

Blatchford Renewable Energy - Energy Transfer Station

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Blatchford Renewable Energy Energy Transfer Station Concept - Justification

Integrated Infrastructure Services Department

City of Edmonton

Capital Profile: CPP# 22-83-8384

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Document Approval

SUBMITTED BY:

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1.0	Christian Felske	Director, Renewable Energy Systems	October 26, 2020

REVIEWED BY:

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1.0	Santosh Appukuttan, Acting Operational Controller, Blatchford Utility	Santosh Appukuttan	October 19, 2020
1.0	Brian Latte, LRT - Traffic Integration Manager	Brian Latte	October 22, 2020
1.0	Barry McNabb, Director, Utility Regulation	Barry McNabb	October 19, 2020
1.0	Jeff Olsen, Manager, Regulatory and Financial Strategies	Jeff Olsen	October 19, 2020

APPROVED BY:

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1.0	Jesse Banford, Acting, Branch Manager	 97226DFD449C46E...	November 3, 2020

1. Executive Summary

1.1. Profile Background

Blatchford Renewable Energy was established to help achieve the City's long term goal of 100% renewable energy and carbon neutrality for the Blatchford development. This new city-owned utility owns and operates an innovative District Energy Sharing System in the community. All buildings in Blatchford, with the exception of stand alone net-zero carbon buildings, must be connected to the District Energy Sharing System for all sustainable heating, cooling and domestic hot water services.

In December 2016, City Council directed the creation of the Blatchford Renewable Energy Utility subsequent to reviewing the business case for developing the District Energy Sharing System. The business case identified capital expenditures over a 50 year period for the construction and maintenance of the Utility. The capital expenditures were further broken down into three asset groups. **Group 1** assets comprise the energy centres and distribution system that are to be financed, owned and maintained by the Utility, **Group 2** assets comprise the mechanical equipment (including energy transfer stations) in the individual buildings to draw energy from the distribution system which are to be financed by the builders and contributed to the Utility to own and maintain, and **Group 3** assets comprise the thermostats and additional equipment in the building walls which are financed, owned and maintained by the owners of the buildings.

In December 2018, City Council approved the Blatchford Renewable Energy Utility Bylaw 17943 which establishes the Utility, outlines the requirements for properties to receive energy service through the Utility, and sets the fees and charges for utility service. Part IV, section 12 of Bylaw 17943 indicates the Utility will supply and install, and subsequently own and maintain as a Group 2 asset, the energy transfer station and energy meter for each building with the installation costs being paid for by the builders.

Buildings in Blatchford will use renewable energy for heating and cooling and, as such, buildings will not need to be equipped with traditional systems related to the production of thermal or cooling energy, such as furnaces, boilers, air conditioners or cooling towers.

As described above, certain townhouses and low-rise to mid-rise multi-family buildings will have an Energy Transfer Station (essentially heating/cooling equipment in a utility room) to distribute the energy from the District Energy Sharing System into the individual building units. Energy Transfer Stations are to some degree similar to central mechanical rooms in traditional multi-family buildings. Blatchford Renewable Energy's operating and business model envisions the utility designing, installing, owning, operating and maintaining the Energy Transfer Stations. The builder will reimburse the full costs for the design and installation of the Energy Transfer Station to the utility. This justification provides the rationale for the chosen Energy Transfer Station approach, as Administration is bringing forward an accompanying Capital Profile for this work.

1.2. Problem/Opportunity

This justification further examines the design and construction philosophy for the Energy Transfer Stations in the first identified buildings in the Blatchford development, which are connected to the main District Energy Sharing System infrastructure. The initial operating and financial model for Blatchford Renewable Energy, manifested in the utility bylaw, assumes the utility will own, operate and maintain the Energy Transfer Stations. The builder will reimburse the utility for the design and construction costs of the Energy Transfer Stations, with the operation and maintenance financed through utility customer rates and fees. The decision to take this approach with the Energy Transfer Stations was weighed against the option of the builder designing and constructing the Energy Transfer Station, after which point the utility would take on ownership for the ensuing operation and maintenance services.

2. Profile/Initiative Description

2.1. Initiative Justification

By designing and constructing the Energy Transfer Stations, the utility ensures that in the initial stages of the District Energy Sharing System development, the proper mechanical systems are in place, resulting in the highest operational and financial efficiencies for the operation and maintenance of the system. Various operational, financial and reputational advantages for this chosen approach include:

- **Critical Operational Interface:** The Energy Transfer Station is a critical interface component connecting the District Energy Sharing infrastructure with most of the buildings in the Blatchford community. The optimal interplay between these buildings and the overall District Energy Sharing System is critically important to ensure the most efficient operation of the system, which will help achieve the best possible operational, financial, and sustainability outcomes. The utility is operating the main District Energy Sharing infrastructure, and with that experience and operational oversight, can ensure that the Energy Transfer Station is properly designed and built.
- **Operational Efficiencies and Cost Savings:** As the utility's business model includes the operation and maintenance of the Energy Transfer Stations, the initial design and construction is of critical importance to ensure that future operation can be optimized. With the utility taking on the design and construction of the Energy Transfer Station, it can ensure that future cost savings and operational efficiencies are achieved. Examples include the ability for the utility to select certain equipment and design operational processes which can be streamlined between all buildings with Energy Transfer Stations, resulting in reduction of operating and maintenance costs.
- **Innovation and Novelty Aspects:** The utility's experience in operating the District Energy Sharing System will also help to drive innovation and alleviate any initial concerns for the Energy Transfer Station concept in Edmonton's builder market. While some experience exists with the concept in the home building community, this chosen approach will provide builders (and future utility customers) with the assurance that the technical and operational details of the system are being met. This in turn, will avoid any remodelling work or cost overruns.
- **Reputational Aspects and Lesson Learned:** Blatchford Renewable Energy has investigated other District Energy Systems locations, where a different design and delivery approach of the Energy Transfer Stations has led to significant operational challenges, cost overruns, and reputational issues. These learnings and experiences have influenced the decision for the utility to take on more control in designing and building the Energy Transfer Stations in the identified buildings.

The utility is committed to review the chosen Energy Transfer Station design and delivery concept during the first stages of development in Blatchford. With more builders and contractors getting experience with the Energy Transfer Station concept in Edmonton, the utility recognizes the opportunity to work with builders in the future and to potentially move some of the Energy Transfer Station design and installation responsibilities to the builder, with the utility providing more of an oversight role.

3. Strategic Alignment

The initiative aligns to Council's strategic goals of climate resilience: Edmonton is a city transitioning to a low-carbon future, has clean air and water and is adapting to a changing climate. The work proposed in this business case further supports Council's vision for the Blatchford development and utility:

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

4. Alternatives

The alternative considered to the proposed Energy Transfer Station design and construction concept is to have the builders design and construct the Energy Transfer Stations, with the utility then becoming the owner and taking on the operation and maintenance. This option was evaluated, and technical and operational advice was received recommending to utilize the proposed process in the initial stages of the development of the District Energy Sharing System to ensure that operational control and efficiencies are achieved, initial cost savings are realized, and that reputational challenges as experienced in other projects, are avoided.

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5. Organizational Change Impact

5.1. Stakeholder Impact

The primary stakeholder impacted by the design and delivery of the Energy Transfer Station are the builders. The utility has provided specific design information materials for them, outlining the chosen concept and technical, operational and financial information for the Energy Transfer Station design and delivery process. This allows the builder and the utility to work hand in hand through the design and construction on site. As mentioned, it is important for builders to familiarize themselves with the design and construction of Energy Transfer Stations and its connection to the District Energy Sharing infrastructure, to in the future allow some of the responsibilities for the Energy Transfer Stations to be moved to the builders.

5.2. Procurement Approach

A detailed process has been laid out for the builder and the utility to work together during the design and delivery stages of the building and specifically the Energy Transfer Station. Based on information from the builder, the design requirements by the utility, and the established procedures, the utility will design and oversee the installation of the Energy Transfer Station. The utility will engage existing technical advisors within Engineering Services, consultants, and contractors for the execution of the work, when needed.

5.3. Costs

The cost for the design and construction of the Energy Transfer Station will be paid for by the builder. The detailed cost will be developed jointly between the builder and the utility through the preliminary and final design stage of the building, with a key factor being the overall energy requirements of the building. The costs are managed through the utility with payment requirements outlined as part of the sales agreement between the builder and the Blatchford Redevelopment Office. Hence no additional funding sources are required for the developed capital profile. If the actual cost for the Energy Transfer Station comes in lower than expected, then the utility has developed a mechanism to refund the builder. Costs for the utility are based on a full cost recovery principle and industry standard contingencies have been developed. Based on the current land development forecast from the Blatchford Redevelopment Office the expected timelines and costs are outlined in table 1 below:

Table 1: Expected Costs for Energy Transfer Stations in Blatchford

Activity	2022	2023	2024	Total
Design/Construction	\$1,500,000	\$1,500,000	\$2,000,000	\$5,000,000

5.4. Anticipated Cost Benefits

The cost benefit for the utility is achieved from the operational efficiencies that come from the utility designing and constructing the Energy Transfer Station to most efficiently connect with the existing and future District Energy Sharing System infrastructure. This will lead to lower operation and maintenance costs for the utility, e.g. through the choice of equipment and operational efficiency gains. The actual anticipated savings will vary, mainly dependent on the specific size and energy load of each building. At this time these costs are difficult to quantify as actual costs for contractors are not actually known as the ETS concept is fairly new to the Edmonton and area market. The utility will gather necessary data to ensure that a more detailed analysis is generated. The utility is currently working closely with the Blatchford Land Development Office and is engaged early in the process reviewing the design of buildings in Blatchford.

6. Resourcing

The work required to implement this process includes internal and external resources to design and deliver the Energy Transfer Stations in buildings in Blatchford. The costs are managed through the utility, with the funding recovered from the respective builders in Blatchford.

7. Key Risk(s) and Mitigation Strategies

The key risk managed with the chosen strategy is that Blatchford Renewable Energy will not lose control of the design and construction of the Energy Transfer Stations. This ensures that the utility can make certain the overall energy systems are working effectively and efficiently to reduce the operational and reputational risks in comparison to the considered alternative. This risk is owned by the leadership of Blatchford Renewable Energy.

8. Conclusion and Recommendation

This new [Capital Profile](#) is needed to manage the design and delivery of the Energy Transfer Stations in the majority of buildings in Blatchford. The funding source for this profile will be “developer funding” which would impact any other City or Utility capital programs. The recommendation is for the utility to design and construct the Energy Transfer Stations and to

own, operate and maintain them. This approach will result in higher efficiency from the overall utility infrastructure, lower operating costs, and reduced system operation and reputational risks. The alternative considered would also see the builder pay and manage its resources to complete the work, but would likely result in lower efficiency, higher operating costs for the utility and enhanced risks of operation.

The cost of the design and construction will be fully covered by the builder and the cost of the ongoing operation and maintenance will be financed through customer rates and fees.

9. Review and Approval Process

This justification will be approved by the Director of Renewable Energy Systems. The final approval will be received from the Branch Manager prior to submission to Utility Committee and the Council.

Attachment 1 - [Blatchford Energy Transfer Station \(ETS\) Capital Profile](#)