must be set such that they are at or near the cost of conventional energy sources. Two low carbon community heating solutions were analyzed under the DE, representing proven technologies that are being used by other district energy systems in BC, wood chip combustion and sewer heat extraction.
City of Surrey District Energy System[19]	Surrey City Centre Customers	**Definition Summary** Business as usual is defined as electric resistance (baseboard) heating. **Energy Cost**

[17] https://www.newwestcity.ca/database/files/library/CNW_DOCS_563535_v2_Sapperton_District_Energy_System___Summary_of_Air_Quality_Impact_Study_.pdf
[18] https://www.newwestcity.ca/database/files/library/November_7_2016_Council_Report___Sapperton_District_Energy_System___Recommendations.pdf
[19] https://www.surrey.ca/bylawsandcouncillibrary/R109-B5E8.pdf

Precedent	BAU Reference Point	Business as Usual Calculation
		Thermal energy price comparable to current electricity rates, estimated at $81/MWh. **Capital Cost** The total capital cost for providing DE in a hub area ranges from $9.1 million to upwards of $66 million. If capital costs are combined with operations and maintenance costs, fuel costs, and applicable carbon taxes, the costs will range from lows of $60 per MWh to highs of $125 per MWh over a 40 year period. Almost all new high density residential development in Surrey is heated by electric resistance heaters. This type of heating has a low capital cost but has a high operating cost, compared to a hot water heating system in a district energy system. An installation premium for initial DE capital costs of $1,400 to $2,100 is estimated per unit which is estimated to be recoverable over 10-20 years. **Additional Considerations** Under a DE annual maintenance costs are expected to be reduced as a result of the elimination of boilers and chillers contained in individual buildings. As additional customers connect to the system, the financial viability of a DE improves. DEs are able to obtain greater efficiencies in energy usage. These efficiencies result in a reduction in direct energy costs to customers.
Dockside Green Energy ("DGE")[20]	City of Victoria Customers	**Definition Summary** A 20-year levelized rate calculated under the DE is compared to rates under Tarasen ("TGVI") Natural Gas and Lonsdale DES Natural Gas. Costs included in this analysis include fixed and variable energy costs, gas cost recovery charges, and boiler cost and maintenance. **Energy Cost**

[20] http://www.bcuc.com/Documents/Proceedings/2008/DOC_17671_B-1_DocksideEnergyCPCN.pdf

Precedent	BAU Reference Point	Business as Usual Calculation
		DGE is proposing a fixed/variable rate structure that would recover 50% of forecast revenues from the stratas with a fixed cost of $2.57/m^2 and 50% through a volume based rate of $14.01/GJ. DGE is also planning to have a separate gas recovery charge applied to peak usage periods to recover gas costs. For a typical 100 square meter apartment the expected energy cost is estimated at $42.33 per month. Under TGVI energy required for the same usage would cost $21.80. Under Lonsdale, this cost is $36.66. These usage totals assume 1,979 GJ in monthly usage. **Capital Costs** Under the TGVI, additional costs associated with boiler cost and associated maintenance are added to the BAU cost comparison. These costs are estimated at $22.84 monthly. No related costs are allocated in the DGE scenario or Lonsdale scenario. When this cost is included, the total monthly costs per suite are $42.33, $44.65, and $36.66 for DGE, TGVI, and Lonsdale respectively. Based on the above costs and the expected revenues generated by DGE, a 20 year NPV of negative $500,000 is expected.
St. Paul District Energy[21]	City of St. Paul Customer Rates	**Energy Cost** Energy charges are determined with the costs of energy (fuel and electricity) to produce hot water. The rates are based on the DE's estimated annual cost of energy of $0.02559/kWh, less fuel adjustment of $0.69/MWh, multiplied by projected total system megawatt-hour usage of energy. A fixed charge is determined every year calculated based on building's demand multiplied by the hot water demand rate of $5.27/kWh. The annual demand charge is based on the DE's energy costs which include energy production, (such as boilers) energy delivery, (pumps, distribution pipeline) operations, repairs, capital expenditures, and working capital. The sum of all of these is then divided by the total system-wide customer demand and multiplied by the individual customer building demand. Total energy charges based on the above analysis is compared to the energy charges under a natural gas heating system.

[21] http://www.districtenergy.com/wp-content/uploads/2015/09/DEHRBFY16.pdf

Precedent	BAU Reference Point	Business as Usual Calculation
Cogswell Redevelopment District Energy System[22]	City of Halifax Customers	**Definition Summary** The DES was compared to BAU scenarios on the basis of total costs to own and operate each system over 20 years. Costs compared include costs of energy and fuel, and capital and maintenance costs. **Energy Cost** The BAU system delivers energy at a cost of $0.092/kWh initially, as compared to $0.079/kWh under the DES. The reduction in cost stems from reduced fuel usage resulting from greater efficiencies as compared to BAU options, combined with reduced fuel cost. DES efficiency is estimated at 420% of the electric baseboard heating BAU base case. **Capital Cost** The DES option has a capital cost premium of $7.1 million over the natural gas boiler BAU. Under the DES, the present value of all costs is estimated at $19.8 million, as compared to $23.2 million under the DES.
Corix SFU UniverCity Neighborhood Utility Service ("NUS")[23]	Residential Natural Gas Customers	**Rates** Rates under the NUS include a 30 year levelized rate of biomass power generation delivered to SFU and customers in UniverCity. Using a levelized rate approach, rates under the NUS are compared to residential natural gas rates, and biomass excluding SFU. Residential rates under the NUS are $131.28, $144.71 using residential natural gas, and $151.41 excluding SFU. An alternative situation exists whereby SFU customers may opt out at year 20, in this scenario levelized rates are $148.31. Levelized costs consider the impact of energy costs as well as capital costs.
Whistler Cheakamus Crossing	City of Whistler Customers	**Definition Summary** The BAU is compared to the DE based on energy and ownership costs of the systems. BAU scenarios considered include electric hydronic heating system, or electric baseboard heating. Service life considered is based on a 20 year lifecycle.

[22] https://www.halifax.ca/sites/default/files/documents/city-hall/regional-council/170221rc1421.pdf
[23] http://www.bcuc.com/Documents/Proceedings/2017/DOC_49996_09-15-2017_Corix_Burnaby-Mtn-DEU-CPCN_Decision_WEB_Redacted.pdf

Precedent	BAU Reference Point	Business as Usual Calculation
District Energy System[24]		**Energy Costs** The first BAU scenario requires electricity to run an electric boiler, an electric DHW tank, and circulating pumps. A blended BC Hydro rate of $0.1166/kWh is applied to energy used in this scenario. The second BAU scenario requires electricity to run electric baseboards, and an electric DHW tank. A blended BC Hydro rate of $0.1166/kWh is applied to energy used in this scenario. Under the DE system, electricity costs are required in operating the heat pump and backup tank elements. As a result reduced energy usage in this scenario, a blended rate of $0.1036/kWh is used. Additionally, a DES utility charge of $4.58/$m^2$ is applied in this scenario. Average annual savings under the DES are $428 as compared to BAU 1, and $408 compared to BAU 2. In 2016 dollars, discounted savings are $3,440, and $12,440 as compared to BAU 1 and BAU 2 respectively. **Maintenance Costs** Annual maintenance costs are expected to be higher under the DE scenario as compared to BAU scenarios. These costs are estimated based on a routine annual service visit for normally functioning systems. Initial routine maintenance costs are estimated at $350 under the DE as compared to $300 under BAU 1, and nil under BAU 2. **Capital Costs** Capital costs related to the replacement of major components upon the end of useful service life are expected to be highest under the DE system. Initial capital costs are estimated at $543, $354, and $94 for the DE, BAU 1, and BAU 2 respectively. **Total Cost** Initial costs which include energy, maintenance, and capital costs under the DE total $1,895 per year. By 2036, this total increases to $2,857. In BAU 1, comparable costs are $2,085 in 2016 and $4,481 in 2036, and in BAU 2 these costs are $1,493 and $3,508. Over time, the DE system becomes much more cost effective as a result of superior energy cost stability.

[24] https://www.whistler.ca/sites/default/files/2017/Feb/related/108/energy_study_program_report_r2.pdf

Precedent	BAU Reference Point	Business as Usual Calculation
Envida Community Energy Inc.	City of Guelph Customers	In setting rates, Envida focused mainly on the alternative rates that customers would be subject to outside of the district energy. As such, business as usual was defined as the rates that customers would pay to Union Gas and Guelph Hydro for same or similar services. Given that there was no requirement to sign on to the district energy rates were initially set using a discount on the comparable rates in order to incentivize customers to sign on to the system. Qualitatively, capital and maintenance costs, as well as alternative uses of space were considered, and factored into sales pitches, however, these were not expressly included in the setting of rates.
Markham District Energy Inc. (MDEI)	City of Markham Customers	**BAU Definition** In establishing a BAU comparison, MDEI considered lifecycle cost of capital equipment to determine a fixed rate, and comparable city of Markham rates in establishing a variable rate. **Lifecycle Costs** Customers signing on to the DE system lock in rates for a 20+ year period. Contracts are negotiated individually with each potential customer. These customers have the alternative of buying a boiler/chiller and generating power in more traditional ways. MDEI analyzes the costs associated with buying and maintaining this equipment over the life of the contract and uses this information in negotiating applicable rates. **Cost of Power** In determining a variable rate, MDEI makes an estimate on the costs of a “virtual boiler”. This involves determining and agreeing upon an expected efficiency of a boiler with the customer, determining the equivalent boiler usage based on actual power used in a billing period, and applying this usage and efficiency to current rates. This process is completed for every billing period for the customer. As such, variable rates represent an estimate of the amount that they would be paying in a BAU scenario.
Hamilton Community Energy (HCE)	Hamilton Hydro Customers	**BAU Definition** In assessing a comparative BAU, HCE negotiate based on lifecycle costing. While no formal quantification is made, this analysis is performed as there is generally some desire for this analysis from the potential customers being engaged.

Precedent	BAU Reference Point	Business as Usual Calculation
BC District Energy Systems Study[25]	BC Hydro and Fortis Gas Customers	**Preamble** This study relates to general conditions associated with BC Direct Energy systems. The conditions discussed are in relation to the following 9 District Energy Located in BC: Central heat Distribution LTD (CHDL), Corix SFU UniverCity Neighborhood Utility Service (NUS), Dockside Green Energy (DGE), Corix Sun Rivers Resort Community, City of Vancouver Southeast False Creek Neighborhood Energy Utility (NEU), Prince George Downtown Biomass System, Whistler Cheakamus Crossing District Energy System, Upper Gibsons Geoexchange District Energy Utility and Westhills Langford District Energy Sharing System. **BAU Definition** The BAU scenario compared to relates specifically to the hydro rates which would be paid by customers on a utility bill. The DEs analyzed are compared based on the cost per mWh estimated to be paid by Fortis Gas or BC Hydro for heating and hot water utilities. Rate comparisons are summarized in the chart below.

[25] https://pics.uvic.ca/sites/default/files/uploads/publications/WP_District_Energy_May2012.pdf

Precedent	BAU Reference Point	Business as Usual Calculation

Utility	Estimated Cost per MW.h (2011)
Fortis Lower Mainland Gas	$ 40
Fortis Vancouver Island Gas	$ 60
Fortis Whistler Gas	$ 60
Prince George Downtown DE	$ 76 (2012)
Lonsdale Energy DE	$ 68
Central Heat DE	$ 50
Southeast False Creek DE	$ 84
BC Hydro (heat)	$ 86
Westhills DE	$ 84
Fortis BC Revelstoke Propane	$ 92
Dockside Green DE	$ 98
Corix UniverCity DE	$ 145 (2012)

Rates

Rates are set given a forecasted revenue requirement to meet forecasted expenses and a target return on equity (ROE). The target ROE is set by adding a utility-specific risk premium to a benchmark rate of return based on long term Canada bond yields. BAU scenarios are used as a comparative benchmark to the DE rates rather than a specific method of rate setting.

Qualitative considerations

Initial and lifecycle costs of capital equipment, as well as related maintenance costs required in a BAU scenario are considered only qualitatively, no specific quantification is made for these items. Additional qualitative items noted are the fluctuations of gas and electricity prices, comfort levels associated with various heating methods, floor space and associated usage of said space, and the environmental impact.

Precedent	BAU Reference Point	Business as Usual Calculation
Westhills Langford District Energy Sharing System[26, 27]	City of Langford Customers	Rate comparisons are made based on BC Hydro residential rates. The implied benchmarking point is the total utility bill, including energy cost and service charges, that a customer would be expected to be charged on a monthly basis. Initial rates were set to be identical to BC Hydro rates, less any rate riders. In subsequent years, rates are allowed to increase by up to 10%. Service charges and multi-family residential rates are increased based on the Consumer Price Index for household operations published by the Greater Victoria region.

[26] https://pics.uvic.ca/sites/default/files/uploads/publications/WP_District_Energy_May2012.pdf
[27] http://www.langford.ca/assets/Bylaws/Services/multi-utility-schedules-1291.pdf

Appendix 3 – Model Inputs

A. Energy Use Requirements

a. The MWh energy use requirements per the COE Financial Model over the first 5 years of utility operations are detailed below. These requirements detail the required energy output in terms of heating, cooling, and domestic hot water for the average customer within each customer class.

Energy Use Requirements in MWh	2018	2019	2020	2021	2022	2023
Fee Simple Town Houses						
a) Space Heating	-	124	124	186	294	400
b) Space Cooling	-	41	41	61	97	131
c) DHW	-	88	88	132	208	282
sub-total	-	253	253	379	599	813
Strata Town Houses						
a) Space Heating	-	128	128	192	304	412
b) Space Cooling	-	42	42	63	100	135
c) DHW	-	91	91	136	215	291
sub-total	-	261	261	391	618	839
4-6 Story Condo Units						
a) Space Heating	-	466	466	697	1,101	1,495
b) Space Cooling	-	325	325	486	768	1,043
c) DHW	-	363	363	543	858	1,165
sub-total	-	1,153	1,153	1,726	2,728	3,703
7-10 Story Mixed Use Units						
a) Space Heating	-	90	90	135	213	289
b) Space Cooling	-	92	92	138	218	296
c) DHW	-	67	67	100	158	214
sub-total	-	249	249	373	589	800
NAIT Educational space						
a) Space Heating	-	-	-	-	-	-
b) Space Cooling	-	-	-	-	-	-
c) DHW	-	-	-	-	-	-
sub-total	-	-	-	-	-	-
NAIT Residential Units						
a) Space Heating	-	-	-	-	-	-
b) Space Cooling	-	-	-	-	-	-
c) DHW	-	-	-	-	-	-
sub-total	-	-	-	-	-	-
Office Space						
a) Space Heating	-	-	-	-	-	-
b) Space Cooling	-	-	-	-	-	-
c) DHW	-	-	-	-	-	-
sub-total	-	-	-	-	-	-
All						
a) Space Heating	-	808	808	1,210	1,912	2,596
b) Space Cooling	-	500	500	749	1,183	1,606
c) DHW	-	608	608	910	1,438	1,953
sub-total	-	1,917	1,917	2,869	4,534	6,155

B. BAU Commodity Requirements

a. Under the BAU, gas and electricity are used in order to deliver the Energy Use Requirements above. Per the COE Financial Model, the values below outline the MWh requirements under the BAU in order to meet output requirements under each customer class. In determining these commodity requirements factors such as efficiency, and energy use intensity (based on building codes) are considered.

Commodity Requirements in MWh - BAU	2018	2019	2020	2021	2022	2023
Fee Simple Town Houses						
a) Space Heating						
Gas	-	494	494	739	1,168	1,586
Electricity	-	-	-	-	-	-
b) Space Cooling - Electricity	-	11	11	17	27	37
c) DHW - Gas	-	164	164	245	387	526
sub-total	-	669	669	1,001	1,582	2,148
Strata Town Houses						
a) Space Heating						
Gas	-	510	510	763	1,205	1,636
Electricity	-	-	-	-	-	-
b) Space Cooling - Electricity	-	12	12	18	28	38
c) DHW - Gas	-	169	169	253	399	542
sub-total	-	690	690	1,033	1,633	2,217
4-6 Story Condo Units						
a) Space Heating						
Gas	-	1,676	1,676	2,508	3,963	5,381
Electricity	-	296	296	444	701	952
b) Space Cooling - Electricity	-	129	129	192	304	413
c) DHW - Gas	-	585	585	876	1,384	1,879
sub-total	-	2,686	2,686	4,021	6,353	8,625
7-10 Story Mixed Use Units						
a) Space Heating						
Gas	-	324	324	484	765	1,039
Electricity	-	48	48	73	115	156
b) Space Cooling - Electricity	-	34	34	51	80	109
c) DHW - Gas	-	108	108	161	255	346
sub-total	-	514	514	769	1,215	1,649
NAIT Educational space						
a) Space Heating						
Gas	-	-	-	-	-	-
Electricity	-	-	-	-	-	-
b) Space Cooling - Electricity	-	-	-	-	-	-
c) DHW - Gas	-	-	-	-	-	-
sub-total	-	-	-	-	-	-
NAIT Residential Units						
a) Space Heating						
Gas	-	-	-	-	-	-
Electricity	-	-	-	-	-	-
b) Space Cooling - Electricity	-	-	-	-	-	-
c) DHW - Gas	-	-	-	-	-	-
sub-total	-	-	-	-	-	-
Office Space						
a) Space Heating						
Gas	-	-	-	-	-	-
Electricity	-	-	-	-	-	-
b) Space Cooling - Electricity	-	-	-	-	-	-
c) DHW - Gas	-	-	-	-	-	-
sub-total	-	-	-	-	-	-
All						
a) Space Heating						
Gas	-	3,002	3,002	4,495	7,101	9,641
Electricity	-	345	345	516	816	1,108
b) Space Cooling - Electricity	-	186	186	278	439	596
c) DHW - Gas	-	1,025	1,025	1,535	2,425	3,293
sub-total	-	4,559	4,559	6,824	10,782	14,638

Source: COE District Energy Rate Model

C. DESS Commodity Requirements

a. Under the DESS, thermal power and electricity are used in order to deliver the Energy Use Requirements in Appendix 3B above. Per the COE Financial Model, the values below outline the MWh requirements under the DESS in order to meet output requirements under each customer class. In determining these commodity requirements factors such as efficiency, and energy use intensity (based on building codes) are considered.

	2018	2019	2020	2021	2022	2023
Commodity Requirements in MWh - DESS						
Fee Simple Town Houses						
a) Space Heating						
Thermal	-	93	93	140	221	300
Electricity	-	31	31	47	74	100
b) Space Cooling		33.3%	33.3%	33.3%	33.3%	33.3%
Thermal	-	48	48	72	113	154
Electricity	-	7	7	10	16	22
c) DHW		14.6%	14.6%	14.6%	14.6%	14.6%
Thermal	-	59	59	88	139	188
Electricity	-	29	29	44	69	94
sub-total	-	267	267	400	632	858
Strata Town Houses						
a) Space Heating						
Thermal	-	96	96	144	228	309
Electricity	-	32	32	48	76	103
b) Space Cooling						
Thermal	-	49	49	74	117	159
Electricity	-	7	7	11	17	23
c) DHW						
Thermal	-	60	60	91	143	194
Electricity	-	30	30	45	72	97
sub-total	-	276	276	413	652	885
4-6 Story Condo Units						
a) Space Heating						
Thermal	-	349	349	523	826	1,121
Electricity	-	133	133	199	314	427
b) Space Cooling						
Thermal	-	380	380	569	899	1,221
Electricity	-	67	67	100	158	215
c) DHW						
Thermal	-	242	242	362	572	777
Electricity	-	121	121	181	286	388
sub-total	-	1,292	1,292	1,934	3,056	4,149
7-10 Story Mixed Use Units						
a) Space Heating						
Thermal	-	67	67	101	159	217
Electricity	-	23	23	35	55	75
b) Space Cooling						
Thermal	-	108	108	162	256	347
Electricity	-	17	17	25	39	53
c) DHW						
Thermal	-	45	45	67	105	143
Electricity	-	22	22	33	53	71
sub-total	-	282	282	422	667	906

	2018	2019	2020	2021	2022	2023
Commodity Requirements in MWh - DESS						
NAIT Educational space						
a) Space Heating						
Thermal	-	-	-	-	-	-
Electricity	-	-	-	-	-	-
b) Space Cooling						
Thermal	-	-	-	-	-	-
Electricity	-	-	-	-	-	-
c) DHW						
Thermal	-	-	-	-	-	-
Electricity	-	-	-	-	-	-
sub-total	-	-	-	-	-	-
NAIT Residential Units						
a) Space Heating						
Thermal	-	-	-	-	-	-
Electricity	-	-	-	-	-	-
b) Space Cooling						
Thermal	-	-	-	-	-	-
Electricity	-	-	-	-	-	-
c) DHW						
Thermal	-	-	-	-	-	-
Electricity	-	-	-	-	-	-
sub-total	-	-	-	-	-	-
Office Space						
a) Space Heating						
Thermal	-	-	-	-	-	-
Electricity	-	-	-	-	-	-
b) Space Cooling						
Thermal	-	-	-	-	-	-
Electricity	-	-	-	-	-	-
c) DHW						
Thermal	-	-	-	-	-	-
Electricity	-	-	-	-	-	-
sub-total	-	-	-	-	-	-
All						
a) Space Heating						
Thermal	-	606	606	908	1,434	1,947
Electricity	-	219	219	328	519	704
b) Space Cooling						
Thermal	-	585	585	876	1,385	1,880
Electricity	-	98	98	146	231	313
c) DHW						
Thermal	-	405	405	607	959	1,302
Electricity	-	203	203	303	479	651
sub-total	-	2,117	2,117	3,169	5,007	6,798

D. BAU Rates

a. The long term carbon tax growth rate is an expected annual growth for the carbon tax in 2023 and beyond. From 2018 to 2022, the carbon tax is expected to grow from $30/tonne to $50/tonne on a straight line basis. These assumptions are taken directly from the COE Financial Model.

b. For detailed information on variable electricity rate growth, refer to the Electricity Rate Growth section which follows.

c. For detailed information on variable gas rate growth, refer to the Gas Rate Growth section which follows.

d. For detailed information on initial year variable and fixed electricity rates, and fixed electricity rate growth refer to the Electricity Rate Inputs section which follows. For 2019 and later years, variable and fixed electricity rates are increased at the respective growth rates noted in the table below.

e. For detailed information on initial year variable and fixed gas rates, and fixed gas rate growth refer to the Gas Rate Inputs section which follows. For 2019 and later years, variable and fixed gas rates are increased at the respective growth rates noted in the table below.

f. 4-6 Condo Fixed Inclusion and 5-7 Condo Fixed Inclusion values are adjustments made to fixed gas rates to account for a reduction in the number of gas connections present in these condo buildings. As per the with the COE Financial Model, 4-6 story condos are expected to have one connection for every 60 units, while 5-7 story condos are expected to have 5 connections for every 85 units. These ratios are multiplied by fixed gas rates to determine an effective fixed charge to be applied to customers in these classes respectively.

BAU Rates		2018	2019	2020	2021	2022	2023
Carbon tax growth	3.0%						
Growth:							
Variable Electricity Rate Growth		1.4%	1.4%	1.4%	1.4%	1.4%	1.4%
Fixed Electricity Rate Growth		2.9%	2.9%	2.9%	2.9%	2.9%	2.9%
Variable Gas Rate Growth		5.6%	5.6%	5.6%	5.6%	5.6%	5.6%
Fixed Gas Rate Growth		2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Rates:							
Variable Electricity Rate ($/kWh)		0.11	0.12	0.12	0.12	0.12	0.12
Fixed Electricity Rate ($/day)		0.80	0.82	0.85	0.87	0.90	0.92
Variable Gas Rate ($/kWh)		0.0164	0.0173	0.0182	0.0193	0.0203	0.0215
Variable Gas Rate ($/kWh) - Large Use		0.011	0.011	0.012	0.013	0.013	0.014
Fixed Gas Rate ($/day)		1.44	1.47	1.51	1.55	1.59	1.63
Fixed Gas Rate ($/day) - Large Use		7.65	7.84	8.03	8.23	8.44	8.65
4-6 Condo Fixed Inclusion		0.017	0.017	0.017	0.017	0.017	0.017
5-7 Condo Fixed Inclusion		0.058	0.058	0.058	0.058	0.058	0.058
Carbon tax ($/tonne)		30.00	35.00	40.00	45.00	50.00	51.50

E. Electricity Rate Growth

a. Using an EDC Associates Ltd. (EDC) Pool Price Forecast[28] (below) electricity rate growth has been estimated. The forecasted value was used to determine an average annual rate in order to capture to growth in the cost of electricity from 2018 to 2032. In the case below, a growth rate of approximately 1.4% is implicit in the increase from $49.15/MWh in 2018 to $58.62/MWh in 2032. This 1.4% growth rate has been applied to current variable electricity rates to estimate future rates. Annual growth rates as per EDC's pool price forecasts were also considered. Because these ranged significantly with positive and negative changes (e.g. 2018 to 2019 increased by 17.1%, followed by a -8.1% from 2019 to 2020), a longer term horizon was selected as a growth rate proxy in order to reduce significant annual BAU bill changes.

b. Fixed growth rates are consistent with the COE Financial Model, which calculates the average historical fixed electricity growth rate from 2013 to 2017. Fixed rates in the COE Financial Model are calculated using a similar methodology as described in the Electricity Rate Inputs section detailed below. The average growth rate over the period noted is 2.9%, which is applied to the initial rates to forecast future rates to be used in rate setting.

EDC Pool Price Forecast

	Annual Flat ($/MWh)
2018	$49.15
2019	$57.56
2020	$52.88
2021	$59.06
2022	$48.93
2023	$50.52
2024	$52.43
2025	$52.58
2026	$51.86
2027	$52.83
2028	$53.43
2029	$54.21
2030	$54.64
2031	$55.61
2032	$58.62

[28] Provided by City of Edmonton on July 31, 2018.

F. Gas Rate Growth

a. Using an EDC Pool Price Forecast[29] (below) estimated gas rate growth has been estimated. The forecasted value was used to determine an average annual rate in order to capture to growth in the cost of gas from 2018 to 2032. In the case below, a growth rate of approximately 5.6% is implicit in the increase from $1.52/MWh in 2018 to $3.08/MWh in 2032. This 5.6% growth rate has been applied to current variable gas rates to estimate future rates. Annual growth rates as per EDC's annual natural gas forecasts were also considered. Because these ranged significantly (e.g. 2018 to 2019 increased by 8.6%, followed by a 9.1% from 2019 to 2020, and 21.7% from 2020 to 2022), a longer term horizon was selected as a growth rate proxy in order to reduce significant annual BAU bill changes.

a. Growth rates for the fixed portion of the gas rate has been calculated consistent with the COE Financial Model approach, which assumes that the rates will grow at the average growth rate for the past 5 years. The fixed rate has grown from $1.34 in 2011 to $1.54 in 2017 for an average growth rate of 2.5%, which has been maintained in our calculation of initial year rates.

EDC Natural Gas Price Forecast

	Annual AECO-C ($/GJ)
2018	$1.52
2019	$1.65
2020	$1.80
2021	$2.19
2022	$2.42
2023	$2.53
2024	$2.62
2025	$2.67
2026	$2.73
2027	$2.79
2028	$2.84
2029	$2.90
2030	$2.96
2031	$3.02
2032	$3.08

[29] Provided by City of Edmonton on July 31, 2018.

G. Electricity Rate Inputs

a. Initial year energy rates are estimated based on current regulatory rates posted by Epcor, as well as 5 year rates available to customers in Edmonton per Direct Energy. Current energy related monthly charges, distribution access fees, system access charge, and other fees and riders are taken from Epcor published schedules on https://www.epcor.com/products-services/power/rates-tariffs-fees/Pages/power-tariffs-terms-and-conditions-edmonton.aspx as of July 2018. Energy related energy charges are based on a 5 year contract offered by Direct Energy in Edmonton as of July 2018, refer to https://www.directenergy.ca/alberta/electricity-plans for additional details.

b. To determine a fixed electricity rate, the monthly energy related charges of $5.36 per month are converted to a daily value of $0.18 per day, and added to the daily distribution access fee of $0.62, to give a total daily fixed charge of $0.80.

c. To determine a variable charge per kWh, all charges which vary with energy usage (see Energy Charges (Cents/kWh) column in chart below) are added to give a total initial variable electricity charge of $0.11/kWh.

d. The table below provides the fixed and variable charges according to the Direct Energy 5 year contract offer as of July 2018, as well as an illustrative bill make-up for a customer using 7200 kWh annually.

Annual Electricity Bill for an Average Edmonton Residential Customer - calculation based on 5 year contract offered by Direct Energy

Annual Consumption Assumed 7200 kWh

	Rates			Charges					
	Daily Charges ($/Day)	Monthly Charges ($/Month	Energy Charges (Cents/kWh)	Daily Based	Monthly Base ($)	Energy Based ($)	Total ($)	Fixed Charges per day	In $/kWh
Energy Related		5.3600	6.1900	0.00	64.32	445.68	510.00	0.18	0.0619
Distribution Access	0.6210		0.9070	226.65	0.00	65.30	291.96	0.62	0.0091
System Access			3.0250	0.00	0.00	217.80	217.80	-	0.0303
Balancing Pool Rider			0.3210	0.00	0.00	23.11	23.11	-	0.0032
Local Access Fee			0.8100	0.00	0.00	58.32	58.32	-	0.0081
SAS True up Rider - J			-0.1720	0.00	0.00	-12.38	-12.38	-	- 0.0017
Rider K			0.3580	0.00	0.00	25.78	25.78	-	0.0036
Total				**226.65**	**64.32**	**823.61**	**1,114.58**	0.80	0.11

H. Gas Rate Inputs

a. Initial year gas rates are based on regulatory rates per Atco Gas, and Direct Energy Regulatory Services. Rates have been taken for low use and high use customers in order to separate usage patterns that are expected for town homes (low usage) as compared to condos (high usage). To determine the updated cost of gas of $0.0055/kWh, we determined the average rate charged for direct energy costs for 2018 year to date to August 1, 2018, and divided the figure by 277.78 in order to convert from $/GJ to $/kWh.

b. Fixed admin fees are taken from Direct Energy Regulatory Services (https://www.directenergyregulatedservices.com/natural-gas) as of July 2018, which has separate rates posted for each of general use and large use customers.

c. Delivery Variables + Riders, and Delivery Fixed + Riders are sourced from Atco Gas who posts these rates, which are categorized as fixed and variable rates. Variable rates are converted to kWh for use in the model using a conversion factor of 277.78. These delivery fees are grossed up from the regulatory posted rates by 32.9% to account for the Edmonton franchise fee. This gross up value is consistent with the factor used in the COE financial model.

d. In addition to regulatory rates, a certainty premium of $0.0036/kWh has been added to variable rates, consistent with treatment in the COE Financial Model. Given the above discussed values, the total variable gas rate (cost of gas plus delivery variables, plus certainty premium) is $0.0164/kWh for low use customers, and $0.0107/kWh for high use customers. Fixed charges (admin fee plus delivery fixed) are $1.4366/day for low use customers, and $7.8243/day for high use customers.

e. Growth rates for fixed gas has been calculated consistent with the COE Financial Model approach, which assumes that the rates will grow at the average growth rate for the past 5 years. As seen in the table below, the fixed rate has grown from $1.34 in 2011 to $1.54 in 2017 for an average growth rate of 2.5%, which has been maintained in our calculation of initial year rates.

Low Use			2011	2012	2013	2014	2015	2016	2017	6.5 Yr Average Value 2011-2017 (admin fee	5 Yr Average Value 2011-2015	Difference Aug.2017 vs Jan.2016	Used in Model	Updated 08/18 (per GT)	Variance
Energy Charges - Direct Energy										EPCOR 2yr fixed plan at $3.69, 5 yr at $4.59					
- Cost of Gas	$/GJ		$ 3.62	$ 2.41	$ 3.07	$ 4.52	$ 2.73	$ 2.09	$ 2.22	$ 2.95	$ 3.28	-10%	0.0106	0.0055	48.66%
		annual change	n/a	-34%	28%	47%	-40%	-23%	6%						
- Admin Fee	$/day		$ 0.223	$ 0.223	$ 0.223	$ 0.223	$ 0.223	$ 0.249	$ 0.249	$ 0.249	$ 0.223	12%	0.2490	0.2490	0.00%
		annual change	n/a	0%	0%	0%	0%								
Distributor Charges - Atco North															
- Delivery Variable + Riders	$/GJ*		$ 1.67	$ 1.73	$ 1.97	$ 1.98	$ 2.05	$ 2.39	$ 2.61	$ 2.06	$ 1.89	9%	0.0074	0.0073	1.23%
		annual change	n/a	4%	14%	1%	3%	17%	9%						
- Delivery Fixed + Riders	$/day*		$ 1.122	$ 1.053	$ 1.174	$ 1.163	$ 1.255	$ 1.289	$ 1.293	$ 1.193	$ 1.153	3%	1.2931	1.1876	8.16%
		annual change	n/a	-6%	12%	-1%	8%	3%	0%						
Certainty Premium (Per model)													0.0036	0.0036	
Total															
- Variable	$/GJ		$ 5.28	$ 4.13	$ 5.04	$ 6.51	$ 4.78	$ 4.48	$ 4.83	$ 5.01	$ 5.18	-3%	0.0216	0.0164	24.32%
		annual change	n/a	-22%	22%	29%	-27%	-6%	8%						
- Fixed	$/day		$ 1.34	$ 1.28	$ 1.40	$ 1.39	$ 1.48	$ 1.54	$ 1.54	$ 1.44	$ 1.38	5%	1.5421	1.4366	6.84%
		annual change	n/a	-5%	10%	-1%	7%	4%	0%	2.5%					

High Use			2011	2012	2013	2014	2015	2016	2017	6.5 Yr Average Value 2011-2017 (admin fee current)	5 Yr Average Value 2011-2015		Used in Model	Updated 08/18 (per GT)	Variance
Energy Charges - Direct Energy															
- Cost of Gas	$/GJ		$ 3.62	$ 2.41	$ 3.07	$ 4.52	$ 2.73	$ 2.09	$ 2.22	$ 2.95	$ 3.28	-10%	0.0106	0.0055	48.66%
		annual change	n/a	-34%	28%	47%	-40%	-23%	6%						
- Admin Fee	$/day		$ 0.223	$ 0.223	$ 0.223	$ 0.223	$ 0.223	$ 0.249	$ 0.249	$ 0.249	$ 0.223	12%	0.2490	0.6820	-173.90%
		annual change	n/a	0%	0%	0%	0%	12%	0%						
Distributor Charges - Atco North															
- Delivery Variable + Riders	$/GJ*		$ 0.43	$ 0.45	$ 0.49	$ 0.52	$ 0.49	$ 0.53	$ 0.64	$ 0.51	$ 0.48	6%	0.0018	0.0016	11.61%
		annual change	n/a	4%	9%	8%	-6%	8%	21%						
- Delivery Fixed + Riders	$/day*		$ 6.328	$ 5.940	$ 6.827	$ 6.911	$ 7.336	$ 7.535	$ 7.575	$ 6.92	$ 6.67	4%	7.5753	6.9631	8.08%
		annual change	n/a	-6%	15%	1%	6%	3%	1%						
Certainty Premium (Per model)													0.0036	0.0036	
Total															
- Variable	$/GJ		$ 4.05	$ 2.85	$ 3.56	$ 5.05	$ 3.22	$ 2.62	$ 2.86	$ 3.46	$ 3.76	-8%	0.0160	0.0107	33.53%
		annual change	n/a	-30%	25%	42%	-36%	-19%	9%						
- Fixed	$/day		$ 6.55	$ 6.16	$ 7.05	$ 7.13	$ 7.56	$ 7.78	$ 7.82	$ 7.17	$ 6.89	4%	7.8243	7.6451	2.29%
		annual change	n/a	-6%	14%	1%	6%	3%	1%	3.3%					

I. End User Maintenance Costs

a. End user maintenance costs are taken directly from the COE Financial Model, which shows the average maintenance costs expected to be paid by customers of each class under each of the BAU and DESS scenarios. These maintenance costs were developed based on analysis performed by engineers for use in the COE Financial Model.

End User Maintenance Costs (Per Model)	2018	2019	2020	2021	2022	2023
BAU						
Fee Simple Town Houses	-	184	125	121	144	147
Strata Town Houses	-	192	131	126	150	153
4-6 Story Condo Units	-	289	197	190	226	230
7-10 Story Mixed Use Units	-	289	197	190	226	230
NAIT Educational space	-	-	-	-	-	-
NAIT Residential Units	-	-	-	-	-	-
Office Space	-	-	-	-	-	23,016
All	-	954	650	628	746	23,775
DESS						
Fee Simple Town Houses	-	287	196	189	225	229
Strata Town Houses	-	307	209	202	240	244
4-6 Story Condo Units	-	201	137	132	157	160
7-10 Story Mixed Use Units	-	201	137	132	157	160
NAIT Educational space	-	-	-	-	-	-
NAIT Residential Units	-	-	-	-	-	-
Office Space	-	-	-	-	-	16,324
All	-	996	679	656	779	17,116

J. Build-Out

a. The estimated build-out for each customer class is sourced directly from the COE Financial Model.

	2018	2019	2020	2021	2022	2023
Build-out						
total Fee Simple T/Hs	-	30	30	44	70	95
total Strata T/Hs	-	30	30	45	71	96
total 4-6 Story condo buildings	-	3	3	4	7	9
total 4-6 Story condo units	-	171	171	256	404	548
total 7-10 Story MU buildings	-	0	0	1	1	1
total 7-10 Story MU units	-	31	31	47	74	101
total NAIT Educational buildings	-	-	-	-	-	-
total NAIT Residential buildings	-	-	-	-	-	-
total NAIT Residential units	-	-	-	-	-	-
total office buildings	-	-	-	-	-	-
Total Customers	-	262	262	392	619	840

Appendix 4 – BAU Bill Components

The values presented in the table below represent the fixed and variable components of a BAU Bill as structured per the COE Financial Model.

	Variable Electricity	Variable Gas	Carbon Tax	Total Variable	Fixed Gas	Fixed Electricity	Total Fixed
BAU							
Simple TH	3.2%	27.3%	10.1%	**40.6%**	38.1%	21.3%	**59.4%**
Strata TH	3.2%	27.5%	10.2%	**41.0%**	37.9%	21.2%	**59.0%**
4-6 Condo	33.1%	17.1%	9.8%	**60.0%**	5.5%	34.5%	**40.0%**
7-10 Condo	30.0%	15.2%	8.7%	**53.9%**	16.5%	29.6%	**46.1%**

CITY POLICY

POLICY NUMBER:
C597

REFERENCE:

ADOPTED BY:
City Council

SUPERSEDES:
New

PREPARED BY: Integrated Infrastructure Services **DATE:** March 22, 2018

TITLE: **BLATCHFORD DISTRICT ENERGY UTILITY FISCAL POLICY**

Policy Statements:

1. The Utility is to be operated in a manner that balances the best possible service at the lowest cost (public utility) while employing private sector approaches to rate setting.
2. Similar to private utilities, the Utility will account for the cost of service under a full cost accounting approach. All customer charges will be based upon cost of service with the end user (customer) paying at most a comparable fee to what they would elsewhere in the City of Edmonton through their energy utility bills and annual maintenance costs.
3. Through a phased approach, the Utility will generate positive net income, cash flow and a rate of return sufficient to cover current year expenses, working capital requirements, and to facilitate the funding for capital infrastructure and rehabilitation and replacement of its capital assets.
4. The Utility is to contribute towards achieving the City's Energy Transition Strategy.

The purpose of this policy is to:

1. Ensure that the Blatchford District Energy Utility is operated in a manner that reflects City Council's overall vision and philosophical objectives for the Utility.
2. Ensure that there is a consistent approach year over year for the financial planning, budgeting, and rate setting for the City managed Utility.
3. Ensure that the Utility is financially sustainable over the long term.

1. DEFINITIONS

1.1 **Cash Flow** - the ability of the Utility to meets it financial obligations as payments are due.

1.2 **Capital Assets** - assets of the Utility meeting the requirements defined under Public Sector Accounting Standard PS3150.

1.3 **Capital Investment Outlook** - a 10-year forecast of capital required to ensure that appropriate infrastructure are in place to meet service needs, including the replacement of Contributed Assets.

1.4 **Capital Plan** - a 4-year plan for funding capital infrastructure approved by City Council.

1.5 **Contributed Assets** - capital assets of the Utility for which funding was provided from non-rate sources. Examples may include infrastructure constructed by the Blatchford Development, partnership funding, grants, etc.

1.6 **Debt to Net Assets Ratio** - is a measure of the extent to which the net book value of non-contributed assets is being financed by debt.

1.7 **Financial Indicators** - a set of financial measures that provide signals on the financial health of the Utility.

1.8 **Financial Sustainability** - financial sustainability is achieved when all targets set for the Financial Indicators (as recommended by the Utility Committee and approved by City Council) are attained.

1.9 **Full Cost Accounting** - shall include cost allocation from services provided by City Administration and may include administration costs, and other shared services such as Communication, Human Resources, Information Technology, Law, Corporate Procurement and Supply Services, Financial Services, Fleet and Facility Maintenance, and general corporate overhead.

1.10 **Investment in Utility Financed Assets** - Net Book Value of Utility Financed Assets minus associated outstanding debt used to pay for the assets.

1.11 **Net Book Value** - acquisition costs of original costs of capital assets minus their accumulated depreciation

1.12 **Pay As You Go** - the amount of cash required to implement the Capital Plan; annual amount to be funded from operating revenues.

1.13 **Rate Revenue** - revenue generated through monthly customer rates.

1.14 **Regulated Activities** - are activities that are core to the services provided by the Utility. Examples include, the provision of energy for heating and cooling and domestic hot water.

1.15 **Utility** - refers to the Blatchford District Energy Utility, a self-funded operation that provides energy services for heating, cooling and domestic hot water to customers on a fee for service basis at rates regulated by City Council.

1.16 **Utility Financed Assets** - assets of the Utility for which funding has been provided from rates either through debt or Pay As You Go funding.

Following are financial indicators and additional general policy statements to guide the financial management of the utility.

2. FINANCIAL INDICATORS

Financial indicators are measures that provide financial information about the sustainability of the Utility. Taken collectively, these indicators allow for periodic assessment on whether the Utility is moving towards or away from financial sustainability.

2.1 Rate Sufficient to Meet Expenditures and Cash Flow (Positive Net Income and Positive Cash Position)

A. The Utility will generate positive net income, cash flow and a rate of return sufficient to cover current year expenses, working capital requirements, and to facilitate the funding for capital infrastructure and rehabilitation and replacement of its capital assets.

B. The management of the Utility's cash position is the responsibility of Administration, taking into consideration current borrowing rates and current and future cash requirements.

C. Where the Utility's cash position is insufficient to meet cash flow requirements, the Utility will borrow from the City of Edmonton on a short term basis, with the interest being paid by the Utility at an interest rate that compensates the City of Edmonton reflecting the Fund Balance where the cash was drawn.

Indicator Targets:

I. Positive Net Income
II. The target combined Cash Position of the Utility is the Pay As You Go funding required as identified in the Capital Plan.
III. Stable consistent rate increases.

2.2 Debt Financing of Capital

A. The Utility will not utilize Debt to finance current operating expenditures.
B. Debt will be considered for Capital Expenditures for:
   a. projects with long-term benefits;
   b. major rehabilitation or upgrade of existing assets; and
   c. emerging requirements to support corporate priorities and strategic plans.

C. The Utility will follow the City of Edmonton's process for debt issuance, including the term of the debt and will be consolidated with City debt in determining the City's position relative to the legislated debt limits.

Indicator Target:

The Debt to Net Assets Ratio is a measure of the extent that capital investment is financed through debt, presented on a combined basis and calculated as follows:

Total Long Term Debt

divided by

Net book value of Non-Contributed Assets

= Debt to Net Assets Ratio

The target for the Debt to Net Assets Ratio may vary between 50% and 70%, taking into consideration borrowing rates. Incremental targets, by year, are as follows:

2030 - 98%; 2040 - 85%; 2050 - 70%; 2060 - 60%

3.0 Financial Planning

Budget and financial planning follow the general principles of budget, long range planning, and management of capital assets as established by the City of Edmonton and in accordance with Public Sector Accounting Standards defined by the Public Sector Accounting Board.

The Utility will prepare a 4-year Business Plan, to be presented annually to the Utility Committee, prior to the preparation of the multi-year operating and capital budgets or supplemental budget adjustments.

The Utility Committee shall recommend annually to City Council the customer rates for the upcoming year, based on review of an annual rate filing prepared by the Utility subsequent to the preparation and presentation of the 4-year Business Plan.

BLATCHFORD RENEWABLE ENERGY UTILITY

2019 - 2022

Business Plan

Table of Contents

Blatchford Renewable Energy Utility

BLATCHFORD

After operating as a functioning airport for decades, Edmonton City Council voted to implement a phased closure of the City Centre Airport in 2009, with the airport officially closing in 2013. A business case for the Blatchford community was approved by City Council in 2014 with the construction of the first phase commencing in 2015. In 2017, construction activities continued, including the installation of the storm, sanitary, water services and distribution piping for the District Energy Sharing System. The first phase of the builder selection process, in support of the first stage of development, also commenced in 2017 and will continue in 2018.

The Blatchford development is aimed to be one of the world's largest sustainable communities and home to 30,000 residents; all living sustainably on 536 acres of land, minutes away from downtown, existing infrastructure, schools, retails and services. Blatchford will be comprised of two primarily residential spaces on the east and west side of the site, along with a town centre, an 80-acre central park with plenty of green space throughout the community, as well as a civic plaza that will function as a large gathering space for the community.

VISION

Blatchford will be home to up to 30,000 Edmontonians living, working and learning in a sustainable community that uses 100% renewable energy, is carbon neutral, significantly reduces its ecological footprint, and empowers residents to pursue a range of sustainable lifestyle choices.

ENERGY STRATEGY FOR BLATCHFORD

The Blatchford Energy Strategy is the product of a multi-year assessment and design process. The strategy is based on three key components: Energy Conservation, Energy Efficiency, and Renewable Energy generation.

Energy Conservation

Blatchford's energy conservation strategy will reduce the overall community energy demand by requiring the construction of high performance buildings. In addition to minimizing the demand for energy at the outset of development, the size of the renewable energy infrastructure and the investment required will be reduced.

Energy Efficiency

The second component of the Blatchford energy plan is a high-efficiency energy delivery system. This ambient (low) temperature District Energy Sharing System, will provide heating, cooling and domestic hot water for the Blatchford development. The District Energy Sharing System allows for energy sharing between buildings, development phases and building types. In a neighbourhood the size of Blatchford with a large diversity of building types and densities, this sharing of energy can reduce overall energy consumption by 10 to 20 percent.

Renewable Energy

The third component of the Blatchford district energy strategy includes incorporating renewable energy as the primary source of thermal energy. This approach uses two different energy sources; geo-exchange and sewer heat exchange, to meet the thermal energy demands of the site, both now and at full build-out. In future, the electricity used for heating, cooling and domestic hot water production is planned to be offset with the addition of renewable electricity generation. As an example, energy could be provided through solar photovoltaic technology.

BLATCHFORD RENEWABLE ENERGY UTILITY

To help achieve the City's long term goal of 100% renewable energy and carbon neutrality for Blatchford, a new public, city owned utility has been established. The Blatchford Renewable Energy Utility will own and operate the District Energy Sharing System and certain mechanical equipment within the customer buildings themselves. All buildings in Blatchford, with the exception of net-zero carbon buildings, must be connected to the District Energy Sharing Systems for all heating, cooling and domestic hot water services.

The first stage of the Utility development of the District Energy Sharing System consists of: a ground heat exchanger borefield located under the future stormwater pond; Energy Centre No. 1 located on the future Blatchford Plaza; and a Distribution Piping System which carries district energy water from the Energy Centre to Stage 1 of the Blatchford land development.

Customer condominium buildings will contain an Energy Transfer Station that provides thermal energy from the District Energy Sharing System for the buildings. Blatchford buildings will use renewable district energy for heating and cooling and, as such, buildings will not need to be equipped with traditional systems related to the production of thermal energy, such as furnaces, boilers, chillers or fireplaces. Blatchford buildings will not require ancillaries such as boiler venting or cooling towers. The Blatchford Renewable Energy Utility will own, operate and maintain the central mechanical systems in the Energy Transfer Station, reducing the operational burden on the builder and homeowner.

Some buildings in Blatchford may be exempted from the requirement to connect to the District Energy Sharing System if they are designed, built and certified to a net zero carbon standard, or better.

BLATCHFORD DEVELOPMENT

The development and operation of the Utility is closely connected to the work of the Blatchford Development Office. This Office is responsible for meeting Council's vision for the community. As the land developer, the Blatchford Office is responsible for land use planning, engineering design, construction of public infrastructure, and selling fully serviced parcels of land. Close collaboration between the Blatchford Development Office and the Blatchford Renewable Energy Utility is crucial to ensure planning and construction activities are aligned along with monitoring and updating the financial performance of both entities. As with any large land development project, a staging plan exists. However, the sequence and timing of the stages are subject to change depending on market conditions. The current operational, energy and financial model for the Utility is based on the most recent development scenario for Blatchford and will need to be adjusted as necessary and hand-in-hand with the business case for the land development.

Business Plan Priorities

Strategic Plan

The strategic objectives of the Blatchford Renewable Energy Utility focus on the growth of the District Energy Sharing System and the integration of emerging technologies into the Utility's operation. The overall goal is to reach steady reliable operation, financial sustainability and achieve Council's vision for a carbon neutral community powered entirely by renewable energy.

Growth of the Utility infrastructure will be closely aligned with the pace of the land development and market uptake by the building community. The Blatchford Renewable Energy Utility will follow the Blatchford development schedule and will adjust accordingly as considerations change along the way. Overall a staged approach for the land development and Utility is planned in Blatchford, which will also include periodic updates of the energy and financial model for the Utility. Following the current land development scenario, the overall potential locations and staging of future Utility operated Energy Centers for the District Energy Sharing System is outlined in Figure 1. Each Energy Center will provide energy to defined stages of land development. The identified service area is outlined with potential commissioning of Energy Centres. At full build out, currently anticipated in year 2047, the Utility is expected to have more than 16,000 customers. Figure 1 identifies Energy Centers (EC) based on geothermal ground heat exchange technology, and the Sewer Heat Recovery Energy Centre (SHX) located in the Town Centre of Blatchford.

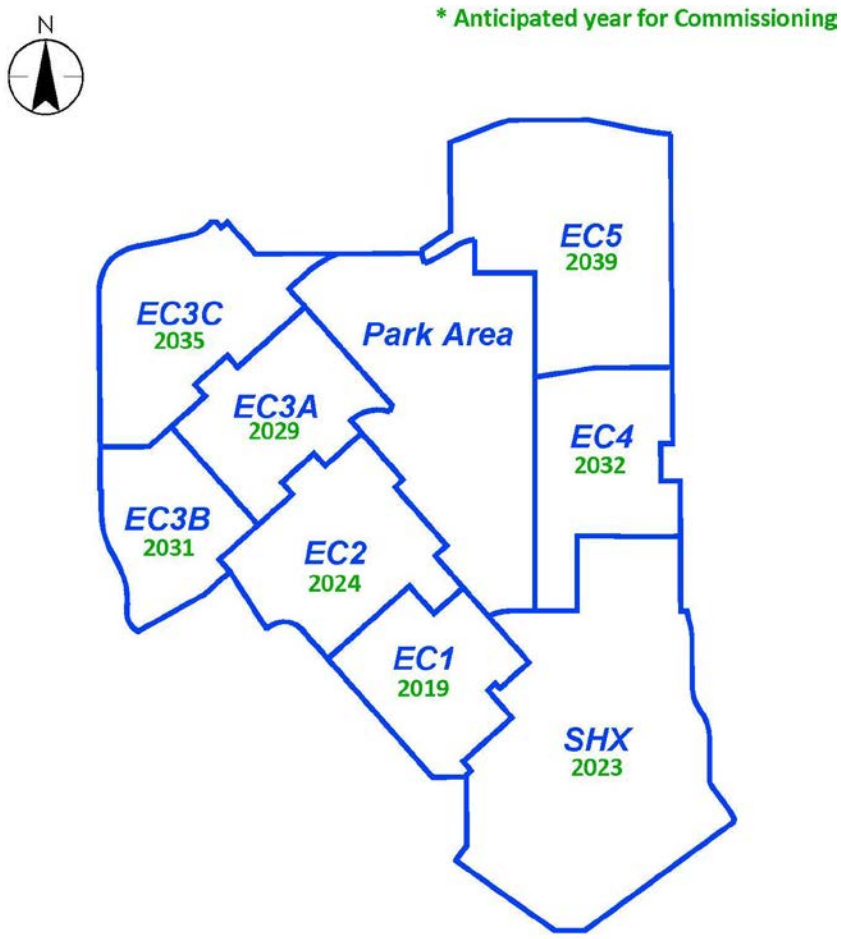

Figure 1: Map showing potential staging of Energy Centers for the full Blatchford Development (Years indicate potential commissioning date)

The Utility will continuously monitor emerging and alternative renewable energy technologies (such as Solar PV, renewable natural gas, micro CHP units) and evaluate how they can be practically implemented and financed in a prudent manner to ensure the sustainability goals and customer rate expectations for Blatchford are met. While the District Energy Sharing System provides heating, cooling and domestic hot water to residents and businesses in Blatchford, the main hurdle to providing electricity remains with the ability for the City to mandate that residents and businesses purchase electricity only from renewable sources; doing so would contradict provincial consumer choice principles. Discussions with the provincial government to amend existing electricity related regulations for the Blatchford utility scale project have been ongoing and will continue in order to reach Council's overall goal and vision.

Achieving financial sustainability for the new Utility depends on factors such as external capital injections, stable rate structure and other related Utility fees. This relationship and importance will be outlined in more detail in a separate section in this Business Plan. The strategic vision from an operational perspective includes the partnership with an external utility service provider to operate and maintain the Utility infrastructure, while the Utility remains municipally owned. The Utility is evaluating the timing and opportunities to engage an external partner, which will likely occur when the initial stage of operations has matured.

Initial 4-year Plan

During the first four years of existence, the focus of activities of the Blatchford Renewable Energy Utility is on the construction and operation of the first stages of the District Energy Sharing System and further development and establishment of the governance and financial structure of the Utility.

As shown in Figure 2, the first stage of the District Energy Sharing System construction consists of a ground heat exchanger borefield located under the future stormwater pond; Energy Centre No. 1 located on the future Blatchford Plaza; and a Distribution Piping System which carries district energy water from the Energy Centre to Stage 1 of the Blatchford development.

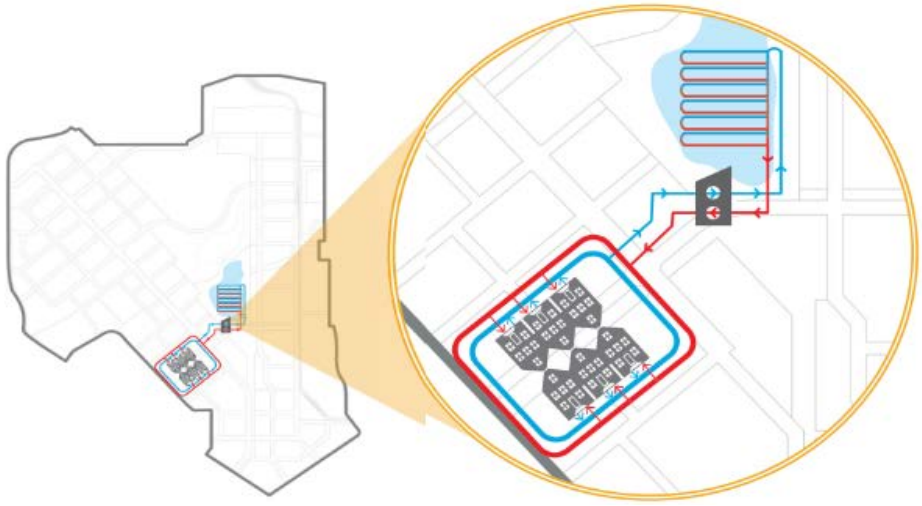

Figure 2: Map showing the Ground Heat Exchanger Borefield, Energy Centre 1 and the Distribution Piping System that will form part of the first stage of District Energy Sharing System

Stage 1 construction of the District Energy Sharing System started in April 2018 and the current schedule foresees construction completion with commissioning by the third quarter of 2019. With further development into the Town Centre or further west into Blatchford, additional Energy Centre stages are planned in conjunction with the land development progress. The first stage of the District Energy Sharing System can supply energy for additional stages of residential and commercial development in Blatchford. Special attention will be given to the planning and development of the Sewer Heat Recovery Energy Centre in the Town Centre. Construction start of the Sewer Heat Recovery Energy Centre is currently expected in 2022 with commissioning anticipated in 2023. The next Energy Centre #2, based on geoexchange technology, will be dependent on the current overall development scenario for Blatchford, and will be expected to be commissioned in 2024. The related planning, design and construction activities for these initiatives are integrated in the next four year operating and capital budget cycle in 2019-2022. In parallel, the operation of the District Energy Sharing System, starting with Stage 1, will grow with the future stages coming online.

Starting in 2018, financial and operational governance activities of the Blatchford Renewable Energy Utility are geared towards full Utility structure development. In April of 2018, City Council approved the Fiscal Policy of the Blatchford Renewable Energy Utility. The Fiscal Policy is the prerequisite required to support the first four year Utility Business Plan and Bylaw including rates. These documents provide the financial background required for the Utility, and establish the key

parameters for long term financial sustainability. Following the approval of the Business Plan, work on the initial rates will be integrated in the Utility Bylaw, which will be presented to Council later in 2018. The Bylaw will establish the District Energy Sharing System, its operation, define the ownership and conditions, identify connecting requirements and specifications, fees, rates, and fines. The Business Plan and Bylaw will be developed and updated, if needed, on an annual basis.

Operational Plan

Initial operation of the first stage of the District Energy Sharing System, with a relatively small number of connections and accounts, will be managed internally by the Utility in partnership with other City Departments, external contractors and technical experts. Overall focus will be on appropriate oversight of the design and initial Utility operation. Through the design and construction of the first stage of the District Energy Sharing System, operational and maintenance protocols will be developed and implemented into the full operation. Qualified service providers will be evaluated and engaged for all aspects of utility operation. The Utility is currently evaluating service providers for initial billing services and customer support functions. The growth of the Utility will depend on the timing of the engagement of an qualified external operator of the District Energy Sharing System. The Utility is evaluating an opportune time to engage an external partner, which will likely occur when the initial stage of operations have matured. To promote the Blatchford Community, the Blatchford Land Development program is growing its marketing and communication efforts in cooperation with the Blatchford Renewable Energy Utility.

Key Measures

Table 1 below provides a summary of the Blatchford Renewable Energy Utility's key performance measures:

Table 1: Key Performance Measures of the Blatchford Renewable Energy Utility

Utility Strategic Direction	Performance Measures	Forecasted Targets				Corporate Goals
		2019	2020	2021	2022	
Goal: A Healthy Community Well Served						
Blatchford Renewable Energy Utility strives to provide a high level of customer satisfaction by delivering timely and uninterrupted thermal energy.	Thermal Energy Provided	799 MWh	1,597 MWh	1,994 MWh	3,085 MWh	
	DESS Operational Uptime	100%	100%	100%	100%	
Goal: Environmental Stewardship						
Blatchford Renewable Energy Utility is committed to staying true to the project vision by complying to the environmental regulations and abiding by ENVISO goals in order to protect environment and biodiversity.	Compliance with environmental permits and regulations	100%	100%	100%	100%	
	Renewable Energy (Utility)[1]	100%	100%	100%	100%	
	Renewable Energy (Community)[2]	47%	47%	57%	57%	
	GHG reduction (Utility)[3]	348 tCO2e	1,086 tCO2e	3,451 tCO2e	4,844 tCO2e	
Goal: Operational Effectiveness						

Blatchford Renewable Energy Utility is committed to providing a culture of innovation and a strong sense of purpose through a commitment to people, and optimizing systems and resources.	Cumulative Accounts Connected	262	262	392	619	

Utility Strategic Direction	Performance Measures	Forecasted Targets				Corporate Goals
		2019	2020	2021	2022	
Goal: Fiscal Sustainability						
Blatchford Renewable Energy Utility strives to become financially sustainable and is committed to be fair and equitable.	Positive net income	no	no	no	no	
	Debt to net asset ratio [4]	0%	0%	0%	0%	
	Positive Cash position	no	no	no	no	

1 Renewable Energy (Utility): Percent of renewable energy used for Utility owned and operated equipment
2 Renewable Energy (Community): Percent of renewable energy for whole Community
3 GHG Reduction (Utility): Tonnes of carbon dioxide equivalent reduced from Utility operation
4 Debt to net asset ratio: Utility is not anticipated to take on its own debt until 2026

Preserve and sustain Edmonton's environment	**Improve Edmonton's livability**	**Ensure Edmonton's financial sustainability**
Transform Edmonton's urban form	**Diversify Edmonton's economy**	**Shift Edmonton's transportation mode**

Risk Identification

Table 2 below identifies the operational risks associated with the design and construction of the District Energy Sharing System and the development of the Blatchford Renewable Energy Utility. The likelihood score is from 1-Rare to 5-Almost Certain. The Impact score is from 1-Minor to 5-Worst Case.

Table 2: Risk Matrix for the Blatchford Renewable Energy Utility

Risk Factor	Likelihood (1 to 5)	Impact (1 to 5)	Mitigation Strategy	Risk Owner
Financial: Substantial external investment is needed for the Utility. Impact on rate structure and uptake in customers is critical for long term viability.	2	5	• Communicate and lobby government for external funding, update financial model forecast frequently and engage with Council for any changes.	Utility Leadership
Political: Direction could impact the original vision and delivery of the project.	2	4	• Communication to Council. • Accelerate, slow down or adjust activities, depending on situation.	Utility Leadership
Marketing and Land Development: Direct Utility impact on pace of development and uptake of land parcels by builders.	4	2	• Ensure close collaboration and monitoring of land development and building industry.	Utility Leadership
Technical: By following Blatchford vision of sustainability, technical and financial risks are encountered.	4	2	• Allow longer schedule for Planning and Engineering of sustainable design. Use Project Develop Deliver Model (PDDM).	Utility Leadership

Financial Impacts 2019 - 2022

This Business Plan adheres to the principles as established by the Blatchford District Energy Utility Fiscal Policy C597, shown in Appendix 1 of this plan. The Fiscal Policy establishes the framework for how the Utility will set its rates, finance capital, and manage its cash position. The Utility continues to strive towards achieving the financial indicators as set out in the Fiscal Policy (i.e. Positive Net Income, Positive Cash Position, Debt Financing of Capital). Additional efforts will be made to minimize rate increases in alignment with inflation, identify operational efficiencies, and prioritize capital projects.

A summary of the three financial indicators established is provided in the Fiscal Policy as well as the projected timelines and key milestones for the Blatchford Renewable Energy Utility to achieve long term financial sustainability in Appendix 2.

In the first four years, as the Utility continues to develop and moves towards longer term financial sustainability, the regulatory and financial priorities will be to:

1) Establish the regulatory framework and customer rates based upon a cost of service methodology that ensures the Blatchford Renewable Energy Utility customers pay a comparable energy fee to what they would elsewhere in the City of Edmonton through their energy utility bills and annual maintenance costs;
2) Obtain a non-refundable cash infusion in order to fund the initial stages of the Utility infrastructure development;
3) Obtain short-term bridge financing to be used as working capital for the day-to-day operations of the Utility as it continues to mature and begins to generate positive net income and a positive cash position as the number of residents and utility customers increase.

Funding Sources

The Utility will fund its operating and capital requirements from a number of sources. During the initial implementation and startup of the Utility, funds will be sourced mainly from the non-refundable cash infusion that is required to offset initial capital costs, as well as Builder Contributed Capital, and Infrastructure Fees, which further assist the utility in meeting its funding requirement.

- Rate Revenue
  The Utility will generate revenue through monthly customer rates. Rates will be designed to be comparable to what customers would pay elsewhere in the City through their energy utility bills and annual maintenance costs.

- Non-refundable cash-infusion
  A non-refundable cash infusion is required for the initial years of operation to offset the capital investment required to establish the Utility and allow it to grow over time to achieve financial sustainability. The total amount required in this business plan is anticipated to be $73 million, in addition to the $20 million that was previously approved by Council in prior periods, for a total of $93 million.

- Builder Contributed Capital
  The Builder will pay for central mechanical room equipment in multi-unit buildings, which will then be owned, operated and maintained by the Utility. These will be contributed assets on the Utility's balance sheet and will not attract a net depreciation expense or a return on rate base.

- Infrastructure Fee
  The Utility will collect a one time infrastructure fee for units and buildings from the builders that connect to the District Energy Sharing System. For residential units, an infrastructure fee of $1,750 per door is proposed. For each commercial development, the suggested infrastructure fee is $20 per square meter ($m^2$) of floor space.

- This fee creates an additional source of revenue for the Utility that would otherwise need to be funded by Utility rates or the non-refundable cash infusion. Based on the development timeline, the total infrastructure fee collected during this business plan period is approximately $1.1 million in the first four years and $46.8 million over the full development timeline.

- Debt Borrowing
  To ensure long term financial sustainability, the initial capital expenditures for the Utility will be funded by the non-refundable cash-infusion discussed above. The Utility anticipates its first borrowing for capital expenditures to occur in 2026.

2019 - 2022 Proposed Capital Budget (values $,000)

Table 3: 2019-2022 Capital Budget for the Blatchford Renewable Energy Utility ($000)

Prior Years	2019 Forecast	2020 Proposed	2021 Proposed	2022 Proposed	2023 and Beyond
$17,900	$1,920	$2,820	$1,210	$22,600	$104,064

2019 - 2022 Proposed Operating Budget

The following Tables 3 and 4 show the next four year Operating and Capital Budgets of the Blatchford Renewable Energy Utility. These assumptions will be updated when the budget is brought forward in the fall of 2018 for Council approval.

Table 4: 2019-2022 Operating Budget for the Blatchford Renewable Energy Utility

	2019 Forecast	2020 Proposed	2021 Proposed	2022 Proposed
Revenues and Fees				
Rate Revenue	$88,000	$180,000	$231,000	$367,000
Infrastructure Fees	$467,000	$0	$242,000	$430,000
Total Revenues	**$555,000**	**$180,000**	**$473,000**	**$797,000**
Expenditures and Transfers				
Personnel	$464,628	$473,920	$293,018	$298,878
Material, Goods and Supplies	$196,500	$312,458	$421,964	$459,774
External Services	$592,751	$601,559	$470,300	$501,314
Shared Services	$64,374	$65,662	$66,975	$68,314
Utilities and Other Charges	$24,181	$35,660	$43,286	$62,051
Total Expenditures and Transfers	**$1,342,434**	**$1,489,259**	**$1,295,543**	**$1,390,331**
Net Income	**($787,434)**	**($1,309,259)**	**($822,543)**	**($593,331)**
Full Time Equivalents	**3.0**	**3.0**	**3.0**	**3.0**

Conclusion

The first Business Plan for the new Blatchford Renewable Utility provides an overview of the strategic development of the new Utility, with a focus on the initial four years of its operation. The strategic objectives of the Utility are the growth of the District Energy Sharing System and the integration of emerging technologies into the Utility's operation to reach steady reliable operation, financial sustainability, and achieve Council's vision for a carbon neutral community, powered entirely by renewable energy. The growth of the new Utility is, and will continue to be, closely connected to the land development activities in Blatchford. The activities during the first four years of the Utility's existence concentrate on the construction and operation of the initial stages of the District Energy Sharing System as well as the development of the full Utility governance and operational structure. Special focus will be on the financial operation of the Utility, with the goal of aligning its financial indicators and reaching sustainable operation.

Appendix 1: Blatchford Renewable Energy Utility Fiscal Policy

		POLICY NUMBER: C597	
REFERENCE:		**ADOPTED BY:** City Council **SUPERSEDES:** **New**	
PREPARED BY:	Integrated Infrastructure Services	**DATE:**	March 22, 2018
TITLE:	**BLATCHFORD DISTRICT ENERGY UTILITY FISCAL POLICY**		

Policy Statements:

1. The Utility is to be operated in a manner that balances the best possible service at the lowest cost (public utility) while employing private sector approaches to rate setting.
2. Similar to private utilities, the Utility will account for the cost of service under a full cost accounting approach. All customer charges will be based upon cost of service with the end user (customer) paying at most a comparable fee to what they would elsewhere in the City of Edmonton through their energy utility bills and annual maintenance costs.
3. Through a phased approach, the Utility will generate positive net income, cash flow and a rate of return sufficient to cover current year expenses, working capital requirements, and to facilitate the funding for capital infrastructure and rehabilitation and replacement of its capital assets.
4. The Utility is to contribute towards achieving the City's Energy Transition Strategy.

The purpose of this policy is to:

1. Ensure that the Blatchford District Energy Utility is operated in a manner that reflects City Council's overall vision and philosophical objectives for the Utility.
2. Ensure that there is a consistent approach year over year for the financial planning, budgeting, and rate setting for the City managed Utility.
3. Ensure that the Utility is financially sustainable over the long term.

1. DEFINITIONS

1.1 **Cash Flow** - the ability of the Utility to meets it financial obligations as payments are due.

1.2 **Capital Assets** - assets of the Utility meeting the requirements defined under Public Sector Accounting Standard PS3150.

1.3 **Capital Investment Outlook** - a 10-year forecast of capital required to ensure that appropriate infrastructure is in place to meet service needs, including the replacement of Contributed Assets.

1.4 **Capital Plan** - a 4-year plan for funding capital infrastructure approved by City Council.

1.5 **Contributed Assets** - capital assets of the Utility for which funding was provided from non-rate sources. Examples may include infrastructure constructed by the Blatchford Development, partnership funding, grants, etc.

1.6 **Debt to Net Assets Ratio** - a measure of the extent to which the net book value of non-contributed assets is being financed by debt.

1.7 **Financial Indicators** - a set of financial measures that provide signals on the financial health of the Utility.

1.8 **Financial Sustainability** - financial sustainability is achieved when all targets set for the Financial Indicators (as recommended by the Utility Committee and approved by City Council) are attained.

1.9 **Full Cost Accounting** - shall include cost allocation from services provided by City Administration and may include administration costs, and other shared services such as Communications, Human Resources, Information Technology, Law, Corporate Procurement and Supply Services, Financial Services, Fleet and Facility Maintenance, and general corporate overhead.

1.10 **Investment in Utility Financed Assets** - Net Book Value of Utility Financed Assets minus associated outstanding debt used to pay for the assets.

1.11 **Net Book Value** - acquisition costs of original costs of capital assets minus their accumulated depreciation

1.12 **Pay As You Go** - the amount of cash required to implement the Capital Plan; annual amount to be funded from operating revenues.

1.13 **Rate Revenue** - revenue generated through monthly customer rates.

1.14 **Regulated Activities** - are activities that are core to the services provided by the Utility. Examples include, the provision of energy for heating and cooling

and domestic hot water.

1.15 **Utility** - refers to the Blatchford District Energy Utility, a self-funded operation that provides energy services for heating, cooling and domestic hot water to customers on a fee for service basis at rates regulated by City Council.

1.16 **Utility Financed Assets** - assets of the Utility for which funding has been provided from rates either through debt or Pay As You Go funding.

Following are financial indicators and additional general policy statements to guide the financial management of the utility.

2. FINANCIAL INDICATORS

Financial indicators are measures that provide financial information about the sustainability of the Utility. Taken collectively, these indicators allow for periodic assessment on whether the Utility is moving towards or away from financial sustainability.

2.1 Rate Sufficient to Meet Expenditures and Cash Flow (Positive Net Income and Positive Cash Position)

A. The Utility will generate positive net income, cash flow and a rate of return sufficient to cover current year expenses, working capital requirements, and to facilitate the funding for capital infrastructure and rehabilitation and replacement of its capital assets.

B. The management of the Utility's cash position is the responsibility of Administration, taking into consideration current borrowing rates and current and future cash requirements.

C. Where the Utility's cash position is insufficient to meet cash flow requirements, the Utility will borrow from the City of Edmonton on a short term basis, with the interest being paid by the Utility at an interest rate that compensates the City of Edmonton reflecting the Fund Balance where the cash was drawn.

Indicator Targets:

I. Positive Net Income
II. The target combined Cash Position of the Utility is the Pay As You Go funding required as identified in the Capital Plan.
III. Stable consistent rate increases.

2.2 Debt Financing of Capital

A. The Utility will not utilize Debt to finance current operating expenditures.
B. Debt will be considered for Capital Expenditures for:
    a. projects with long-term benefits;
    b. major rehabilitation or upgrade of existing assets; and
    c. emerging requirements to support corporate priorities and strategic plans.
C. The Utility will follow the City of Edmonton's process for debt issuance, including the term of the debt and will be consolidated with City debt in determining the City's position relative to the legislated debt limits.

Indicator Target:

The Debt to Net Assets Ratio is a measure of the extent that capital investment is financed through debt, presented on a combined basis and calculated as follows:

Total Long Term Debt

divided by

Net book value of Non-Contributed Assets

= Debt to Net Assets Ratio

The target for the Debt to Net Assets Ratio may vary between 50%

and 70%, taking into consideration borrowing rates. Incremental targets, by year, are as follows:

2030 - 98%; 2040 - 85%; 2050 - 70%; 2060 - 60%

3.0 Financial Planning

Budget and financial planning follow the general principles of budget, long range planning, and management of capital assets as established by the City of Edmonton and in accordance with Public Sector Accounting Standards defined by the Public Sector Accounting Board.

The Utility will prepare a 4-year Business Plan, to be presented annually to the Utility Committee, prior to the preparation of the multi-year operating and capital budgets or supplemental budget adjustments.

The Utility Committee shall recommend annually to City Council the customer rates for the upcoming year, based on review of an annual rate filing prepared by the Utility subsequent to the preparation and presentation of the 4-year Business Plan.

Appendix 2: Key Financial Indicators

BLATCHFORD DISTRICT ENERGY SHARING SYSTEM KEY FINANCIAL INDICATORS - SCENARIO B								
	2017 - 2021	**2022 - 2026**	**2027 - 2031**	**2032 - 2036**	**2037 - 2041**	**2042 - 2046**	**2047 - 2066**	**At Year 50**
# of Customers	392	3,362	7,653	11,836	14,997	16,643	16,643	16,643
Stages of Utility Buildout *	EC1	EC2 & SHX	EC 3A, 3B, 4	EC 3C & 4	EC5	EC5	Renewal	Full Buildout
Capital Investment								
Cash Infusion	$32M	$61M	-	-	-	-	-	$93M
Contributed by Developer	$3M	$33M	$48M	$31M	$22M	$10M	-	$147M
Non-Contributed	-	$4M	$83M	$19M	$40M	$47M	$227M	$420M
Total Capital	$35M	$98M	$131M	$50M	$62M	$57M	$227M	$660M
Financial Indicators								
1. Positive Net Income	No	**Positive in 2025 ($4M)**	Yes	Yes	Yes	Yes	Yes	$4M
2. Positive Cash Position	No	**Positive in 2025 ($2M)**	Yes	Yes	Yes	Yes	Yes	$12M
3. Debt Financing of Capital (50% - 70%)	n/a	n/a	100% - 98%	98% - 92%	92% - 84%	84% - 74%	**74% - 56%**	56%

*** Definitions:**
"EC" - Energy Centre
"SHX" - Sewer Heat Exchange

Blatchford Renewable Energy Utility
2019 Rate Filing
Index of MFR Schedules

Blatchford Renewable Energy Utility
2019 Rate Filing
Summary of Total System Revenue Requirement
$M

Line No.	Description	Cross Reference	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast
	Revenue Requirement						
1	Operating Costs	S. 5-1	-	1,342.43	1,489.26	1,295.54	1,390.33
2							
3	Depreciation	S. 12-1	-	-	-	-	-
4							
5	Revenue Offsets	S. 13-1	-	-	-	-	-
6							
7	Return on Rate Base	S. 14-1	-	-	-	-	-
8							
9	**Total System Revenue Requirement**		**-**	**1,342.43**	**1,489.26**	**1,295.54**	**1,390.33**
10							
11							
12	**Revenue**						
13	Revenue on Proposed Rates		$ -	$ 77.21	$ 161.43	$ 206.06	$ 325.13
14							
15	Infrastructure Fee		$ -	$ 458.50	$ -	$ 238.51	$ 421.56
16							
17	**Total Revenue**		**$ -**	**$ 535.71**	**$ 161.43**	**$ 444.57**	**$ 746.69**
18							
19	**Revenue Surplus/(shortfall)**		-	(806.73)	(1,327.83)	(850.98)	(643.64)

Blatchford Renewable Energy Utility
2019 Rate Filing
Summary of Operating Costs
$M

Line No.	Description	Cross Reference	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast
1	Utilities	S.6-1	$ -	$ 24.18	$ 35.66	$ 43.29	$ 62.05
2							
3	Operations and Maintenance Costs	S. 7-1	-	700.09	826.12	945.90	994.19
4							
5	Administration Costs	S. 8-1	-	369.86	377.26	194.42	198.31
6							
7	Customer Billing Services Costs	S. 9-1	-	175.88	176.35	36.58	58.92
8							
9	Corporate Administration Costs	S. 10-1	-	72.42	73.87	75.35	76.86
10							
11	Franchise Fees and Property Taxes		-	-	-	-	-
12							
13	**Total Operating Costs**		**$ -**	**$ 1,342.43**	**$ 1,489.26**	**$ 1,295.54**	**$ 1,390.33**

Blatchford Renewable Energy Utility
2019 Rate Filing
Utilities Costs
$M

Line No.	Description	Cross Reference	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	Cross Reference
1	Utilities		$ -	$ 24.18	$ 35.66	$ 43.29	$ 62.05	
2								
3	Other		-	-	-	-	-	
4								
5	**Total Power and Chemicals**		**$ -**	**$ 24.18**	**$ 35.66**	**$ 43.29**	**$ 62.05**	S. 5-1

Blatchford Renewable Energy Utility
2019 Rate Filing
Operations and Maintenance Costs by Function
$M

Line No.		Cross Reference	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	Cross Reference
1	**Energy Centers & Main Distribution System**							
2	Operation & Maintenance		$ -	155.21	263.25	350.13	360.84	
3			-	-	-	-	-	
4		Subtotal	-	155.21	263.25	350.13	360.84	
5								
6	**Customer Connection and Meters**							
7	Operation & Maintenance		-	13.92	21.30	43.37	69.90	
8			-	-	-	-	-	
9		Subtotal	-	13.92	21.30	43.37	69.90	
10								
11	**Quality Assurance**		-	-	-	-	-	
12								
13	**Operations Support Services**							
14	Personnel		-	275.89	281.41	287.04	292.78	
15	Travel & Training		-	5.75	5.87	5.98	6.10	
16	Tools, Equipment & Vehicles			19.31	19.70	20.09	20.49	
17	Technical Consultants		-	230.00	234.60	239.29	244.08	
18	Less: Recovery of Costs		-	-	-	-	-	
19		Subtotal	-	530.95	541.57	552.40	563.45	
20								
21	**Total Operations and Maintenance Costs**		**$ -**	**$ 700.09**	**$ 826.12**	**$ 945.90**	**$ 994.19**	S. 5-1

Blatchford Renewable Energy Utility
2019 Rate Filing
Administration Costs by Function
$M

Line No.	Description	Cross Reference	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	Cross Reference
1	Marketing, Education and Communication		$ -	$ 297.99	$ 303.95	$ 119.65	$ 122.04	
2	Consultants - Financial/Other		-	71.88	73.31	74.78	76.27	
3			-	-	-	-	-	
4	Subtotal		-	369.86	377.26	194.42	198.31	
5								
6	Less:							
7	Allocations to Other Business Units		-	-	-	-	-	
8	Capital Overhead Recoveries		-	-	-	-	-	
9			-	-	-	-	-	
10								
11	**Total Administration Costs**		**$ -**	**$ 369.86**	**$ 377.26**	**$ 194.42**	**$ 198.31**	S. 5-1

Blatchford Renewable Energy Utility
2019 Rate Filing
Customer Billing Costs
$M

Line No.	Description	Cross Reference	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	Cross Reference
1	Monthly Billing Charges		$ -	$ 23.50	$ 23.97	$ 36.58	$ 58.92	
2	One-time Set-up Charges			$ 152.38	$ 152.38	$ -	$ -	
3	Bad Debts		-	-	-	-	-	
4	Write-offs and Adjustments		-	-	-	-	-	
5								
6	**Total Customer Billing Costs**		**$ -**	**$ 175.88**	**$ 176.35**	**$ 36.58**	**$ 58.92**	S. 5-1

Blatchford Renewable Energy Utility
2019 Rate Filing
Corporate Administration Costs
$M

Line No.	Description	Cross Reference	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	Cross Reference
1	Shared Corporate Service Costs		$ -	$ 64.37	$ 65.66	$ 66.98	$ 68.31	
2	Asset Usage Fees		-	8.05	8.21	8.38	8.54	
3	Subtotal		-	72.42	73.87	75.35	76.86	
4								
5	Less: Allocation to Other Business Units							
6	Shared Corporate Service Costs		-	-	-	-	-	
7	Asset Usage Fees		-	-	-	-	-	
8	Subtotal		-	-	-	-	-	
9								
10	**Total Corporate Administration Costs**		**$ -**	**$ 72.42**	**$ 73.87**	**$ 75.35**	**$ 76.86**	S. 5-1

Blatchford Renewable Energy Utility
2019 Rate Filing
Rate Base
$M

Line No.	Description	Cross Reference	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	Cross Reference
1	Prior Year Property, Plant and Equipment	S. 15-2	$ -	$ -	$ 18,278.00	$ 19,442.00	$ 19,442.00	
2	Prior Year Accumulated Depreciation		-	-	-	-	-	
3	Prior Year Net Property		-	-	18,278.00	19,442.00	19,442.00	
4								
5	Current Year Property, Plant and Equipment	S. 15-2	-	18,278.00	19,442.00	19,442.00	19,442.00	
6	Current Year Accumulated Depreciation		-	-	-	-	-	
7	Current Year Net Property		-	18,278.00	19,442.00	19,442.00	19,442.00	
8								
9	Mid-Year Net Property		-	9,139.00	18,860.00	19,442.00	19,442.00	
10								
11	Materials and Supplies		-	-	-	-	-	
12								
13	Working Capital		-	-	-	-	-	
14								
15	Gross Mid-Year Rate Base		-	9,139.00	18,860.00	19,442.00	19,442.00	
16								
17	Mid-Year Net Contributions	S. 15-6	-	(9,139.00)	(18,860.00)	(19,442.00)	(19,442.00)	
18								
19	**Net Mid-Year Rate Base**		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	

Blatchford Renewable Energy Utility
2019 Rate Filing
Property, Plant & Equipment
$M

Line No.		Cross Reference	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast
1	Previous year balance		$ -	$ -	$ 18,278.00	$ 19,442.00	$ 19,442.00
2							
3	Additions to Property, Plant & Equipment						
4	BREU Funded	S. 15-4	-	18,278.00	1,164.00	-	-
5	Developer Additions		-	-	-	-	-
6			-	18,278.00	1,164.00	-	-
7							
8	Retirements and Adjustments		-	-	-	-	-
9							
10	**Current year balance**		**$ -**	**$ 18,278.00**	**$ 19,442.00**	**$ 19,442.00**	**$ 19,442.00**

Blatchford Renewable Energy Utility
2019 Rate Filing
Construction Work in Progress
$M

Line No.		Cross Reference	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	Cross Reference
1	Previous year balance		$ -	$ 18,011.00	$ 1,657.19	$ 3,314.39	$ 6,212.83	
2								
3	Capital Expenditures		18,011.00	1,924.19	2,821.19	2,898.45	22,598.10	
4								
5	Less: Capital Additions		-	(18,278.00)	(1,164.00)	-	-	S. 15-2
6								
7	**Current year balance**		$ 18,011.00	$ 1,657.19	$ 3,314.39	$ 6,212.83	$ 28,810.94	

Blatchford Renewable Energy Utility
2019 Rate Filing
Contributions in Aid of Construction
$M

Line No.	Description	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	Cross Reference
1	Prior Year Gross Contributions	$ -	$ -	$ (18,278.00)	$ (19,442.00)	$ (19,442.00)	
2							
3	City Contributions	-	(18,278.00)	(1,164.00)	-	-	
4	Customer Contributions	-	-	-	-	-	
5	Developer Contributions	-	-	-	-	-	
6	Retirements, Transfers & Disposals						
7							
8	**Current Year Gross Contributions**	-	(18,278.00)	(19,442.00)	(19,442.00)	(19,442.00)	
9							
10	Prior Year Accumulated Amortization	-	-	-	-	-	
11							
12	Gross Amortization	-	-	-	-	-	
13	Retirements, Transfers & Disposals						
14							
15	**Current Year Accumulated Amortization**	-	-	-	-	-	
16							
17							
18	**Mid Year Net Contributions**	**$ -**	**$ (9,139.00)**	**$ (18,860.00)**	**$ (19,442.00)**	**$ (19,442.00)**	S. 15-1

Blatchford Renewable Energy Utility
2019 Rate Filing
Customers and Consumption
$M

Line No.	Description	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	Cross Reference
1	**TOTAL CUSTOMERS - AVERAGE**						
2	Townhomes	-	30	60	75	116	
3	Apartments	-	101	202	253	391	
4	Other	-	-	-	-	-	
5							
6	**Total Customers - Average**	**-**	**131**	**262**	**328**	**507**	
7							
8	**TOTAL CONSUMPTION (MWh)**						
9							
10	Townhomes	-	203	405	507	785	
11	Apartments	-	596	1,191	1,488	2,301	
12	Other	-	-	-	-	-	
13	Subtotal	-	798	1,596	1,995	3,086	
14		-	-	-	-	-	
15							
16	**Total Consumption (kWh)**	**-**	**798**	**1,596**	**1,995**	**3,086**	
17							
18	**Average Monthly Consumption per Customer** (kWh per month)						
19	Townhomes	-	562.5	562.5	563.3	563.9	
20	Apartments	-	491.3	491.3	490.9	490.9	
21	Other	-	-	-	-	-	

Blatchford Renewable Energy Utility
2019 Rate Filing
Revenue on Proposed Rates
$M

Line No.	Description	Cross Reference	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast
1	**Total Revenue on Proposed Rates**						
2	Townhomes		$ -	$ 125.81	$ 44.10	$ 110.94	$ 185.46
3	Apartments		-	409.90	117.33	333.63	561.23
4	Other		-	-	-	-	-
5	**Total Revenue on Proposed Rates**		**$ -**	**$ 535.71**	**$ 161.43**	**$ 444.57**	**$ 746.69**
6							
7	**Rate Revenue on Proposed Rates**						
8	Townhomes			20.81	44.10	56.32	88.89
9	Apartments			56.40	117.33	149.74	236.24
10	Other						
11	**Rate Revenue on Proposed Rates**		**$ -**	**$ 77.21**	**$ 161.43**	**$ 206.06**	**$ 325.13**
12							
13	**Infrastructure Fee**						
14	Townhomes			105.00	-	54.62	96.57
15	Apartments			353.50	-	183.89	324.99
16	Other						
17	**Total Infrastructure Fee**		**$ -**	**$ 458.50**	**$ -**	**$ 238.51**	**$ 421.56**

Blatchford Renewable Energy Utility
2019 Rate Filing
Proposed End Use Customer Rates and Fees

Line No.	Description	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast
1	**Fixed Charge ($/day)**				
2	Townhomes	**$1.43**	$1.52	$1.55	$1.58
3	Apartments	**$1.12**	$1.16	$1.18	$1.21
4					
5					
6	**Variable Charge ($/kWh)**				
7	Townhomes & Apartments	**$0.0248**	$0.0267	$0.0272	$0.0278
8					
9					
10					
11	**Infrastructure Fee ($/connection)**				
12	Residential - Townhomes & Apartments	**$ 1,750**	$1,785	$1,821	$1,857
13	Commercial	**$ 20.00**	$20.40	$20.81	$21.22

Note: Approval is being sought for End Use Customer Rates and Fees for 2019 only.

Blatchford Renewable Energy Utility
2019 Rate Filing
Interest on Financing
$M

Line No.	Description	Cross Reference	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast
1	**Deferral Account Opening Balance**		-	(820.84)	(2,204.35)	(3,160.52)
2						
3	Current Year Surplus/shortfall	S. 3-1'	(806.73)	(1,327.83)	(850.98)	(643.64)
4						
5	**Deferral Account Closing Balance**		(806.73)	(2,148.67)	(3,055.33)	(3,804.16)
6						
7	Interest Costs		(14.12)	(55.68)	(105.19)	(148.00)
8						
9	**Deferral Account Closing Balance Including Interest Costs**		**(820.84)**	**(2,204.35)**	**(3,160.52)**	**(3,952.16)**
10						
11	Interest Rate on Financing		3.50%	3.75%	4.00%	4.25%

Blatchford Renewable Energy Utility
2019 Rate Schedules
For Thermal Energy Service
Effective January 1 2019 to December 31 2019

Blatchford Renewable Energy Utility (BREU)
Rate BREU 1 - Residential Service

For Thermal Energy Service for all customers throughout the Service Area served by the Blatchford Renewable Energy Utility.

Rate

Rate Component		2019 Rate
Fixed Charge ($/day)		
	Townhomes	1.43
	Apartments	1.12
Variable Charge ($/kWh)		0.0248

The minimum charge is the Fixed Charge.

Application

Price Adjustments

Rate BREU 1 may be adjusted by applicable riders or rate adjustments, from time to time, as approved by Edmonton City Council.

Bylaw 17943 shall apply to customers taking service under Rate BREU 1.