bcuc
British Columbia
Utilities Commission

Suite 410, 900 Howe Street
Vancouver, BC Canada V6Z 2N3
bcuc.com

P: 604.660.4700
TF: 1.800.663.1385
F: 604.660.1102

Creative Energy Seȟáḵw Limited Partnership

Application for a Certificate of Public Convenience and Necessity for the Seȟáḵw District Energy System

---

Decision
and Order C-5-23

October 26, 2023

Before:
C. M. Brewer, Panel Chair
A. K. Fung, KC, Commissioner
E. B. Lockhart, Commissioner

TABLE OF CONTENTS

Page no.

Executive Summary

The Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) is developing its Seṅáḵw reserve in the Vancouver area. Nch'ḵaẏ West, a development company in which the Squamish Nation is a majority partner is undertaking the Seṅáḵw development and engaged Creative Energy Seṅáḵw Limited Partnership (CESLP) to provide a low carbon thermal energy system for heating and cooling.

The energy system that CESLP proposes to build is a low carbon electrified energy system that provides cooling with electric chillers and heating from captured waste heat from the cooling equipment and reclaimed heat from a Metro Vancouver main sewer line using heat pumps. Electric boilers, thermal storage and natural gas boilers will provide peaking and backup to the heat recovery processes (Seṅáḵw DES or the Project).

The Seṅáḵw DES has been sized to serve seven new buildings to be constructed through phases 1 and 2 of the Seṅáḵw development. Expansion of the Seṅáḵw DES to serve potential future development phases 3 and 4 is not part of this application.

CESLP has applied to the British Columbia Utilities Commission (BCUC) for a Certificate of Public Convenience and Necessity (CPCN) to construct, own and operate the Seṅáḵw DES. The key components of the DES are an energy centre, an energy transfer station at each connected building and a distribution piping system to deliver the thermal energy.

The Panel finds a need for low carbon heating and cooling for the Seṅáḵw development. Further, of the low carbon technologies that CESLP evaluated including biomass and ocean heat recovery, the Panel agrees with CESLP's conclusion that sewer heat recovery is the most reasonable alternative to meet the developer's requirement for a low carbon energy system.

CESLP developed a load forecast to determine the peak heating and cooling needs of the Seṅáḵw development. This forecast was developed based on the winter and summer design conditions set out in Vancouver Building By-Law 2019 and is used to determine the thermal generation capacity of the energy centre. CESLP developed a second load forecast, an hourly heating and cooling energy model, using standard weather data instead of peak weather conditions. This second forecast, the energy model is intended to be representative of typical system operation for the Seṅáḵw DES over a full year and is used by CESLP as part of its indicative cost of service and rates model, and to forecast greenhouse gas emissions.

The Panel finds that the Seṅáḵw DES is properly sized to meet forecast demand, and that it includes a justifiable level of redundancy for heating. In addition, the Panel finds that CESLP has appropriately identified key risks and adequately addressed them, in particular the risks associated with construction costs and fuel availability.

The Seṅáḵw DES is expected to be in-service by February 2025 and has an estimated capital cost of $26.4 million in 2022 dollars before escalation and allowance for funds used during construction.

The BCUC finds that public convenience and necessity require the construction and operation of the Project. Accordingly, for the reasons outlined in the accompanying Decision, and pursuant to sections 45 and 46 of the *Utilities Commission Act*, the BCUC grants a CPCN to CESLP for the Seṅáḵw DES and directs various reporting requirements relating to the Project.

1.0 Introduction

On October 20, 2022, Creative Energy Seṅáḵw Limited Partnership (CESLP), a wholly owned subsidiary of Creative Energy Ventures LP, applied to the British Columbia Utilities Commission (BCUC) pursuant to sections 45 and 46 of the *Utilities Commission Act* (UCA) for a Certificate of Public Convenience and Necessity (CPCN) to construct, own and operate a thermal energy system to provide heating and cooling to the Seṅáḵw development, which is on Seṅáḵw Lands (Application). The Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) owns the Seṅáḵw Lands as reserve lands through an agreement with the federal government.[1]

The proposed thermal energy system is a low carbon electrified energy system that provides cooling to the Seṅáḵw development with electric chillers and heating from captured waste heat from the cooling equipment and reclaimed heat from a Metro Vancouver main sewer line using high-temperature heat pumps. Electric boilers, thermal storage and natural gas boilers will be in place to provide peaking and backup to the heat recovery processes (Seṅáḵw DES or the Project).[2]

The Seṅáḵw development is a mixed-use project of primarily purpose-built rental housing, which is planned to be built over 4 phases (Seṅáḵw Development).[3] The Seṅáḵw DES has been sized to serve seven new buildings to be constructed through phases 1 and 2 of the Seṅáḵw Development. Future expansion of the Seṅáḵw DES is contemplated to serve phases 3 and phase 4 of the Seṅáḵw Development. However, final plans for phases 3 and 4 have not been confirmed and the potential future expansion of the Seṅáḵw DES to serve those phases does not form part of the requested approvals of this Application.[4]

The Seṅáḵw DES is expected to be in-service by February 2025, with occupancy of the seven buildings in phases 1 and 2 of the Seṅáḵw Development expected between 2025 and 2027.[5] The Seṅáḵw DES has an estimated capital cost estimate of $26.4 million in 2022 dollars before escalation and allowance for funds used during construction.[6]

1.1 Legislative and Regulatory Framework

1.1.1 *Utilities Commission Act*

Section 45(1) of the UCA requires that except as otherwise provided, after September 11, 1980, a person must not begin the construction or operation of a public utility plant or system, or an extension of either, without first obtaining from the BCUC a certificate that public convenience and necessity require, or will require, the construction or operation of the plant or system.[7]

[1] Exhibit B-1, p. 1.
[2] Ibid., p. 2.
[3] Ibid., pp. 1, 22.
[4] Ibid., p. 3.
[5] Ibid., pp. 25-26; CESLP provided an update during the proceeding that the Project schedule provided in the Application is approximately three months behind schedule. Exhibit B-3, BCUC IR 14.1.
[6] Ibid., p. 26,
[7] *Utilities Commission Act*, RSBC 1996, c. 473, section 45(1).

Section 46(3.1) of the UCA provides that in deciding whether to issue a CPCN applied for by a public utility other than the authority (as defined in the UCA as the British Columbia Hydro and Power Authority (BC Hydro)), the BCUC must consider:[8]

a) the applicable of British Columbia's energy objectives, which are defined in section 2 of the *Clean Energy Act* (CEA)[9];

b) the most recent long-term resource plan filed by the public utility under section 44.1 of the UCA, if any; and

c) the extent to which the application for the certificate is consistent with the applicable requirements under sections 6 and 19 of the CEA.[10]

Only item (a) above is applicable to the review of the Project given: CESLP has not filed a long term resource plan under section 44.1 of the UCA; section 6 of the CEA pertains to electricity self-sufficiency, which is not a consideration for CESLP; and section 19 of the CEA pertains to clean or renewable resources and is only applicable to BC Hydro and a prescribed public utility, if any, and a public utility in a class of prescribed public utilities, if any.

1.1.2 BCUC Guidelines

The BCUC provides two sets of guidelines applicable to this Application: The Thermal Energy Systems Regulatory Framework Guidelines (TES Guidelines) and the CPCN Guidelines as summarized below.

TES Guidelines

On August 28, 2014, the BCUC issued Order G-127-14 approving the TES Guidelines. Order G-27-15 approved certain revisions to the TES Guidelines.

The TES Guidelines state that a thermal energy system (TES) that does not meet the requirements of a Micro TES or a Strata Corporation TES and does not meet the Stream A characteristics as described in section 2.3.1 of the TES Guidelines, is by default considered to be a Stream B TES. In such cases, a CPCN application is to be submitted to the BCUC. CPCN applications for Stream B TES are generally expected to be prepared in accordance with the BCUC's 2015 Certificate of Public Convenience and Necessity Application Guidelines (CPCN Guidelines) as well as section 2.4.2 of the TES Guidelines, which outlines additional filing requirements for Stream B TES.[11]

CPCN Guidelines

The BCUC's CPCN Guidelines provide general guidance regarding the BCUC's expectation of the information that should be included in a CPCN application while providing the flexibility for an application to reflect the specific circumstances of the applicant, the size and nature of the project and the issues raised by the application.[12]

The BCUC's CPCN Guidelines state that a CPCN application submitted under sections 45 and 46 of the UCA should contain information on the applicant, project need, alternatives and justification, consultation, project description, project cost estimate, provincial government energy objectives and policy considerations, and new service areas.[13]

[8] UCA, section 46(3.1).
[9] CEA, section 2.
[10] Sections 6 and 19 of the CEA do not apply to CESLP.
[11] TES Guidelines, pp. 18–20.
[12] Appendix A to Order G-20-15, BCUC 2015 Certificate of Public Convenience and Necessity Guidelines (CPCN Guidelines), p. 1.
[13] Ibid.

1.2 Regulatory Process

Pursuant to an order issued on November 30, 2022, the BCUC established a regulatory timetable for the review of the Application, which included public notification, intervener registration, one round of BCUC and intervener information requests (IRs), and further process to be determined.[14]

By order dated March 3, 2023, the BCUC established a further regulatory timetable for the review of the Application, which included a second round of BCUC and intervener IRs, and final and reply arguments.[15] Following receipt of CESLP's IR 2 responses, the BCUC amended the regulatory timetable to include a third round of IRs, submissions on further process and a CESLP reply submission on further process.[16]

On June 14, 2023, the BCUC established a further regulatory timetable, which included CESLP final argument and intervener final argument. The BCUC also directed CESLP, by no later than September 1, 2023, to file its agreement with Metro Vancouver[17] for sewage diversion (Sewage Diversion Agreement) once executed or provide an update on the status of the Sewage Diversion Agreement.[18] On July 25, 2023, the BCUC established a further regulatory timetable to include CESLP reply argument.[19]

On August 29, 2023, CESLP provided an update on the Sewage Diversion Agreement. CESLP confirmed that negotiations had concluded, and that the senior staff required to sign the agreement were out of the office until the first week of September 2023. CESLP stated that once executed, it would file a copy of the Sewage Diversion Agreement on the record of the proceeding.[20] In response, the BCUC requested that CESLP file a copy of the executed Sewage Diversion Agreement by no later than September 18, 2023. The BCUC also requested that this filing include a blacklined copy of the executed agreement to show all changes from the draft agreement filed previously during the proceeding.[21]

On September 18, 2023, CESLP filed an executed copy of the Sewage Diversion Agreement.[22]

The Residential Consumer Intervener Association (RCIA) registered as the sole intervener in the proceeding.

The BCUC received two letters of comment in this proceeding: the first from the Squamish Nation, dated January 19, 2023; and the second from the Kits Point Residents Association, dated May 3, 2023.[23]

1.3 Decision Framework

The structure of this Decision largely follows that of BCUC's CPCN Guidelines:

- Section 2 addresses the applicant, CESLP;
- Section 3 addresses the need for the Project;
- Section 4 addresses the alternatives to the Project;
- Section 5 addresses the Project description;

[14] Order G-346-22, dated November 30, 2023.
[15] Order G-42-23, dated March 3, 2023.
[16] Order G-93-23, dated April 24, 2024.
[17] The Sewage Diversion Agreement is between CESLP and the Greater Vancouver Sewerage and Drainage District. In this Decision, the Greater Vancouver Sewerage and Drainage District is referred to as Metro Vancouver.
[18] Order G-144-23, dated June 14, 2023.
[19] Order G-197-23, dated July 25, 2023.
[20] Exhibit B-12, p. 1.
[21] Exhibit A-11, p. 1.
[22] Exhibit B-13.
[23] Exhibit E-1 and E-2.

- Section 6 addresses the cost of the Project and indicative rates;
- Section 7 addresses consultation and engagement for the Project;
- Section 8 addresses the Project's consistency with BC's Energy Objectives;
- Section 9 provides the overall CPCN determination; and
- Appendix A sets out the reporting requirements associated with the CPCN.

2.0 Applicant

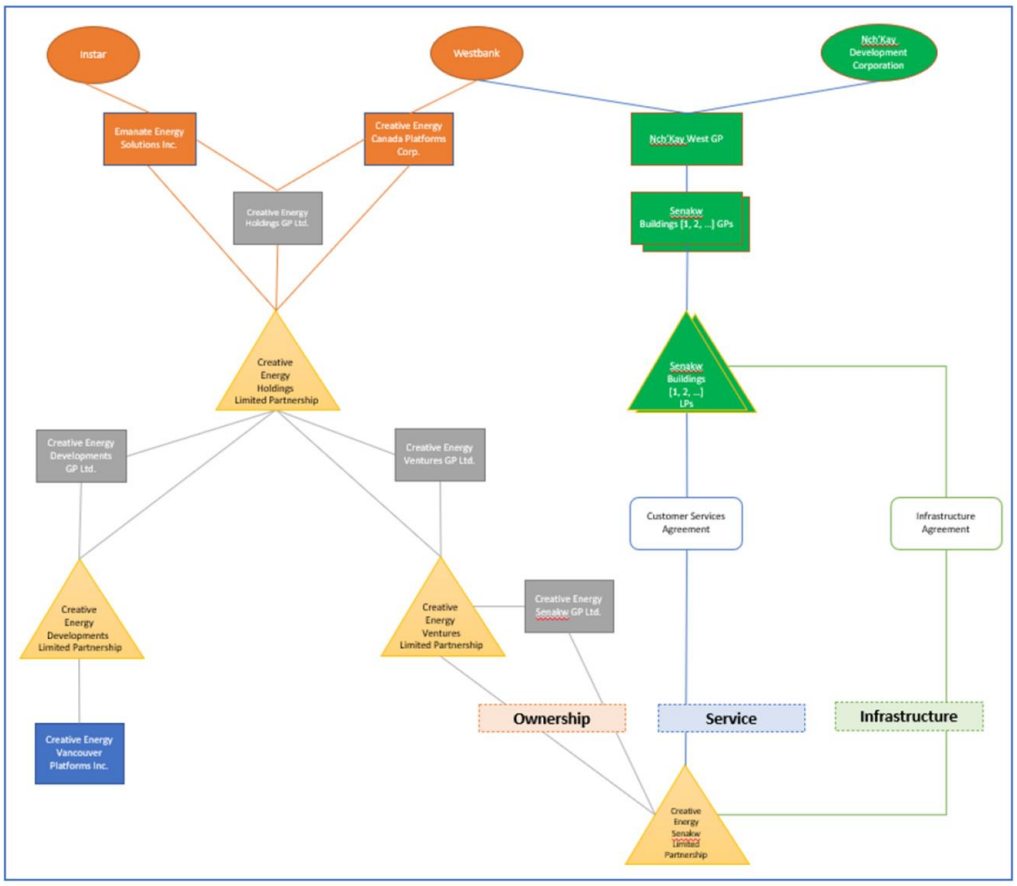
CESLP is a wholly owned subsidiary of Creative Energy Ventures LP and was formed for the purpose of developing, designing, constructing, owning, and operating the Seṅáḵw DES.[24]

The Seṅáḵw Development is being developed by Nch'ḵaẏ West (Developer), a partnership between the Nch'ḵaẏ Development Corporation (NDC) and Westbank Projects Corp.[25] CESLP explains that the NDC was established in 2018 as the economic development arm of the Squamish Nation with a mandate to develop, manage and own the active businesses of the Squamish Nation.[26]

CESLP's corporate structure, including its relationship with the developers of the Seṅáḵw Development, is provided in Figure 1 below.

Figure 1: Structure of Ownership and Agreements[27]

[24] Exhibit B-1, p. 9.
[25] Ibid., Section 1.1, p. 2.
[26] Ibid., Section 1.1, p. 2.
[27] Ibid., Appendix C.



CESLP explains that the NDC held an option to acquire a 50 percent ownership interest in CESLP but this option expired in November 2022.[28] The NDC holds an option to purchase an ownership interest of up to 20 percent in CESLP for a period of up to 30 days following the BCUC decision for the Project.[29] CESLP submits that a decision by the NDC to exercise this option would not impact the financial capacity and timelines to construct and operate the Project.[30]

CESLP submits that it has the technical and financial capability to successfully design, construct, own and operate the Seṅáḵw DES to serve the needs of the Seṅáḵw Development safely and reliably.[31] CESLP explains that it has the financial capacity to fund the Seṅáḵw DES through a combination of equity from its ultimate shareholders, Westbank Holdings Inc. (Westbank) and Instar Asset Management Inc., and third-party debt through CESLP's affiliate Creative Energy Developments Limited Partnership.[32] Technical capacity is provided by CESLP's affiliate Creative Energy Vancouver Platforms Inc. (Creative Energy Platforms). CESLP submits that Creative Energy Platforms staff have extensive experience in the development, design, implementation, operation, and maintenance of district thermal energy systems.[33]

[28] Exhibit B-3, BCUC IR1 2.2.
[29] Ibid., BCUC IR1 2.2.
[30] Ibid., BCUC IR1 2.3.
[31] CESLP Final Argument, p. 8.
[32] Exhibit B-1, Section 2.3, p. 10; Exhibit B-3, BCUC IR1 1.1.
[33] Exhibit B-1, pp. 9-10.

3.0 Project Need and Justification

This section provides an overview of the need and justification for the Seṅáḵw DES, a description of the low carbon strategy employed, and the load forecast developed for the Project.

3.1 Overview

CESLP states that the Seṅáḵw DES is driven by the objectives of the Developer of the Seṅáḵw Development and CESLP's sole customer, Nch'ḵaẏ̓ West.[34] The main objectives of the Seṅáḵw Development are to achieve the following:[35]

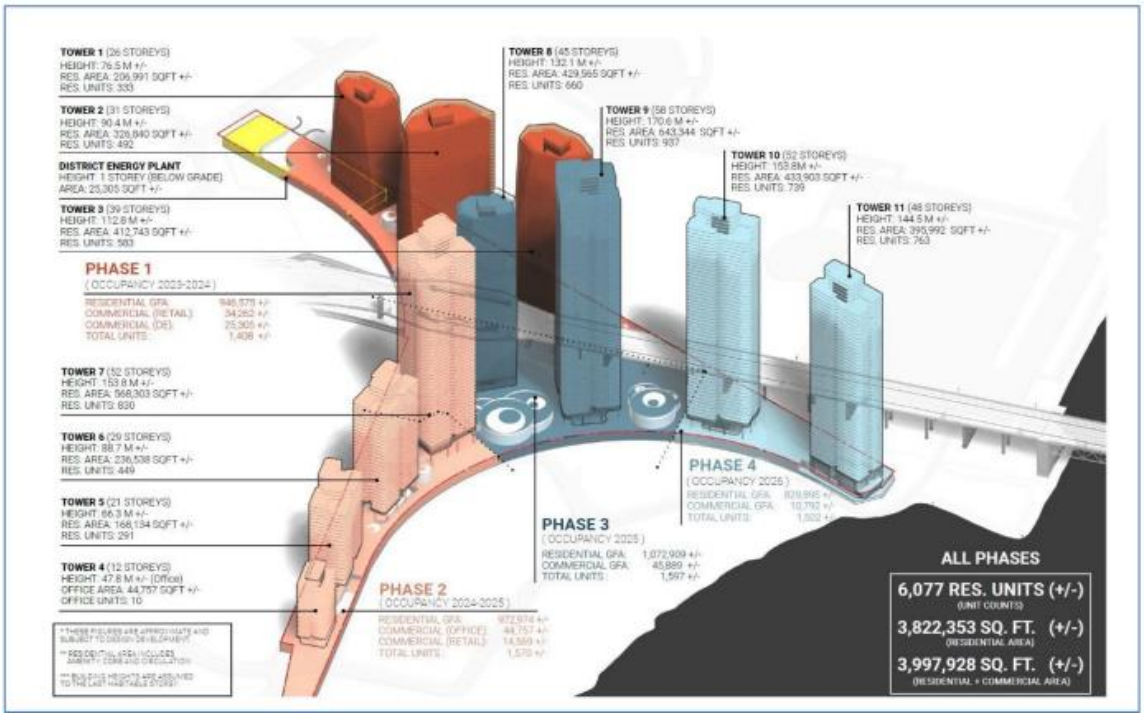
- City building – providing a transit-oriented mixed-use project of primarily purpose-built rental for Vancouver;
- Climate leadership – demonstrating leadership through a significant low to near-zero carbon development;
- Cultural legacy – Creating a legacy project for the Squamish Nation that reflects its history and culture;
- Economic and social benefit – generating significant economic benefit for the Squamish Nation to allow it to meet its housing, education, and social services needs; and
- Reconciliation – Indigenous/Private sector collaboration that furthers national reconciliation.

CESLP states the need and justification for the Seṅáḵw DES stem from the Squamish Nation's vision, which includes, as outlined above, the Squamish Nation's intent to promote a sustainable and carbon neutral Seṅáḵw Development overall as a legacy for the Squamish Nation.[36]

[34] CESLP Final Argument, p. 7.
[35] Exhibit B-1, Section 1.1, p.1, and Section 4.1, p. 17.
[36] Exhibit B-1, p. 16, 17.

The following figure provides the overall phasing plan for the Seṅáḵw Development. As noted previously, this Application is for a DES to serve phases 1 and 2 of the Seṅáḵw Development only. Future expansion of the Seṅáḵw DES is contemplated to serve phases 3 and phase 4. However, final plans for phases 3 and 4 have not been confirmed and the potential future expansion of the Seṅáḵw DES to serve those phases does not form part of the requested approvals of this Application.[37]

Figure 2: Seṅáḵw Development Phasing[38]



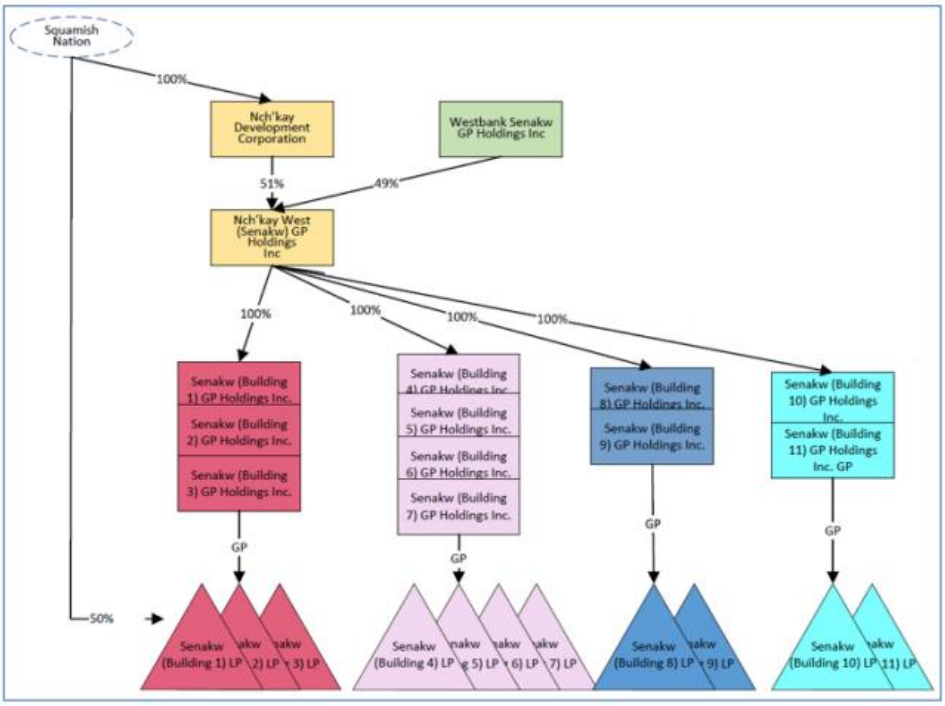
Upon completion of phases 1 and 2, the Seṅáḵw DES will provide low carbon energy for approximately 185,000 m^2 (~2,000,000 ft^2) of building floor area.[39] CESLP states that the required services to be provided by the Seṅáḵw DES, namely space cooling, space heating, and domestic hot water (DHW), and the technology employed to provide these services have been defined by the Developer.[40] CESLP asserts that the Seṅáḵw DES has been conceived and developed as the Squamish Nation's preferred system to directly further its climate leadership and legacy objectives.[41]

CESLP and Nch'ḵaẏ West (through its limited partnerships) have entered into an infrastructure agreement through which CESLP will construct, own, and operate the Seṅáḵw DES to provide low carbon heating and cooling to phases 1 and 2 of the Seṅáḵw Development (Infrastructure Agreement).[42]

[37] Exhibit B-1, p. 3.
[38] Ibid., p. 22.
[39] Ibid., Section 5.1, p. 21.
[40] Ibid., Section 4, p. 16.
[41] Ibid., p.7.
[42] Ibid., p. 2-3.

The customers of the Seȟáḵw DES are each of the buildings in the Seȟáḵw Development. CESLP notes that the customer entities will be established as separate limited partnerships under the single ownership control of the Developer, Nch'ḵaẏ̓ West, as described in Figure 3, below.[43]

Figure 3: The Customers of the Seȟáḵw DES[44]



3.2 Low Carbon Strategy

CESLP states that, as a condition of its site servicing agreement with the City of Vancouver (City), the Squamish Nation has agreed to deliver a development that includes a low carbon DES.[45] The site servicing agreement does not include a definition of 'low carbon'. However, CESLP provides reference to the City's Low-Carbon Energy Systems Policy, which includes the following definition: "low carbon is defined as the provision of heat energy at a carbon intensity that is much less than that of fossil fuels, and low enough so that when applied to modelled building energy use, the development satisfies the City imposed GHG limits".[46] CESLP states that the City has not imposed any greenhouse gas (GHG) limits on the Seȟáḵw DES and notes that the Seȟáḵw Development is not required to comply with the City's low carbon energy and sustainable development requirements as the development is not within the City's jurisdiction.[47] Regardless, CESLP states that the Seȟáḵw DES as proposed would achieve a GHG emission factor associated with heating and cooling of 0.3 $kgCO_{2e}/m^2$, which is significantly lower than the minimum (6.0 kg CO_{2e}/m^2) that the City would require if this Project were under its jurisdiction.[48]

CESLP explains that there are no formal requirements to confirm the operating GHG intensity of the Seȟáḵw DES to the Developer, Nch'ḵaẏ̓ West, nor to the City. Notwithstanding this, CESLP will provide regular reports to the NDC that will include the performance and GHG emissions of the system.[49]

[43] Exhibit B-1, pp. 3-4.
[44] Ibid., p. 4.
[45] Ibid., Section 1.4.1, p. 5, and Section 4.1, p. 16.
[46] Exhibit B-3, BCUC IR1 4.1.
[47] Exhibit B-1, Section 4.1, p. 16; Exhibit B-3, BCUC IR1 4.1.
[48] Exhibit B-3, BCUC IR1 4.1.
[49] Ibid., BCUC IR1 4.8.

CESLP states the Squamish Nation is committed to demonstrating the highest level of sustainable building performance with the priority objective of the Seṅáḵw Development being minimizing GHG emissions, especially GHG emitted during the operation of the Seṅáḵw DES.[50]

3.3 Load Forecast

CESLP describes the methodology used to estimate the load forecast that drives the need for the Seṅáḵw DES and the required capacity to provide heating and cooling for each building of phases 1 and 2 of the Seṅáḵw Development. Two sets of load forecasts values were developed for the Seṅáḵw DES, each with different inputs and assumptions, and each formulated for a different purpose. The peak design loads, which comprise the first forecast described below, were developed using the winter and summer design conditions set out in Vancouver Building By-Law 2019 and are used as a basis to size the thermal generation capacity of the Seṅáḵw DES energy centre. The second forecast, an hourly heating and cooling energy model, was developed using standard weather data instead of the peak weather conditions. The energy modeled load forecast is lower than the peak design load forecast and is intended to be representative of typical system operation for the Seṅáḵw DES over a full year. The modelled loads are used as part of CESLP's indicative cost of service and rates model and to forecast GHG emissions.[51]

The following sections expand on the assumptions used to develop the two load forecasts.

3.3.1 Peak Design Loads

CESLP explains the peak design loads were developed by the building mechanical designer, AME Group, based on its heating and cooling load calculations via a standard steady state software.[52] The calculated peak design loads are summarized in Table 1: Peak Design Loadsbelow.

Table 1: Peak Design Loads[53]

Project Phase	Peak Design Loads (kW)	
	Heating (Space Heating + DHW)	Space Cooling
Phases 1 & 2	10,343	8,026

CESLP explains the following inputs and assumptions used to develop the peak design loads:

- The loads were calculated using the weather conditions set out in the Vancouver Building By-Law 2019, which establish the outdoor design temperatures for winter and summer.[54] CESLP submits that the use of a load forecast based on the above weather conditions to size the thermal generation plant is a requirement of the Vancouver Building By-Law 2019 and is good industry practice as set out in the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) handbooks and similar documents.[55]

[50] Exhibit B-1, Section 4.1, p. 16.
[51] Exhibit B-5, BCUC IR2 2.1; Exhibit B-7, BCUC IR3 19.1, 19.3.
[52] Exhibit B-5, BCUC IR2 2.1.
[53] Table by BCUC with data from Exhibit B-1, Appendix G, p. 2.
[54] Exhibit B-7, BCUC IR3 19.11.
[55] Ibid., BCUC IR3 19.2.

- The heating load calculations do not account for solar and building internal heat gains (e.g., occupants, lighting, etc.).[56]
- Heating associated with heat loss through the building envelope is included, as is heating for ventilation air.[57]
- The cooling load calculations consider the peak solar heat gain and internal heat gains from occupants, and equipment.[58]
- The calculations consider actual building design information.[59]
- Heating requirements for domestic hot water are included, with usage based on the guidance of the American Society of Plumbing Engineers.[60]

CESLP confirms that the inputs and assumptions used to develop the peak design loads for the Seȟáḵw DES are the same as those used in the development of the peak design loads for two thermal energy systems that are affiliated with CESLP: Oakridge Energy's Oakridge DES and Creative Energy Platforms' TES for cooling at the Vancouver House development.[61]

3.3.2 Modeled Loads

In addition to the peak design loads described in the previous section, AME Group prepared an hourly heating and cooling model for the buildings.[62] CESLP indicates that the modeled loads were estimated using a thermal energy model of the buildings that was developed in accordance with the BC Step Code and the City's Energy Modeling Guidelines.[63] Table 2 below summarizes the load forecast and annual energy demands obtained from the energy model:

Table 2: Modeled Loads[64]

Project Phase	Modeled Loads (kW)		Modeled Annual Demand (MWh)	
	Heating (Space Heating + DHW)	Space Cooling	Heating (Space Heating + DHW)	Space Cooling
Phase 1 & 2	5,924	5,188	11,218	4,172

CESLP describes the following factors as some of the major inputs to the model:

- The model uses standard climatic data from the 2016 Canadian Weather Year for Energy Calculation (CWEC) weather file for Vancouver, as recommended by the City's Energy Modeling Guidelines. CESLP notes that as an example and for purposes of comparison, the minimum outdoor air temperature in the CWEC 2016 weather file is nearly 3 degrees Celsius warmer than the outdoor temperature used to estimate the design peak loads. [65]

[56] Ibid., BCUC IR3 19.11.
[57] Exhibit B-7, BCUC IR3 19.11.
[58] Ibid., BCUC IR3 19.9 and 19.11.
[59] Exhibit B-5, BCUC IR2 2.1.1.
[60] Exhibit B-7, BCUC IR3 19.9, 19.11.
[61] Ibid., BCUC IR3 19.9.
[62] Exhibit B-3, BCUC IR1 2.1.
[63] Exhibit B-5, BCUC IR2 2.1.
[64] Table by BCUC with data from Exhibit B-5, BCUC IR2 2.1 and Exhibit B-1, p. 28.
[65] Exhibit B-7, BCUC IR3 19.8.

- The calculations consider actual building design information.[66] CESLP describes the factors related to building design, which include size, shape and orientation, envelope, insulation, etc.[67]
- The model includes factors such as beneficial solar and internal heat gains.[68]
- The model includes heating requirements for DHW. CESLP indicates the hot water usage in the energy model is based on the values set out in the City's Energy Modeling Guidelines, which are lower than those allowed for in the design.[69]

CESLP states that the modeled loads are intended to represent a typical operation of the Seṅáḵw DES for each hour during a year, and under average weather conditions.[70] CESLP explains that the modeled loads are always lower than the peak design loads as the weather file used in the model does not include extreme weather events and the modeling includes the benefits of heat gains, as described above, which are variable and therefore cannot be allowed for when determining the peak design values.[71] CESLP also notes that the heating loads calculated by the energy model could be exceeded in extreme winter conditions.[72]

Positions of the Parties

RCIA did not provide any submissions on these topics.

Panel Discussion

The Panel finds that there is a need for low carbon heating and cooling for the Seṅáḵw Development. CESLP has been tasked by Seṅáḵw Development with designing and building a space cooling, space heating, and domestic hot water system that is sustainable and low carbon. The Panel accepts that this condition of the Seṅáḵw Development's municipal servicing agreement between the City and the Squamish Nation is a key driver of the low carbon system design. The Seṅáḵw DES satisfies this condition.

As noted earlier, the initial stage of the Seṅáḵw Development includes buildings described as phases 1 and 2, which cover approximately 185,000 square metres (~2,000,000 square feet) of building floor area in seven towers that range from 12 to 52 storeys in height. These buildings will be used primarily for residential rental housing, with a smaller percentage of space used for retail and commercial. At full build-out, the Seṅáḵw DES will be required to provide low carbon heating, cooling and hot water to a total of 3,997,928 square feet of space, which include 6,077 residential units occupying 3,822,353 square feet. While there is no formal definition of what constitutes "low carbon", the Panel accepts that the emission factor of .3 $kgCO_{2e}/m^2$ is significantly lower than the standard set by the City. The Panel is satisfied that the Seṅáḵw DES is low carbon, and given that the system was designed based on the actual design information of the buildings, the estimates are as accurate as possible.

The Panel also accepts CESLP's load forecast assumptions and methodology, in particular, using the accepted standards as set out in the City Building By-Law weather forecast and ASHRAE to calculate peak heating and cooling loads. The extremes for peak loads are based on the City Building Bylaw 2019 in the case of peak load, and the City's Energy Modeling Guidelines and BC Step Code for the modeled load which, in the Panel's view, justify the capacity of the Project and demonstrate the likelihood that it can achieve low carbon targets. The assumption of heat loss as a consideration for peak heat load forecast is reasonable, as is the inclusion of solar and internal heat in the calculation of cooling load. While the same heating/cooling capacity may not be

[66] Exhibit B-3, BCUC IR1 3.1.
[67] Exhibit B-1, p. 27.
[68] Exhibit B-5, BCUC IR2 2.1.
[69] Exhibit B-7, BCUC IR3 19.11.
[70] Ibid., BCUC IR3 19.8.
[71] Exhibit B-5, BCUC IR2 2.1.
[72] Exhibit B-3, BCUC IR1 12.7.

required for everyday operation, the Panel recognizes that Seṅáḵw DES must be capable of responding to extreme temperatures.

The Panel accepts CESLP's rationale for including different modeling standards for peak load and modeled load. The City's Energy Modeling Guidelines and BC Step Code provide guidance on calculating the day-to-day heating and cooling needs, and as such, their use to estimate GHG emissions is acceptable. Had the peak load been used for calculating emissions, the standard applied to Seṅáḵw DES for the purpose of estimating emissions would have exceeded actual emissions.

4.0 Description and Evaluation of Alternatives

CESLP submits that potentially feasible project alternatives to provide the required heating and cooling have been evaluated, and the design concept for the Seṅáḵw DES was chosen by the Developer, Nch'ḵaẏ̓ West, based on the available and preferred energy technologies that would achieve the objectives of the Squamish Nation for the Seṅáḵw Development.[73]

This section summarizes the evaluation of alternatives, including the justification supporting the selection of the preferred alternative.

CESLP states that it engaged energy system experts to evaluate various options for a low carbon district energy system for the Seṅáḵw Development. In 2020, CESLP's engineering consultant, FVB Energy Inc. (FVB), completed a feasibility study to assess the technical, social and financial viability of various low carbon thermal energy technology alternatives (Feasibility Study).[74]

The alternatives analysis considered low carbon thermal energy technology conceptual designs that could meet different Project emission targets:

- **Carbon Target 1 (Low carbon Strategy)**: approximately 70 percent of thermal energy supplied by low carbon energy sources or 70 $kgCO_{2e}$/MWh of delivered thermal energy; or
- **Carbon Target 2 (Near-Zero Carbon Strategy)**: approximately 98 percent of thermal energy supplied by low carbon energy sources or 10 $kgCO_{2e}$/MWh of delivered thermal energy.

4.1 Low carbon Thermal Energy Technology Alternatives Considered

CESLP considered the following low carbon technologies to be feasible heating supply alternatives: biomass, ocean heat recovery, and sewer heat recovery. Other low carbon thermal energy technologies were evaluated, including geo-exchange and air-source heat pumps. However, these were screened out as not feasible. Geo-exchange was screened out as the Seṅáḵw Development does not exhibit a balanced heating and cooling load, a requirement for this technology over the long-term so as to avoid overheating or overcooling the ground in proximity to the geo-exchange boreholes.[75] Air-source heat pumps were screened out as the technology would require significant outdoor space, which is not available at the Seṅáḵw Development, in order to achieve the low carbon objectives of the Project.[76]

[73] CESLP Final Argument, p. 9.
[74] Exhibit B-1, Section 4.2, p. 17.
[75] Ibid., Appendix F, p. 19.
[76] Ibid.

CESLP states that the Developer, Nch'k̲aẏ West, was directly involved in specifying technological concepts and energy sources for the Feasibility Study, and in determining whether options identified as potentially feasible were screened in or out of further study.[77]

With respect to alternatives considered for cooling supply, CESLP states that the only feasible low carbon technology for cooling supply is electric chillers.[78]

The Feasibility Study concluded that renewable natural gas (RNG) supplies, as of 2020, were very limited and essentially unavailable in BC.[79] CESLP notes that no further assessment of RNG availability has been conducted since completion of the Feasibility Study. However, CESLP maintains that it does not consider there to be greater certainty regarding the supply of RNG.[80] CESLP states that it does not consider RNG to be suitable as a primary energy source. Further, CESLP states that the use of electricity as the primary energy source is the preference of the Squamish Nation and is in line with the BC Government's CleanBC Roadmap to 2030.[81] However, should CESLP determine during its operating phase that burning RNG in the proposed gas boilers is more economical than running the electric boilers, CESLP would investigate procuring RNG.[82]

4.2 Feasible Low carbon Thermal Energy Technology Alternatives

The following summarizes CESLP's assessment of the three identified feasible alternatives.

Biomass

The biomass heating technology involves the combustion of locally available wood waste products to provide heating to the Seṅák̲w Development.[83] CESLP considered one 4 megawatt biomass boiler to meet the low carbon emission target, and the combined capacity of one 1.7 megawatt biomass boiler and one 3.3 megawatt biomass boiler for the near-zero carbon emission target.[84]

CESLP identifies uncertainty in future fuel supply, local air emissions (e.g. particulate matter, NOx, etc.) and physical size of boilers and fuel storage as challenges posed by the biomass low carbon heating technology.[85] The biomass alternative was not selected as the preferred alternative for the Project as it did not meet the Squamish Nation's planning objectives.[86] CESLP states that one of the most important factors for not selecting the biomass alternative was the disruption and safety concerns related to fuel delivery.[87]

Ocean Heat Recovery

CESLP identifies ocean heat recovery as a potential low carbon thermal energy technology. This technology involves the installation of heat exchangers adjacent to the Seṅák̲w Development site, in a protected area below the surface of False Creek. The submerged heat exchangers would reject heat to the ocean in the summer months (i.e., provide cooling to the Seṅák̲w Development) and extract heat from the ocean in the winter months (i.e., provide heating to the Seṅák̲w Development).[88]

[77] Ibid., Section 4.2, p. 17.
[78] Ibid., p. 18.
[79] Exhibit B-1, p. 27.
[80] Exhibit B-3, BCUC IR1 9.1.
[81] Exhibit B-5, BCUC IR2 6.3.1.
[82] Exhibit B-3, BCUC IR1 9.1.1.
[83] Exhibit B-1, Appendix F, p. 23.
[84] Ibid., Appendix F, p. 23.
[85] Ibid., Appendix F, p. 25.
[86] Ibid., Section 4.2, p. 18.
[87] Exhibit B-3, BCUC IR1 8.3.1.
[88] Exhibit B-1, Appendix F, p. 21.

Based on an assumed minimum ocean temperature of 8 degrees Celsius, CESLP determined that a heat exchanger occupying an area of approximately 300 square metres is required to meet the highest heating demands of the Seṅáḵw Development.[89] The physical height dimension of the heat exchangers would be approximately two metres. In addition to the submerged heat exchangers, approximately 400 metres of 14-inch interconnection pipe would be required to transfer heat to and from the Seṅáḵw Development.[90] CESLP states that to install this infrastructure, permits may be necessary from the Department of Fisheries, the Port Authority, the City and possibly others.[91]

The depth of the ocean at low tide at the proposed heat exchanger location in False Creek is approximately three metres. CESLP determined not to proceed with the ocean heat recovery low carbon technology in part because of the risks of equipment damage associated with installing heat exchangers at such a shallow water depth. CESLP also notes the congestion at the Fisherman's Wharf marina at the proposed heat exchange location.[92]

Sewer Heat Recovery

The sewer heat recovery low carbon technology involves extracting heat from a nearby sanitary main line, and then using heat pumps to elevate the extracted heat to a temperature that is useful to CESLP customers. CESLP identified a 900 millimetre sewer line adjacent to the Seṅáḵw Development as a suitable sanitary main line from which to extract heat.[93]

In analyzing sewer heat recovery as a potential energy source, the Feasibility Study identified the following strengths and challenges:

Table 3: Sewer Heat Recovery Strengths and Challenges[94]

Strength	**Challenge**
Convenient source, (i.e.: the sewer main on Chestnut Street). [95]	Low grade energy source.[96]
Local experience based on the City's False Creek Neighbourhood Energy Utility.[97]	Uncertain energy availability due to gaps in data.[98]
No impact to local air emissions.[99]	Fouling and odour management. The Feasibility Study noted that these issues can be managed through established technology and practices.[100]
No fuel deliveries.[101]	
Moderate source temperature results in reasonable heat pump coefficient of performance. [102]	

[89] Ibid., Appendix F, p. 21.
[90] Ibid., Appendix F, p. 21.
[91] Exhibit B-1, p. 22.
[92] Ibid., Section 4.2, p. 18.
[93] Ibid., Section 4.2, p. 19.
[94] Table by the BCUC.
[95] Exhibit B-1, pdf p. 233.
[96] Ibid., pdf p. 238.
[97] Ibid., pdf p. 233.
[98] Ibid., pdf p. 238.
[99] Ibid., pdf p. 238
[100] Ibid., Attachment F, pdf p. 238, 252.
[101] Ibid., pdf p. 238.
[102] Ibid.1, pdf p. 238.

Regarding the challenge noted above of uncertain energy availability due to gaps in data, at the time that FVB completed its Feasibility Study, CESLP had access to six months of temperature and flow rate data from the identified adjacent 900 millimetre sewer line. Based on this data, FVB determined that the heat output from a sewer heat recovery heat pump concept was approximately 5 megawatts, but recommended completing more detailed technical analysis, such as confirming sewage flows and temperatures.[103] Subsequent to the completion of the Feasibility Study, CESLP obtained further sewage temperature and flow rate data and refined the potential thermal energy output capacity of this technology alternative.[104] This refinement is discussed in Section 5 below.

Having analyzed the three feasible alternatives, CESLP determined to proceed with the sewer heat recovery low carbon technology as the preferred alternative for the Project. CESLP notes that the sewer heat recovery alternative is a proven technology, noting for example that the City's False Creek Neighbourhood Energy Utility has been operating successfully for 12 years. In addition, CESLP identifies that the sewer heat recovery alternative has the capacity to meet the majority of the Seṅáḵw Development's space and hot water heating needs.[105]

Positions of the Parties

RCIA did not provide a submission on this topic in its final argument.

Panel Discussion

The Panel is satisfied that CESLP considered reasonable alternatives, and that sewer heat recovery is the most reasonable alternative to meeting the majority of heating, cooling and hot water needs of the Seṅáḵw Development at this time.

At the request of the Developer, the chosen alternatives were limited by the need for low carbon or the near-zero carbon strategy targets established for the Project. The Panel is satisfied with CESLP's reasoning for screening out geo-exchange and air-source heat pumps, as well as RNG. Of the alternatives considered, biomass did not meet the planning objectives of the Squamish Nation due to the amount of space it would require. In addition, the ability to ensure a secure source of biofuel at affordable prices was uncertain, and even if a secure supply were established, delivery to the Seṅáḵw Development would be problematic due to its location. It was therefore determined not to be a viable option.

CESLP considered ocean heat recovery to be unfavourable due to cost, concerns relating to where it could be safely located, and the likelihood of difficulties in obtaining the necessary environmental approvals, among other things. While none of these options were comprehensively addressed in the Application, the Panel finds that the information provided is sufficient to allow CESLP to exclude them as viable alternatives for the Seṅáḵw Development.

Of the low carbon or near-zero carbon alternatives considered, CESLP was able to justify its selection of sewage heat on a number of bases. Because of its location, the Seṅáḵw Development has ready access to the sewage line which can provide a low-cost heat source. CESLP provided data that included a feasibility study and subsequent data to establish that the temperature and flow rate of the sewer main would provide an adequate thermal energy output for the Project. CESLP pointed to the City's False Creek Neighbourhood Energy Utility to show that sewage heat recovery is a proven near-zero emission technology, and demonstrated that concerns such as odour can be successfully mitigated.

[103] Ibid., Appendix F, PDF p. 224.
[104] Exhibit B-3, BCUC IR1 8.2.
[105] Exhibit B-1, p. 19.

The Panel finds that the sewer heat recovery is the best low carbon alternative due to the proximity to the source, the proven viability of the technology, its near-zero emissions, and the avoidance of any requirement for fuel delivery.

5.0 Project Description

This section begins with an explanation of the design concept of the proposed Seṅáḵw DES, followed by a description of how CESLP sized its system to meet the demand forecast. The section then summarizes the redundancy designed for the Seṅáḵw DES as well as the CESLP's agreement for sewage diversion with Metro Vancouver. Lastly, this section reviews the permitting requirements for the Project, the Project risks, and CESLP's forecast of GHG emissions.

5.1 Design Concept of the Proposed Seṅáḵw DES

The Seṅáḵw DES is a near-zero carbon electrified energy system, cooling the Seṅáḵw Development with electric chillers and heating it with reclaimed heat from the site-adjacent Metro Vancouver Jervis Forcemain No. 2 (Sewer Line) using high-temperature heat pumps and captured waste heat from the cooling equipment. Electric boilers, thermal storage and natural gas boilers will provide peaking and backup to the heat recovery processes.[106] CESLP submits that the Seṅáḵw DES is appropriately designed and sized, and the Project risks are known and low.[107]

The largest source of heat for the Seṅáḵw DES is extraction of energy from the Metro Vancouver Sewer Line.[108] The proposed Seṅáḵw DES will divert sewage from the Sewer Line to the sewer heat recovery system and then return the sewage to the sanitary main downstream.[109] The Sewer Line runs under Chestnut Street on the west side of the Seṅáḵw Development site, as shown in Figure 4 below.

Figure 4: Metro Vancouver Sewer Line (yellow line) and Seṅáḵw Development (red outline)[110]

[106] Exhibit B-2, p. 29; Exhibit B-3, IR1 12.7; CESLP Final Argument, p. 5.
[107] CESLP Final Argument, p. 11.
[108] Exhibit B-1, p. 23.
[109] Ibid., p. 21.
[110] Ibid., p. 22.

The Seṅáḵw DES will include an energy centre, an energy transfer station (ETS) at each connected building, and a distribution piping system (DPS) for delivering the thermal energy from the energy centre to the ETS's at connected buildings.[111]

The Developer, Nch'ḵaẏ West, will construct the energy centre in the parkade adjacent to Chestnut Street on the western edge of the Seṅáḵw Development site. The energy centre is a key component of the Seṅáḵw DES and includes:[112]

- A sewer heat recovery system to capture waste heat from the Metro Vancouver Sewer Line;
- Two 1000-ton chillers tied into three cooling towers on the roof of Tower 1;
- A high temperature heat pump to boost the heating water;
- Four thermal storage buffer tanks;
- One electric boiler;
- Three high-efficiency natural gas boilers; and
- Circulation and distribution pumps, chemical treatment station, control system and associated instrumentation.

Each of the seven buildings to be completed through phases 1 and 2 of the Seṅáḵw Development will have an ETS at the point of service connection to the DPS, which will be in the parkade level of each building tower. Each ETS will include heat exchangers, isolation valves, pressure and temperature instruments, a thermal energy meter, controls system and flow control valves.[113]

The hot and chilled water generated at the energy centre will be delivered to the ETS in the connected buildings through the DPS. The exact routing of the DPS will be coordinated with Nch'ḵaẏ West during detailed design.[114]

5.2 Sizing of the Seṅáḵw DES

As explained in Section 3.3.1, CESLP used the peak design loads as a basis to size the capacity of the energy centre.[115] CESLP explains that the Seṅáḵw DES must be sized using these loads, which account for heating and cooling loads at the design weather conditions, as required by the Vancouver Building By-Law 2019,[116] and indicates that a capacity shortfall could occur if the modeled loads were to be used to size the Seṅáḵw DES as the system will be undersized.[117] CESLP confirms that the approach used to determine the thermal energy capacity of the Seṅáḵw DES is consistent with other thermal energy projects affiliated with CESLP, such as Oakridge Energy's Oakridge DES and Creative Energy Platforms' TES for Cooling at the Vancouver House development.[118] CESLP considers that the process it used to size the installed thermal generation capacity of the energy centre is "the conventional approach to design of district energy systems".[119]

[111] Ibid., p. 21.
[112] Exhibit B-1, p. 23. CESLP confirmed only one electric boiler is planned for the energy centre in Exhibit B-3, BCUC IR1 12.1.
[113] Ibid., p. 24.
[114] Ibid., p. 24.
[115] Exhibit B-7, BCUC IR3 19.1.
[116] Exhibit B-5, BCUC IR2 2.1.
[117] Exhibit B-7, BCUC IR3 19.3 and 19.8.
[118] Ibid., BCUC IR3 19.9.
[119] Exhibit B-5, BCUC IR2, 2.1.

To determine the forecast loads at the energy centre, CESLP applied a diversity factor to the peak design loads of 80 percent for heating and 85 percent for cooling and included an allowance for system losses (1 percent). This is summarized in Table 4 below.[120]

Table 4: Diversified Peak Loads[121]

Service	Peak Design Loads (kW)	Diversified Peak Loads (Forecast loads at energy centre) Includes diversity (80% on heating, 85% on cooling) and system losses at 1% (kW)
Heating	10,343	8,357
Cooling	8,026	6,890

In determining the diversity factors for the Seṅáḵw DES, CESLP explains that there are numerous considerations including the number of buildings, usage of each building and factors relating to location and design. CESLP states that because of the complexity of diversity, it is not practical to make specific calculations to attempt to estimate the diversity factor. Rather, CESLP states that industry standards and professional judgement are used to ensure that an appropriate diversity factor is chosen.[122]

CESLP considers that the diversity factors proposed for the Project are in-line with those applied to other projects at the design stage.[123] Specifically, CESLP explains that the diversity assumptions for the Oakridge Energy DES are very close to those assumed for the Seṅáḵw DES. CESLP considers that the diversity assumptions for the Seṅáḵw DES are slightly more conservative on heating as compared to the Oakridge Energy DES, which used 10 percent diversity on DHW and 80 percent on space heating, whereas the 80 percent diversity assumption for the Seṅáḵw DES is on combined space heating and DHW.[124]

CESLP explains that if actual diversity is a higher percentage than assumed, then there could be a small shortfall in capacity at peak design conditions. This would result in a temporary reduction in heating supply temperatures and increase in chilled water supply temperatures from the energy centre. This would reduce the heating and cooling capacity of the fan coil units in the suites. However, CESLP confirms there would be no loss of service or risk to the system.[125]

[120] Exhibit B-5, IR2 5.1.
[121] Ibid., IR2 2.1, Table prepared by the BCUC.
[122] Ibid., IR2 2.6.
[123] Ibid., IR2 2.6.
[124] Ibid., IR2 2.9.
[125] Exhibit B-7, IR3 20.3.

CESLP summarizes the total heating and cooling capacity of the Seṅáḵw DES in Tables 5 and 6 below. Having determined the thermal generation capacity of the Seṅáḵw DES, CESLP goes on to explain how it determined the capacity of each of the resources in the DES:

Table 5: Heating System Capacity[126]

Heating System	
Resource	**Total Capacity (MW)**
Sewer Heat Recovery	2.75 MW
Electric Boiler	1 MW
Thermal Storage	N/A*
Natural Gas Boilers	3 x 1.58 MW = 4.75 MW
Total Capacity:	**8.5 MW**
* Thermal Storage stores heat from the electric boiler when it is not needed. The capacity of the store is 7.5 MWh	

Table 6: Cooling System Capacity

Cooling System	
Resource	**Total Capacity (MW)**
Electric Chillers	2 x 3.5MW = 7 MW
Total Capacity:	**7 MW**

Sizing of the Sewer Heat Recovery System

CESLP analysed the temperature and flow rate data from the Sewer Line to determine the capacity of the sewer heat recovery system.

As discussed in Section 4.2, at the time that FVB completed its Feasibility Study, CESLP had access to six months of temperature and flow rate data from the Sewer Line. Based on this data, FVB determined that the heat output from a sewer heat recovery heat pump concept was approximately 5 megawatts, but recommended completing more detailed technical analysis, such as confirming sewage flows and temperatures.[127]

CESLP completed additional analysis and obtained additional sewage flows and temperatures from Metro Vancouver for two 12-month periods from October 2020 to September 2021 and January 2022 to December 2022. CESLP provided this data during the proceeding[128] and confirms that the sewage flows and temperatures analyzed indicate sufficient capacity of the sewer heat recovery resource to deliver the required thermal energy to the Seṅáḵw DES.[129]

The sewer heat recovery system for all phases of the Seṅáḵw Development is designed to deliver 3.8 megawatts of thermal energy to the Seṅáḵw Development, with 1.9 megawatts being installed in phases 1 and 2. Once the heat of compression for the heat pump is included this corresponds to thermal energy delivery to customers of 2.75 megawatts in phases 1 and 2 and 5.5 megawatts after completion of phases 3 and 4.[130]

CESLP considers that the sewer heat recovery system has been designed conservatively, as the maximum thermal energy capacity of Metro Vancouver's Sewer Line is higher than 3.8 megawatts during times of the year

[126] Exhibit B-5, IR2 2.15. CESLP explains that chiller heat recovery is not explicitly identified in the heating system capacity table because the sewer heat recovery heat pump is also used to recover heat from the chiller (cooling) system. Exhibit B-7, IR3 21.1.
[127] Exhibit B-1, Appendix F, PDF p. 224.
[128] Exhibit B-3, BCUC IR1 10.6.1.1.
[129] Ibid., BCUC IR1 10.1.1.
[130] Ibid., BCUC IR1 8.2.

when sewage temperatures exceed 16 degrees Celsius.[131] CESLP considers that it is unlikely that Metro Vancouver's Sewer Line will experience significant change in flow or temperature characteristics in the near future. However, if flow or temperature characteristics do change, CESLP states that the sewer heat recovery design can be adapted to accommodate the changes (i.e., adding more heat exchanger plates, etc.).[132]

Sizing of the Electric Boilers and Thermal Storage

CESLP used the thermal energy model to determine the appropriate size of the electric boilers and thermal storage. CESLP's analysis determined that based on a complete DES serving all four phases of the Seṅáḵw Development, increases in thermal storage capacity result in a significant decrease in energy cost up to a capacity of 11,000 kilowatt hour. CESLP states that further increases in thermal storage capacity would not be beneficial as the electrical demand charges remain the same from this point.[133] For the Seṅáḵw DES, which serves phase 1 and 2 of the Seṅáḵw Development only, CESLP sized the electric boilers at 1 megawatt and 7.5 megawatt hours respectively.[134]

Sizing of the Natural Gas Boilers

CESLP explains that the capacity of the natural gas boilers was determined by deducting the capacity of the sewer heat recovery heat pump and the electric boiler from the diversified peak heating demand as follows: [135]

8357 kW (Diversified Peak Demand)
- 2750 kW (Sewer heat recovery heat pump)
- 1000 kW (Electric boiler capacity)
4607 kW (Natural gas boiler capacity is 4,750 kW)

CESLP explained that it considered using larger electric boilers instead of natural gas boilers. However, it discounted this alternative due to the high cost and large space requirements associated with the supporting electrical infrastructure. CESLP states that the electrical demand charges associated with operating large electric boilers for short periods would also be prohibitive.[136]

Sizing of the Electric Chillers

CESLP states that the chillers and cooling towers are sized to meet the design peak demand for cooling.[137]

5.3 System Redundancy

CESLP states that the components of the Seṅáḵw DES are sized to ensure the system can produce sufficient near-zero carbon heating and cooling energy to meet the requirements of the Seṅáḵw Development buildings at all times.[138]

For the heating system, the Seṅáḵw DES is designed such that on loss of the largest single component, which is the heat pump associated with the sewer heat recovery system, the amount of the peak design load that could be served by the remaining components of the heating system is 69 percent, not including the additional

[131] Exhibit B-3, BCUC IR1 10.2.
[132] Ibid., BCUC IR1 10.3.
[133] Ibid., IR1 12.9.
[134] Exhibit B-5, IR2 2.15.
[135] Exhibit B-7, IR3 21.4.
[136] Exhibit B-3, IR1 12.7.2.
[137] Exhibit B-1, p. 32.
[138] Ibid., p. 29.

redundancy from the thermal storage.[139] CESLP states that this level of redundancy is in line with typical practice for residential developments. CESLP states that based on the hourly loads in the energy model, the heating load for the development only exceeds the capacity of the Seṅáḵw DES absent the sewer heat recovery system for two hours per year.[140]

In order to increase the amount of the peak design load that could be served by the remaining components of the heating system on loss of the sewer heat recovery system, the Seṅáḵw DES would require additional thermal generation capacity. CESLP considers that the capital cost and the resulting impact on rates from adding additional boiler capacity is not a prudent investment at this time given the low risk.[141]

For the cooling system, CESLP explains that the Seṅáḵw DES has two chillers and the loss of one chiller would reduce cooling capacity by 50 percent. CESLP states that based on the hourly loads in the energy model, the cooling load for the development only exceeds the capacity of the Seṅáḵw DES absent one of the chillers for 69 hours per year. CESLP considers that given that cooling is provided for comfort only and that the remaining chiller will still provide some level of cooling to the building, this level of redundancy is reasonable.[142]

5.4 Sewage Diversion Agreement

Construction and operation of the Seṅáḵw DES in its preferred configuration rely on successful execution of a Sewage Diversion Agreement with Metro Vancouver to divert sewage from the Sewer Line and to recover waste heat.[143] At the time it filed the Application, CESLP had not yet entered into an agreement for sewage diversion with Metro Vancouver, but filed a draft of the agreement as of April 13, 2023.[144] CESLP also provided updates during the proceeding that it was in advanced negotiations with Metro Vancouver on the terms of the agreement.[145]

On August 29, 2023, CESLP confirmed that negotiations had concluded[146] and on September 18, 2023, CESLP filed an executed Sewage Diversion Agreement on the proceeding record.[147]

CESLP states that execution of the Sewage Diversion Agreement marks a major milestone for the Seṅáḵw DES and secures access to heat resources on terms that appropriately balance the interests of all stakeholders, including CESLP, customers of the Seṅáḵw DES and those whose interests are advanced by Metro Vancouver.[148]

Under the terms of the Sewage Diversion Agreement, there is no cost for the waste heat, subject only to heat policy changes by Metro Vancouver, in which case parties have three years to negotiate rates. If no agreement is reached within that time either party can terminate the agreement.[149] During the first 20 years of the term of the Sewage Diversion Agreement, Metro Vancouver can terminate it with three years written notice to CESLP, in case of major change to Metro Vancouver's heat policy or major change to sewerage infrastructure.[150] Thereafter, Metro Vancouver can terminate the agreement with 18 months written notice.[151]

[139] Exhibit B-5, BCUC IR2 3.2
[140] Ibid., BCUC IR2 3.2
[141] Ibid., BCUC IR2 3.2
[142] Ibid., IR2 3.3.
[143] CESLP Final Argument, p. 10.
[144] Exhibit B-5, Attachment 7.1.1.
[145] Exhibit B-7, BCUC IR3 22.1
[146] Exhibit B-12, p. 1.
[147] Exhibit B-13.
[148] Exhibit B-13, p. 1
[149] Exhibit B-13, p. 2; Exhibit B-13, Attachment 1, Sewage Diversion Agreement, Section 9.
[150] Exhibit B-13, p. 2; Exhibit B-13, Attachment 1, Sewage Diversion Agreement, Section 16.2, p. 33.
[151] Exhibit B-13, p. 2; Exhibit B-13, Attachment 1, Sewage Diversion Agreement, Section 16.2, p. 33.

The Sewage Diversion Agreement does not guarantee minimum quality or amount of sewage supply,[152] nor does it provide for exclusive access.[153]

When asked about risks to its system and service to CESLP customers associated with not having guaranteed quality or quantity or exclusive access, CESLP states that it has considered these risks and assessed them to be low.[154] CESLP further states:[155]

> If the thermal energy from the sewage was not available for a period of time, the backup natural gas boilers would need to operate more than planned to make up the shortfall. The Metro Vancouver [Sewer Line] serves a large part of downtown Vancouver and so there is no chance of it not being in operation for prolonged period of time. From the pump station, the [Sewer Line] passes under False Creek, below Vanier Park, and then along Chestnut Street before the connection to the energy centre. Hypothetically, if Metro Vancouver was to allow other users to extract heat from the sewer upstream of the Seṅáḵw DES energy centre connection, it is very unlikely that this could impact thermal energy available to the Seṅáḵw DES because of the amount of waste heat available in the sewage and a lack of upstream development sites. The City of Vancouver have directed that major future development in this area is to be along the Broadway corridor, which is downstream of Seṅáḵw. Further, any heat extraction upstream would require the approval of Metro Vancouver who would consider, among other things, any potential impact to the Seṅáḵw Development.

5.5 Permitting Requirements

CESLP provides the following summary of permitting requirements for the Seṅáḵw DES:[156]

- Environmental Permits: The Seṅáḵw DES does not require environmental permitting or an environmental assessment.
- Building Permits: Building permits are not required on the Seṅáḵw Lands. The Squamish Nation will engage an experienced local third-party code consultant to review CESLP's plans and specifications and ensure they meet all applicable requirements, including the Vancouver Building Bylaw. The Squamish Nation will issue a tenant improvement permit to CESLP when satisfied that all code requirements have been met in the DES design.
- Sewer and Water Connection: The Squamish Nation intends to adopt sewer and water bylaws that match applicable City bylaws. Accordingly, a permit will need to be obtained from the Squamish Nation prior to connection to either of those services.
- Operating Permits: Technical Safety BC will still need to issue operating permits at the end of energy centre construction. These operating permits includes gas piping, boilers, heat pumps, expansion tanks and any other pressure vessels.

5.6 Project Risks

Technology

CESLP states that the technology risk with sewer heat recovery is low and that all components of the Seṅáḵw DES are "off-the-shelf" and have been tried and tested. CESLP highlights that waste heat capture is

[152] Exhibit B-13, Attachment 1, Sewage Diversion Agreement, Section 7.2, p. 22.
[153] Exhibit B-13, Attachment 1, Sewage Diversion Agreement, Section 7.3, p. 22.
[154] Exhibit B-7, BCUC I3R 22.3.1.
[155] Ibid., IR3 22.3.
[156] Exhibit B-1, section 5.11. Page 38-39.

supplemented with electric boilers for periods of peak heating demand, which are also available for back-up. Natural gas boilers also provide back-up to ensure continuity of service if the low carbon capacity is temporarily offline.[157]

Odour

As noted previously, one challenge of sewer heat recovery is "fouling and odour management". However, the Feasibility Study noted that these issues can effectively be managed through established technology and practices.[158]

CESLP states that it has addressed any risk of odour associated with the sewer heat recovery system through the system design. The DES design uses a completely closed loop on the sewage side and so there is no risk of odours. Further, fouling of the heat exchangers is managed automatically by the sewage heat recovery equipment, which includes filtration and a backwash facility.[159]

CESLP is not aware of any other TES with sewer heat recovery as an energy source using the same mitigations. However, CESLP understands that the City will use the same approach for the expansion of its sewer heat recovery system at its Neighbourhood Energy Utility. The City's current approach is an integration of a sewer pump station where sewage sits in an open trench, and flow is diverted through an open, travelling screen to the heat extraction process. This approach requires a significant amount of HVAC infrastructure to deal with odours including a large, unusual carbon filtration apparatus. The Seṅáḵw DES system has none of these challenges as the sewage remains under pressure within a pipe and is never exposed to the ambient environment within the plant.[160]

Construction Costs

CESLP submits that the construction cost risk is low. As support for this assessment, CESLP states that construction costs have been developed to an Association of Advancement of Cost Engineering International (AACE International) Class 3 cost estimate and include a 20 percent contingency. CESLP notes that the Project is greenfield construction, which it considers lowers construction risk as compared to a brownfield development. CESLP also states that fixed price contracts will be used for the plant construction and mechanical works involved for the DPS to mitigate escalation, and unit-pricing will be used for the civil works related to distribution piping system to control per-unit costing.[161]

Operations Costs

CESLP submits that the operations cost risk is low. As support for this assessment, CESLP states that it will structure maintenance contracts with third party providers that align with current budget estimates. In addition, it has included allowances for foreseeable renewal/replacement costs.[162]

Fuel Availability

CESLP submits that the risk of inadequate fuel availability is low. The main source of fuel for the Seṅáḵw DES is sewer heat capture and, as addressed in section 5.4 above, CESLP has executed an agreement with Metro Vancouver to extract heat from the Metro Vancouver Sewer Line. CESLP submits that the risks of the DES not

[157] Ibid., p. 50.
[158] Exhibit B-1, Attachment F, pdf p. 239, 252.
[159] Exhibit B-3, BCUC IR 10.13.
[160] Ibid., BCUC IR 10.13.1.
[161] Exhibit B-1, p. 50.
[162] Ibid.

having a guaranteed supply of sewage or exclusive access to the sewer main are low. In addition, BC Hydro provides the electricity for the electric boilers and chillers to Seṅáḵw with a dedicated, separately metered connection to the energy centre. A FortisBC Energy Inc. natural gas connection will supply gas through a dedicated, separately metered connection to the energy centre.[163]

Load Forecast and Customer Base Uncertainty

CESLP submits that the Seṅáḵw DES is sized only for known customer load. Nch'ḵaẏ West has committed to the seven connecting buildings in phases 1 and 2 and these are fully supported within this Application. A single entity, Nch'ḵaẏ West, owns all the connecting buildings and each building will have a Customer Service Agreement in place between CESLP and the building limited partnership formed for that purpose.[164]

Financial Risk

CESLP submits that the risk of under-recovered costs and/or stranded assets is low. The Seṅáḵw DES is sized only for known customer load. An Infrastructure Agreement is in place between CESLP and Nch'ḵaẏ West through which CESLP will construct, own, and operate the Seṅáḵw DES to provide low carbon heating and cooling to phases 1 and 2 of the Seṅáḵw Development. Also, CESLP notes that customer rates will be designed to allow for full cost recovery over 40-year customer service contract terms.[165]

5.7 Forecast GHG Emissions

CESLP calculates the combined GHG intensity for heating and cooling for phase 1 and 2 as 3.32 $kgCO_2/MWh$.[166]

CESLP explains that calculating forecast GHG emissions requires the use of the modelled loads described in section 3.3.2, which is a representative model of typical system operation over a full year.[167] CESLP calculates its forecast GHG intensity based on the following forecast of annual contribution from each of its energy sources:

Table 7: Energy Sources[168]

Energy Source	Annual Contribution MWh	Annual Contribution
Sewage Heat Recovery	8950	77%
Heat Recovery from Cooling	1920	17%
Electric Boilers	695	6%
Natural Gas Boilers	Backup as required	-
Total	11,565	100%

As noted previously, CESLP confirms that there are no formal ongoing requirements to confirm the operating GHG intensity of the Seṅáḵw DES to the Developer, Nch'ḵaẏ West, or to the City. However, CESLP will provide regular reports to the NDC that will include the performance and GHG emissions of the system.[169]

[163] Exhibit B-1, p. 51.
[164] Ibid., p. 51.
[165] Ibid., p. 51.
[166] Exhibit B-3, BCUC IR1 13.1.
[167] Exhibit B-7, BCUC IR3 19.3.
[168] Exhibit B-1, p. 24.
[169] Exhibit B-3, BCUC IR1 4.8.

5.8 Future Expansion

The Seṅáḵw DES has been sized to serve seven new buildings to be constructed through phases 1 and 2 of the Seṅáḵw Development. However, future expansion of the Seṅáḵw DES is contemplated to serve phases 3 and 4.[170] This section describes certain items being installed in phases 1 and 2 to prepare for the potential expansion.

To service future building additions, CESLP explains that the capacity of the energy centre would need to be increased and the energy centre is being sized to accommodate that additional equipment.[171]

CESLP explains that the DPS main will be built with 8 inch diameter pipe in phases 1 and 2, which is larger than the minimum 6 inch diameter pipe necessary to serve phases 1 and 2. CESLP considers that installing a 6 inch diameter DPS main pipe would be imprudent because the piping would have to be excavated, removed and replaced with an 8 inch diameter pipe when the buildings in phases 3 and 4 connect. CESLP notes that the DPS will also be designed to accommodate a second branch to the northeast to serve the buildings of phases 3 and 4, and with a relatively small incremental impact to the cost of the Project. CESLP estimates that the additional cost associated with the accommodations for the future branch and the larger pipe is approximately $100,000, or 0.3 percent of the total capital and development costs of the DES.[172]

CESLP also plans to install a third cooling tower in phases 1 and 2, even though the peak cooling demands of the initial phase of the Project could be met with two cooling towers. CESLP states that due to the significant cost impact and logistical challenges associated with procuring and installing an additional cooling tower for phases 3 and 4 after construction of Tower 1 is complete, all three cooling towers will be installed in phases 1 and 2 while the construction crane is present. CESLP estimates that this will incur approximately $332,000 of incremental costs, or 1.0 percent of the total capital and development costs of the DES, whereas using a helicopter to install the 3rd cooling tower at a later date would be significantly more expensive.[173]

CESLP confirms that the $100,000 for DPS and $332,000 for the third cooling tower are the only costs related to phases 3 and 4 that will be incurred during phases 1 and 2.[174] CESLP also confirms that while the additional capacity of these assets will be needed to serve phases 3 and 4, the assets will be in service and provide service to phases 1 and 2 from service commencement.[175]

Positions of the Parties

RCIA submits that availability and supply of fuel are essential for the successful implementation and operation of the Seṅáḵw DES.[176]

RCIA also notes that the members of the Kits Point Residents' Association are concerned about the potential noise and smell associated with the DES, including the associated use of wastewater.[177]

Panel Discussion

The Panel finds that the Project scope is reasonable. The Project comprises an energy centre providing thermal energy, via a distribution piping system, to an energy transfer station at each building in phases 1 and 2 of the Seṅáḵw Development. Thermal energy for heating will come from sewer heat recovery and the recovery of

[170] Exhibit B-1, p. 3.
[171] Ibid., pp. 39-40.
[172] Exhibit B-1, pp. 39-40.
[173] Exhibit B-1, pp. 39-40. Exhibit B-3, IR 15.4.
[174] Exhibit B-3, BCUC IR1 15.6.
[175] Ibid., BCUC IR1 15.7.
[176] RCIA Final Argument, p. 7.
[177] Ibid., p. 9.

waste heat from cooling. Electric chillers will provide space cooling. Electric boilers and thermal energy storage will operate to meet peak heating demands, and natural gas boilers will provide back up as required.

The Panel is persuaded that the system is designed with a justifiable level of redundancy for heating. The largest component of the heating system is the heat pump, for the sewage heat recovery, and if this fails, the system can rely on the electric and gas boilers, thermal storage, and waste heat from the chillers for heat. The system also includes redundancy for cooling, albeit at a lower level than for heating. The Panel is persuaded that the redundancy for cooling is reasonable because, as CESLP notes, except for 69 hours per year, the development can be cooled by one chiller and, if a chiller fails during those 69 peak hours, the remaining chiller will still provide cooling to the buildings.

The Panel finds that the DES is properly sized to meet forecast demand. CESLP has sized the DES capacity as well as the capacity of the individual energy resources for the heating system (sewer heat recovery system, electric and natural gas boilers plus thermal storage) and the cooling system (electric chillers). Further, if the flow or temperature characteristics of the Sewer Line change, which would impact the amount of sewer heat recovered, CESLP notes that it can adapt the sewer heat recovery design to accommodate the changes.

The Panel finds that the evaluation of the Project risks that CESLP has identified is reasonable. Having accepted that the DES is properly sized to meet forecast demand, the Panel recognizes that the uncertainty of the load forecast itself presents a risk, albeit one which CESLP submits is low. We are satisfied with CESLP's assessment that load uncertainty is a low risk because the Developer has committed to the construction of all seven connecting buildings and the DES is sized only for known customer load. This assessment also satisfies us that the financial risk of the Project is low. An additional factor that we accept as mitigating the financial risk is the fact that customer rates will be designed to allow for full cost recovery over the 40-year terms of the customer service agreements.

We are persuaded that the sewage heat recovery technology that CESLP relies on is well known and proven and therefore the risk associated with this technology is low. A related risk, fuel availability, was prominent during much of the proceeding because the Sewage Diversion Agreement between CESLP and Metro Vancouver was not finalized until September 15, 2023. Now that the agreement is executed, however, we are satisfied that the risks inherent in the agreement, which all come down to the lack of a guaranteed supply, are adequately mitigated because CESLP has included alternate energy sources in the Project design. Moreover, as CESLP points out, the Sewer Line serves a large part of downtown Vancouver and there is little to no chance of it not being in operation for a prolonged period.

The Panel is satisfied that CESLP has appropriately addressed construction cost risk, for example, by developing a Class 3 AACE cost estimate and using fixed price contracts to mitigate escalation. Similarly, it has appropriately addressed operations cost risk, for example, by aligning maintenance contracts with current budget estimates.

Finally, the Panel finds that CESLP's decision to 'pre-build' two features of the DES in anticipation of phases 3 and 4, namely the larger diameter pipe for the DPS and adding the third cooling tower, is cost-effective and therefore reasonable.

6.0 Project Cost and Indicative Rates

6.1 Capital Costs

CESLP retained Stantec Consulting as the design engineer of the Seṅáḵw DES, which subsequently engaged BTY Group (BTY) as the quantity surveyor to support the construction cost estimates.[178] CESLP used the construction

[178] Exhibit B-1, Section 5.7, p. 33.

cost estimates to develop an AACE International Class 3 cost estimate including predevelopment costs, project management, legal fees, and allowances for construction management, permitting, and contractor overhead and profit.[179]

CESLP's capital cost estimate for the construction of the Project is $26,400,949 (2022$) before escalation and allowance for funds used during construction (AFUDC).[180] This capital cost estimate has been prepared to an AACE International Class 3 degree of accuracy of -10 to -20 percent on the lower side and +10 to +30 percent on the higher side.[181]

CESLP forecasts that the capital costs of $26,400,949 in 2022 dollars will enter rate base in line with the in-service date of each of the buildings towers starting in 2024 and ending in 2026.[182] CESLP notes that the AFUDC of $1,202,598 is based on the phased construction schedule, deemed capital structure, and a provision for income taxes on the cost of equity.[183] CESLP notes that the total amount entering rate base after escalation is $30,026,176, reflecting when the Project is fully in operation serving the buildings in phases 1 and 2.[184] CESLP notes that the assets will be depreciated over a period of 40 years, aligning with both the average asset life of the system and the expected contracted term of customer service.[185]

Table 8 below presents the capital cost estimate for the Project.

[179] Ibid.
[180] Exhibit B-1, Section 5.7, Table 6, p. 34.
[181] Exhibit B-3, BCUC IR1 16.1.
[182] Exhibit B-1, Section 6.2, pp. 44–45.
[183] Ibid.
[184] Ibid.
[185] Ibid.

Table 8: AACE International Class 3 Capital Cost Estimate[186]

Predevelopment	
Predevelopment - Feasibility Assessment	134,684
Engineering - Class 3 Design	81,750
Legal - Definitive Agreements and CPCN support	200,000
Management Time	162,051
Contingency	5,000
Predevelopment Subtotal	**583,485**
Soft Costs - Detailed Design and Construction	
Engineering - Detailed Design	1,150,000
Project Management (4%)	656,153
Soft Costs Subtotal	**1,806,153**
Procurement, Construction and Commissioning	
Architectural Allowance (P)	60,900
Mechanical (P)	14,870,835
Electrical (P)	1,472,100
Metro Vancouver Connection Costs	105,000
Construction - Hard Costs Subtotal	**16,508,835**
Allowances	
Construction Management and Permitting (10%) (P)	1,640,384
Sub-Trade P&OH (15%) (P)	2,460,575
Design Contingency (10%) (P)	1,761,134
Construction Contingency (10%) (P)	1,640,384
Allowances Subtotal	**7,496,726**
Project Total	**26,400,949**
Project Cost Escalation 4%	2,422,629
Allowance for Funds Used During Construction	1,202,598
Total Project Cost	**30,026,176**

(P) – amount includes a 5% procurement fee corresponding to the revenue sharing requirements of the Squamish Nation, as described in the applicable section below this table.

CESLP explains the five percent procurement fee, indicated by (P) on many of the lines in Table 8 above. Third parties doing work with a contract value of more than $10,000 on Squamish Nation lands must be approved business partners and registered with the NDC procurement business registry. One of the requirements for a bidder to be an approved business partner is payment of a shared revenue fee of five percent of the awarded total contract value. Therefore, CESLP has factored in a five percent procurement fee, as applicable, to the detailed design, construction hard-costs and the associated allowances related to third-party involvement in the design and construction of the Seṅáḵw DES.[187] The NDC acknowledges that the additional third-party costs resulting from these requirements will form part of CESLP's utility cost of service for heating and cooling and will be recovered in the rates charged to Nch'ḵaẏ̓ West as the only customer.[188]

In parallel with constructing the Project, CESLP is in the process of securing an incentive award of approximately $920,000 from BC Hydro under its Low Carbon Electrification program to partially fund the sewer heat recovery component of the Project, specifically the sewage heat recovery heat exchanger system and the high temperature heat pump.[189] The incentive was confirmed to be successful as of the end of 2022, and it is

[186] Exhibit B-1, Section 5.7, Table 6, p. 34.
[187] Exhibit B-1, Section 5.7, pp. 35–36.
[188] Ibid.
[189] Exhibit B-3, BCUC IR1 1.4; Exhibit B-5, BCUC IR2 1.5.

expected that the award will be received in two cash installments upon Project completion with the first 75 percent of the incentive provided at completion of the Project and the remaining 25 percent 12 months later allowing time for measurement and authentication.[190] CESLP notes the exact mechanics of the incentive award are still being determined and is not reflected in the indicative rates.[191] Additionally, CESLP explains that it has made a grant application to Infrastructure Canada, but no decision has been reached and no allowance for associated incentives are reflected in the indicative rates.[192]

6.2 Operating Costs

CESLP provides the forecast annual operating costs used to calculate the indicative rates broken down by fixed costs (maintenance, operators, insurance, taxes, financing, rent, and billing, support & administration) and variable costs (electricity, water, natural gas).[193] CESLP notes that there is no variable cost included for sewage usage given that Metro Vancouver has indicated that there is no fee for the volume of sewage used, only for the costs to facilitate the connection.[194]

Table 9 below presents the indicative cost of service for the Project broken down by type of operating cost. For items such as CESLP's forecast cost of electricity and natural gas, CESLP uses the modeled loads described in section 3.3.2 because these represent typical system operation for the Seȟáḵw DES over a full year.[195]

Table 9: Indicative Cost of Service of the Seȟáḵw DES[196]

Component ($000)	2024 (partial)	2026	2033	2043	2053	2063
Depreciation	113	688	751	751	751	751
Cost of Debt	58	669	616	422	228	33
Cost of Equity	91	1,044	961	658	355	52
Income Taxes	71	-	-	533	452	305
Maintenance	104	578	717	874	1,065	1,298
Operators	52	216	249	303	370	450
Insurance	10	58	72	87	107	130
Billing, Support & Admin	54	253	322	393	479	584
Rent	78	325	373	455	554	676
Total Fixed Costs of Service	633	3,832	4,061	4,476	4,360	4,280
Cost of Electricity	35	336	921	1,368	2,033	3,021
Cost of Water	-	5	11	13	16	20
Cost of Natural Gas Service	1	4	4	5	6	8
Total Variable Cost of Service	36	344	936	1,387	2,056	3,049
Total Cost of Service	669	4,176	4,997	5,863	6,416	7,328

6.3 Indicative rates

For indicative purposes, CESLP provides forecast rates for heating and cooling service under an assumed fixed and variable rate structure.[197]

CESLP proposes an indicative fixed charge for each of heating and cooling that is forecast over a 40-year period, which is based on the duration of the customer service agreements, under the following two component structures:

[190] Exhibit B-5, BCUC IR2 1.1 and 1.2.
[191] Ibid., BCUC IR2 1.1 and 1.3.
[192] Exhibit B-5, BCUC IR2 1.4.
[193] Exhibit B-1, Section 6.2, pp. 42–46.
[194] Ibid., Section 6.2, p. 45.
[195] Exhibit B-7, IR3 23.1.
[196] Exhibit B-7, Appendix 1, "B-7-Appendix1-SenakwDESIndicativeCostofServiceandRatesModel-BCUCIR3-Update".
[197] Exhibit B-1, Section 6.4, p. 48.

(i) A levelized rate for the period 2024-2038 (15 years), serving as an indicative rate-setting construct to smooth rates while the system is being built out, with an assumed annual rate escalation of 2 percent; and

(ii) A cost-of-service rate for the remaining assumed 40-year term, spanning from 2039-2063 (25 years).[198]

CESLP intends to recover capital and operating costs that do not vary with energy consumption through a fixed charge per unit of peak design capacity in kilowatts, reflecting a fixed billing determinant for the allocated recovery of such costs to each connected building.[199]

CESLP intends to recover variable costs (electricity, water, natural gas) using a flow-through approach, based on a per unit of energy consumption in megawatt hours.[200] In CESLP's view, this approach reflects the cost causation of energy use driving the cost of electricity, water, and natural gas consumption.[201]

Table 10 below presents the billing determinants, indicative rates, and revenues for the heating and cooling systems of the Project.

Table 10: Billing Determinants, Rates and Revenues[202]

		2024 (partial)	2026	2033	2043	2053	2063
Heating							
Billing Determinants	Capacity kW	1,231	10,248	10,248	10,248	10,248	10,248
	Energy MWh	1,116	11,218	11,218	11,218	11,218	11,218
Indicative Rates	Fixed $/kW	$ 179	$ 187	$ 214	$ 218	$ 213	$ 209
	Variable $/MWh	$ 27	$ 26	$ 70	$ 104	$ 154	$ 229
Revenue	Fixed $000	$ 221	$ 1,912	$ 2,196	$ 2,238	$ 2,180	$ 2,140
	Variable $000	$ 30	$ 287	$ 785	$ 1,166	$ 1,731	$ 2,572
	Total $000	$ 251	$ 2,199	$ 2,981	$ 3,403	$ 3,911	$ 4,712
Cooling							
Billing Determinants	Capacity kW	768	7,714	7,714	7,714	7,714	7,714
	Energy MWh	433	4,172	4,172	4,172	4,172	4,172
Indicative Rates	Fixed $/kW	$ 240	$ 250	$ 287	$ 290	$ 283	$ 277
	Variable $/MWh	$ 13	$ 14	$ 36	$ 53	$ 78	$ 114
Revenue ($000)	Fixed $000	$ 184	$ 1,928	$ 2,214	$ 2,238	$ 2,180	$ 2,140
	Variable $000	$ 6	$ 57	$ 151	$ 221	$ 324	$ 477
	Total $000	$ 190	$ 1,985	$ 2,366	$ 2,459	$ 2,505	$ 2,617
Total / Average							
Total Billing Determinants	Capacity kW	1,999	17,962	17,962	17,962	17,962	17,962
	Energy MWh	1,549	15,390	15,390	15,390	15,390	15,390
Average Indicative Rates	Fixed $/kW	$ 203	$ 214	$ 246	$ 249	$ 243	$ 238
	Variable $/MWh	$ 23	$ 22	$ 61	$ 90	$ 134	$ 198
Total Revenue ($000)	Fixed $000	$ 405	$ 3,840	$ 4,411	$ 4,476	$ 4,360	$ 4,280
	Variable $000	$ 36	$ 344	$ 936	$ 1,387	$ 2,056	$ 3,049
	Total $000	$ 441	$ 4,184	$ 5,347	$ 5,863	$ 6,416	$ 7,328

CESLP states that it has not yet finalized its rate design, rate-setting or billing approach but it will engage with Nch'ḵaẏ̓ West upon CPCN approval and in advance of final rate setting.[203] CESLP will submit a request for BCUC approval of rates for the Seṅáḵw DES in advance of the planned Project completion and in-service date.[204]

Comparators

Table 11 below compares the Seṅáḵw DES indicative rates to the rates for two thermal energy systems that are affiliated with CESLP: Creative Energy Mount Pleasant LP's Mount Pleasant District Cooling System and Creative Energy Platforms' Vancouver House Development.

198 Exhibit B-1, Section 6.4, p. 48.
199 Ibid.
200 Ibid.
201 Ibid.
202 Exhibit B-7, Appendix 1, "B-7-Appendix1-SenakwDESIndicativeCostofServiceandRatesModel-BCUCIR3-Update".
203 Exhibit B-1, Section 6.4, p. 48.
204 Ibid.

Table 11: Indicative Rate Comparators[205]

	Heating		Cooling	
	Fixed ($/kW)	Variable ($/MWh)	Fixed ($/kW)	Variable ($/MWh)
Creative Energy Seṅáḵw DES	$179	$27	$240	$13
Creative Energy Mount Pleasant DCS	Not applicable	Not applicable	$375.37	Not applicable
Creative Energy Vancouver House Development	$141.68	$27	$137.37	$11.45

CESLP explains the differences for fixed costs as due to differences in capital cost (scale of project, degree of redundancy, services offered) and cost to distribute (length of piping, whether buried or hung).[206] CESLP describes the differences in variable costs as due to differences in time periods (2020 for Vancouver House and 2024 for CESLP), project characteristics (Vancouver House uses natural gas while CESLP will use electricity for heating), and general differences in consumption levels.[207]

Positions of the Parties

RCIA did not comment on Project costs or indicative rates.

Panel Discussion

The Panel accepts CESLP's capital cost estimate of $26,400,949 as well as the amount entering rate base after escalation, being $30,026,176. We find CESLP's approach to developing the capital cost estimate to be reasonable. It prepared the estimate to an AACE Class 3 degree of accuracy, which is consistent with the BCUC's CPCN Guidelines. Construction cost estimates were prepared by BTY, a quantity surveyor.

The Panel is satisfied that the estimated capital costs and operating costs are reasonable for a Project of this nature and further, that the indicative rates provided by CESLP are reasonable for the purposes of the Application. Although the Panel finds the indicative revenue requirements and rates to be reasonable, the approval of the revenue requirements and customer rates will be subject to review and approval by the BCUC in a future proceeding.

The Panel notes that RCIA did not raise any issues regarding the indicative rates or Project costs.

7.0 Indigenous Consultation and Public Engagement

CESLP has not undertaken First Nations consultation or public engagement in relation to the Seṅáḵw DES. CESLP states that this is in response to a request made by the Squamish Nation and informed by the unique characteristics of the Seṅáḵw DES, as an on-reserve Project.[208]

7.1 Indigenous Consultation

In its letter of comment, Squamish Nation confirms that the Seṅáḵw Development is located on Squamish Nation reserve land, within Squamish Nation's jurisdiction and not part of the City. Squamish Nation states that

[205] Exhibit B-7, BCUC IR3 24.1.
[206] Exhibit B-5, BCUC IR2 17.4-17.5.
[207] Exhibit B-7, BCUC IR3 24.2.
[208] Exhibit B-1, Section 1.5. p. 6.

the infrastructure that is being installed to support the Seȟáḵw Development will be located entirely within the boundary of the Seȟáḵw Lands and therefore is not a public access matter.[209]

Positions of the Parties

RCIA submits that thorough deliberation and stakeholder consultation are fundamental components of responsible decision-making processes. RCIA is concerned the lack of consultation exhibited by CESLP in support of the Application does not adequately fulfill its obligation to engage with key stakeholders, including First Nations communities and the public, as required by the BCUC's established guidelines and legal principles.[210]

RCIA submits that CESLP's admission it did not consult with First Nations (namely the Tsleil-Waututh Nation or Musqueam Indian Band) regarding the Project raises concerns about its approach to meaningful engagement and consultation. [211] RCIA cites section 3 of the CPCN Guidelines, which states:[212]

> If an applicant is of the view that the application does not require consultation with First Nations, reasons supporting its conclusion must be provided to the Commission. Unless otherwise justified, the following information should be filed: (i) Identification of the First Nations potentially affected by the application or filing, including the feasible project alternatives; and the information considered to identify these First Nations.

RCIA submits that in the Application, CESLP is the applicant. The onus is on CESLP, as a public utility, to undertake appropriate consultations related to the DES Project.[213]

RCIA submits that any further consideration of this Application should be deferred pending demonstration by CESLP that adequate and appropriate consultation has been undertaken with First Nations (and the general public) and fully reported upon to the BCUC.[214]

In reply, CESLP submits that for CESLP, there is no obligation to engage in consultation beyond what the BCUC requires. CESLP is not an agent of the government (e.g., a Crown utility) and unlike Crown utilities CESLP does not have common law, constitutional or statutory obligations to consult.[215]

CESLP submits that it has complied with all applicable BCUC requirements, being BCUC's CPCN Guidelines and Order G-346-22, in which BCUC established a public hearing process for review of the Application and directed CESLP to provide public notice of the Application. Contrary to the RCIA's submission on this point, CESLP submits that there is no further consultation requirement that CESLP needs to undertake.[216]

Panel Determination

The duty to consult arises when a Crown decision has the potential to adversely impact the Indigenous rights of an Indigenous group or groups. The procedural aspects of this Crown duty are often delegated to the proponent, which in this case is CESLP. However, there appears not to have been any delegation of the Crown duty in this case. The reason, in part, is that the Project approvals required for the Seȟáḵw DES will be undertaken by the Squamish Nation government; there are no Crown permits required that would trigger the duty to consult. The permits that are required for the Seȟáḵw DES, namely, the operating permits and safety permits, are not of a

[209] Exhibit E-1, p. 1.
[210] RCIA Final Argument, Section 2.2, p. 2.
[211] Ibid.
[212] Ibid.
[213] RCIA Final Argument, Section 2.2. p. 3.
[214] Ibid., p. 10.
[215] CESLP Reply Argument, p. 4.
[216] Ibid., p. 5.

nature that would give rise to risk of infringement of Indigenous rights. The Panel therefore finds that nothing gives rise to the duty to consult at this stage of the Project.

7.2 Public Engagement

As previously noted, CESLP did not undertake public engagement into the proposed Seṅáḵw DES as requested by the Squamish Nation and as informed by the unique characteristics of the Seṅáḵw DES.[217]

CESLP explains that the Seṅáḵw DES is located entirely within the boundary of the Seṅáḵw Lands. CESLP identifies that there are no physical or visual touchpoints to land or stakeholders beyond that boundary other than the underground tie-in of the Seṅáḵw DES to the Metro Vancouver Sewer Line, which is immediately adjacent below the curb of Chestnut Street at the western edge of the Seṅáḵw Lands. Further, CESLP identifies that there are no municipal roads or rights of way on the Seṅáḵw Lands.[218]

The Squamish Nation advised CESLP of its belief that a typical public consultation process would not respect the Nation's right to sovereignty and jurisdiction on its land. The Squamish Nation requested that CESLP not engage in public consultation for the Seṅáḵw DES.[219]

During the proceeding, the BCUC identified that the website associated with the Seṅáḵw Development included a webpage related to the proposed Seṅáḵw DES, which included a feedback form and reference to a public information session on October 3, 2022.[220] When asked whether any feedback had been received relating to the Seṅáḵw DES through this website, CESLP explained that while not directly involved in the public engagement referred to on the Seṅáḵw Development website, CESLP made enquiries on whether any feedback had been received in relation to the Seṅáḵw DES as part of this engagement. CESLP understands that the only official public consultation was an October 3rd, 2022, session and that no questions were received with regards to the Seṅáḵw DES.[221]

Positions of the Parties

RCIA submits that a single public session conducted by a third-party falls short of comprehensive public engagement and raises concerns about the adequacy and inclusivity of CESLP's public engagement efforts. RCIA considers that effective public consultation requires an ongoing and iterative process that allows for continuous dialogue and information exchange throughout the decision-making process. Moreover, RCIA submits that merely notifying potentially affected parties about the Seṅáḵw DES does not fulfill genuine public consultation. RCIA considers that while notifying those who may be directly impacted is a necessary step in the process, it falls short of providing meaningful opportunities for public input and engagement.[222]

RCIA submits any further consideration of this Application should be deferred pending demonstration by CESLP that adequate and appropriate consultation has been undertaken with the general public (and First Nations) and fully reported upon to the BCUC.[223]

In its letter of comment, the Kits Point Residents Association (KPRA) raises four issues. The first being impacts on adjoining landowners and residents, which the KPRA states is an overriding concern for residents. The second issue raised is regarding Vanier Park Road. KPRA states that the access road for the Seṅáḵw Development is on

[217] Exhibit B-1, p. 6.
[218] Ibid.
[219] Ibid.
[220] Exhibit A-3, IR1 31.1.
[221] Exhibit B-3, IR1 31.1.
[222] RCIA Final Argument, Section 2.3. Page 3-4.
[223] Ibid., p. 10.

park land and not the Seȟáḵw lands. KPRA therefore considers that public lands have been used in support of this commercial development and to facilitate this DES. KPRA's third issue is regarding compensation for sewage. KPRA is concerned that GVRD/City receive fair compensation for the sewage resource in the interests of the taxpayers and that this resource is appropriately allocated. Lastly, the KPRA raises an issue with respect to governance. The KPRA is concerned that Westbank, which is one of the ultimate parent companies to CESLP, may influence decision making to the detriment of the tenant residential ratepayers who will ultimately bear the costs of those decisions.[224]

CESLP reiterates that the Seȟáḵw DES will be located on the Seȟáḵw Lands within the Seȟáḵw Development and will have minimal, if any, impact outside the Seȟáḵw Lands. CESLP submits that it consulted extensively with the owner of the Seȟáḵw Lands, the Squamish Nation, and the Squamish Nation insisted that CESLP not engage with others with respect to the Seȟáḵw DES. CESLP respected their request. [225]

CESLP notes that it has fulfilled the BCUC's public notice requirements. Parties wanting to raise with the BCUC any concerns in relation to the Seȟáḵw DES were encouraged to get involved in this proceeding.[226]

Panel Discussion

The Panel does not agree with CESLP's position that because the Seȟáḵw DES is situated on reserve land, public engagement is not necessary. Public engagement is an important consideration in each CPCN application that comes before the BCUC. With respect to this CPCN Application, CESLP was entirely reliant on the Seȟáḵw Developer for public feedback regarding the Seȟáḵw DES; however, none of the feedback addressed the Seȟáḵw DES.

In considering sufficiency of public engagement, we must be attentive to the nature and scope of the Project before us, and the extent of potential impact it may have on the public. The Panel received a letter of comment from the neighbourhood adjacent to the Development, the Kits Point Residence Association (KPRA). The Panel appreciates that the KPRA took time to file a letter of comment in this proceeding. The issues KPRA raised focus on four concerns:

- impacts on adjoining landowners and residents;
- that the public resources of park land have been used to facilitate this DES;
- that Metro Vancouver receive fair compensation for its sewage resource in the interests of the taxpayers and that this resource is appropriately allocated; and
- the potential for conflict arising relative to ensuring that tenant residential ratepayers receive the best price because of the degree of effective control given to Westbank.

KPRA's concern about impacts on adjoining landowners and residents is rather unspecific, except for a quote from the Seȟáḵw DES's Application assuring no potential impacts to parties outside the Seȟáḵw Lands in relation to noise or exhaust. CESLP has provided evidence that the system is a closed loop system, which mitigates against the risks of odour from Seȟáḵw DES. With respect to noise, it is unclear what elements of the Seȟáḵw DES KPRA considers may cause noise disturbances to the neighbouring residents. It is primarily underground, below the buildings, so the Panel considers the likelihood of disturbances to neighbours to be minimal. On a similar note, by using sewage heat as a thermal energy source, the Seȟáḵw DES decreases the risk of exhaust. Additionally, CESLP has designed the system to minimize emissions. As such, the Panel considers that CESLP has addressed KPRA's concerns in this regard.

[224] Exhibit E-2, pp. 3-5.
[225] CESLP reply argument, p. 5.
[226] Ibid.

Both the Squamish Nation, as well as CESLP, have confirmed that the Seṅáḵw DES will be located entirely on Squamish Nation's reserve lands and not on public park lands. It is beyond our jurisdiction to comment on the fairness of compensation received by Metro Vancouver for its sewage resources. With respect to KPRA's concerns in relation to the potential conflict with tenants, while care must be taken to distinguish between concerns about the Seṅáḵw Development and concerns about the Seṅáḵw DES, the Seṅáḵw DES as a thermal energy system will be subject to the UCA, including the approval of rates, and customers with complaints relating to the Seṅáḵw DES may bring them before the BCUC for review. In this case, the customer will be the various building owners, not the individual tenants. However, complaints relating to tenancy issues are beyond the jurisdiction of the BCUC.

Public engagement on the Seṅáḵw DES was included in the description of the Seṅáḵw Development, and while KPRA has raised concerns in relation to engagement, the DES is clearly not the focal point for public concern.

8.0 Alignment with Provincial Government Energy Objectives and the *Clean Energy Act*

CESLP states that the Seṅáḵw DES supports the applicable BC energy objectives to:

- reduce BC greenhouse gas emissions (CEA section 2(g));
- encourage the switching from one kind of energy source or use to another that decreases greenhouse gas emissions in BC (CEA section 2(h));
- encourage communities to reduce greenhouse gas emissions and use energy efficiently (CEA section 2(i));
- reduce waste by encouraging the use of waste heat (CEA section 2(j));
- encourage economic development and the creation and retention of jobs (CEA section 2(k));
- foster the development of first nation and rural communities through the use and development of clean or renewable resources (CEA Section 2(l)); and
- achieve BC's energy objectives without the use of nuclear power (CEA section 2(o)).

Positions of the Parties

RCIA did not address this topic in its final argument.

Panel Discussion

The Panel is satisfied that the Seṅáḵw DES meets the objectives set out in the CEA by implementing a low carbon system using waste heat, encouraging economic development, and fostering the development of a First Nation community. CESLP has demonstrated through acceptable modeling that the Seṅáḵw DES meets the low carbon objectives of the Project. Achieving the predicted emissions values depends on the use of electric boilers and thermal storage, with natural gas boilers only used for peak and back-up purposes when conditions are unusually cold or if hot water usage is higher than predicted. As such, it will be important that Seṅáḵw DES track the actual usage of natural gas to ensure that the low carbon objectives are achieved and maintained.

9.0 Overall CPCN Determination

Panel Determination

For the reasons set out in this Decision, the Panel finds that public convenience and necessity require the construction and operation of the Seṅáḵw DES. Accordingly, the Panel grants a CPCN to CESLP authorizing the

construction and operation of the Sel̓ám̓ DES to provide space heating, space cooling and domestic hot water to phases 1 and 2 of the Sel̓ám̓ Development.

The Panel directs CESLP to provide ongoing reporting to the BCUC for the duration of the Project, as detailed in Appendix A of this Decision.

DATED at the City of Vancouver, in the Province of British Columbia, this 26th day of OCTOBER 2023.

Original signed by:

C. M. Brewer
Panel Chair / Commissioner

Original signed by:

A. K. Fung, KC
Commissioner

Original signed by:

E. B. Lockhart
Commissioner

bcuc
British Columbia
Utilities Commission

Suite 410, 900 Howe Street
Vancouver, BC Canada V6Z 2N3
bcuc.com

P: 604.660.4700
TF: 1.800.663.1385
F: 604.660.1102

ORDER NUMBER
C-5-23

IN THE MATTER OF
the *Utilities Commission Act*, RSBC 1996, Chapter 473

and

Creative Energy Seṅáḵw Limited Partnership
Application for a Certificate of Public Convenience and Necessity
for the Seṅáḵw District Energy System

BEFORE:
C. M. Brewer, Panel Chair
A. K. Fung, KC, Commissioner
E. B. Lockhart, Commissioner

on October 26, 2023

CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

WHEREAS:

A. On October 20, 2022, Creative Energy Seṅáḵw Limited Partnership (CESLP) applied to the British Columbia Utilities Commission (BCUC) pursuant to sections 45 and 46 of the *Utilities Commission Act* (UCA) for a Certificate of Public Convenience and Necessity (CPCN) to construct, own and operate a thermal energy system to provide heating and cooling to the Senáḵw development, which is on Seṅáḵw Lands (Application);

B. The Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) owns the Seṅáḵw Lands as reserve lands through an agreement with the federal government;

C. The proposed thermal energy system is a low carbon electrified energy system that provides cooling to the Senáḵw development with electric chillers, and provides heating with captured waste heat from the cooling equipment and reclaimed heat from a Metro Vancouver main sewer line using high-temperature heat pumps. Electric boilers, thermal storage and natural gas boilers will be in place to provide peaking and backup to the heat recovery processes (Seṅáḵw DES or the Project);

D. By Orders G-346-22, G-42-23, and G-93-23, dated November 30, 2022, March 3, 2023, and April 24, 2023, respectively, the BCUC established, furthered, and amended the regulatory timetable for the review of the Application, which included public notification, intervener registration, three rounds of BCUC and intervener information requests, and submissions on further process;

E. By Orders G-144-23 and G-197-23, dated June 14, 2023, and July 25, 2023, respectively, the BCUC established further regulatory timetables, which included CESLP and intervener final argument, and CESLP reply argument. The BCUC also directed CESLP, by no later than September 1, 2023, to file its Sewage

Diversion Agreement with Metro Vancouver once executed or provide an update on the status of the Sewage Diversion Agreement;

F. By letter, dated August 29, 2023, CESLP provided an update on the Sewage Diversion Agreement, confirming that negotiations had concluded, and that the senior staff required to sign the agreement were out of the office until the first week of September 2023;

G. By letter, dated September 11, 2023, the BCUC requested that CESLP file a copy of the executed Sewage Diversion Agreement by no later than September 18, 2023;

H. By letter, dated, September 18, 2023, CESLP filed an executed copy of the Sewage Diversion Agreement;

I. The Residential Consumer Intervener Association registered as the sole intervener in the proceeding; and

J. The BCUC has considered the Application, the evidence and submissions in this proceeding and determines that certain approvals are warranted.

NOW THEREFORE for the reasons set out in the Decision issued concurrently with this order and pursuant to sections 45 and 46 of the UCA, the BCUC orders as follows:

1. A CPCN is granted to CESLP authorizing the construction and operation of the Seṅáḵw DES to provide space heating, space cooling and domestic hot water to phases 1 and 2 of the Seṅáḵw development.

2. CESLP is directed to file Project reports as outlined in Appendix A of the Decision.

DATED at the City of Vancouver, in the Province of British Columbia, this 26th day of October 2023.

BY ORDER

Original signed by:

C. M. Brewer
Commissioner

Creative Energy Seṅáḵw Limited Partnership
Application for a Certificate of Public Convenience and Necessity
for the Seṅáḵw District Energy System

PROJECT REPORTING

The scope of Project reporting will comprise the following:

1. Semi-annual Progress Reports

Each report shall be brief and is only required to provide:

- An update on the status of the Project, including any major accomplishments achieved during the reporting period. *Suggested length: ½ page maximum.*
- The actual and forecast costs of the Project compared to the Project capital cost estimate provided in Table 6 of the Application, highlighting variances and with an explanation of significant variances.

Suggested format:

Cost Item	Actuals Spent to Date	Forecast to Complete	CPCN Budget (Table 6 of Application)	Forecast Variance	Explanation of Significant Variances
Cost item					
Cost item					
.					
.					
Cost item					

- The forecast peak loads at the Seṅáḵw DES energy centre, compared to the forecast provided in response to BCUC IR 2, 2.1 in Exhibit B-5 of the proceeding, with an explanation of significant variances.

Suggested format:

Service	Forecast Peak Loads at Energy Centre	Forecast Peak Load at Energy Centre (as provided in Application)	Variance	Explanation of Significant Variance
Heating		8,357 kW		
Cooling		6,890 kW		

- The status of Project risks provided in Chapter 7 of the Application, highlighting the status of identified risks, changes in and additions to risks, the actions that CESLP is taking to deal with the risks and the likely impact on the Project's schedule and cost.

CESLP must file semi-annual progress reports within 30 days of the end of each semi-annual reporting period, with the first report covering the period ending June 30, 2024.

2. Material Change Reports

A material change is a change in CESLP's plan for the Project that would reasonably be expected to have a significant impact on the schedule, cost or scope (Material Change), such that:

- There is a schedule delay of greater than six months compared to the schedule provided in Table 4 of the Application;
- The total Project cost exceeds 30 percent of the estimated Project cost provided in Table 6 of the Application; or
- There is a change to the Project scope provided in Chapter 5 of the Application.

In the event of a Material Change, CESLP must file a Material Change report with the BCUC explaining the reasons for the Material Change, CESLP's consideration of the Project risk and the options available, and actions CESLP is taking to address the Material Change. CESLP must file the Material Change report as soon as practicable and in any event within 30 days of the date on which the Material Change occurs.

3. Final Report

A Final Report is to be submitted within three months of commissioning of the Seṅáḵw DES energy centre. The report is to include:

- The final cost of the Project, including a breakdown of the final costs. If final costs are not available, provide the actual and forecast costs of the Project to completion;
- A comparison of these costs to the estimates provided in Table 6 of the Application; and
- An explanation of all material cost variances for any of the cost items provided in Table 6 of the Application that exceed 30 percent of the estimates.

This information can be provided in a similar tabular format as suggested for the semi-annual progress reports.

Creative Energy Seȟáḵw Limited Partnership
Application for a Certificate of Public Convenience and Necessity for the Seȟáḵw District Energy System
Decision and Order C-5-23

GLOSSARY AND ACRONYMS

ACRONYM / GLOSSARY	DESCRIPTION
AACE International	Association of Advancement of Cost Engineering International
AFUDC	Allowance for funds used during construction
Application	Application for a CPCN to construct, own and operate a thermal energy system to provide heating and cooling to the Seȟáḵw development, which is on Seȟáḵw Lands
BCUC	British Columbia Utilities Commission
CEA	*Clean Energy Act*
CESLP	Creative Energy Seȟáḵw Limited Partnership
City	City of Vancouver
CPCN	Certificate of Public Convenience and Necessity
CPCN Guidelines	BCUC's 2015 Certificate of Public Convenience and Necessity Application Guidelines
DHW	Domestic hot water
DPS	Distribution piping system
ETS	Energy transfer station
FVB	FVB Energy Inc. (Engineering Consultant)
Infrastructure Agreement	Agreement between CESLP and Nch'ḵaẏ̓ West through which CESLP will construct, own, and operate the Seȟáḵw DES to provide low carbon heating and cooling to phases 1 and 2 of the Seȟáḵw Development
IRs	Information Requests
KPRA	Kits Point Residents Association

ACRONYM / GLOSSARY	DESCRIPTION
NDC	Nch'ḵaẏ Development Corporation
Project	The proposed district energy system at the Seṅáḵw development
RCIA	Residential Consumer Intervener Association
RNG	Renewable Natural Gas
Seṅáḵw DES	The proposed district energy system at the Seṅáḵw development
Seṅáḵw Development	The Seṅáḵw development is a mixed-use project of primarily purpose-built rental housing, which is planned to be built over 4 phases
Sewage Diversion Agreement	CESLP's agreement with Metro Vancouver for sewage diversion
Squamish Nation	Sḵwx̱wú7mesh Úxwumixw
TES Guidelines	Thermal Energy Systems Regulatory Framework Guidelines
UCA	*Utilities Commission Act*

IN THE MATTER OF
the *Utilities Commission Act*, RSBC 1996, Chapter 473

and

Creative Energy Seṅáḵw Limited Partnership
Certificate of Public Convenience and Necessity for the Senakw District Energy System

EXHIBIT LIST

Exhibit No.	Description
COMMISSION DOCUMENTS	
A-1	Letter dated November 7, 2022 – BCUC appointment of panel for the review of the Certificate of Public Convenience and Necessity (CPCN) for the Senakw District Energy System
A-2	Letter dated November 30, 2022 – BCUC order G-346-22 with Reasons for Decision establishing a regulatory timetable
A-3	Letter dated January 17, 2023 – BCUC Information Request No. 1 to Creative Energy
A-4	Letter dated January 27, 2023 – BCUC Response to Sḵwx̱wú7mesh Úxwumixw (Squamish Nation)
A-5	Letter dated March 3, 2023 – BCUC Order G-42-23 establishing a further timetable
A-6	Letter dated March 21, 2023 – BCUC Information Request No. 2 to Creative Energy
A-7	Letter dated April 24, 2023 – BCUC Order G-93-23 establishing an amended timetable
A-8	Letter dated May 5, 2023 – BCUC Information Request No. 3 to Creative Energy
A-9	Letter dated June 14, 2023 – BCUC Order G-144-23 establishing a further timetable
A-10	Letter dated July 25, 2023 – BCUC Order G-197-23 establishing a further timetable
A-11	Letter dated September 11, 2023 – BCUC response regarding Sewage Diversion Agreement

Exhibit No.	Description
APPLICANT DOCUMENTS	
B-1	**CREATIVE ENERGY SEN̓ÁḴW LIMITED PARTNERSHIP (CREATIVE ENERGY)** - Certificate of Public Convenience and Necessity (CPCN) for the Senakw District Energy System dated October 20, 2022
B-2	Letter dated December 16, 2022 – Creative Energy submitting confirmation of Application and Public Notice
B-3	Letter dated February 9, 2023 – Creative Energy submitting response to BCUC Information Request No. 1
B-4	Letter dated February 9, 2023 – Creative Energy submitting response to RCIA Information Request No. 1
B-5	Letter dated April 13, 2023 – Creative Energy submitting responses to BCUC Information Request No. 2
B-6	Letter dated April 13, 2023 – Creative Energy submitting responses to RCIA Information Request No. 2
B-7	Letter dated May 25, 2023 – Creative Energy submitting responses to BCUC Information Request No. 3
B-8	Letter dated May 25, 2023 – Creative Energy submitting responses to RCIA Information Request No. 3
B-9	Letter dated June 1, 2023 – Creative Energy submission on further process
B-10	Letter dated June 6, 2023 – Creative Energy reply submission on further process
B-11	Letter dated July 21, 2023 – Creative Energy submission on further process
B-12	Letter dated August 29, 2023 – Creative Energy submitting update on Metro Vancouver Sewage Diversion Agreement
B-13	Letter dated September 18, 2023 – Creative Energy submitting executed Sewage Diversion Agreement

Exhibit No.	Description
INTERVENER DOCUMENTS	
C1-1	**RESIDENTIAL CONSUMER INTERVENER ASSOCIATION (RCIA)** – Letter dated January 9, 2023 submitting request to intervener by Matthew Matusiak
C1-2	Letter dated January 26, 2023 – RCIA submitting Information Request No. 1 to Creative Energy
C1-3	Letter dated March 28, 2023 – RCIA submitting Information Request No. 2 to Creative Energy
C1-4	Letter dated May 11, 2023 – RCIA submitting Information Request No. 3 to Creative Energy
C1-5	Letter dated May 31, 2023 – RCIA submission on further process
INTERESTED PARTY DOCUMENTS	
D-1	**BROID, D. (BROID)** – Letter dated November 28, 2022 submitting request for Interested Party Status
D-2	**FORTISBC ALTERNATIVE ENERGY SERVICES INC. (FAES)** – Letter dated January 9, 2023 submitting request for Interested Party Status by Grant Bierlmeier
D-3	**SQUAMISH NATION (SQUAMISH NATION)** – Letter dated February 10, 2023 submitting request for Interested Party Status by Jacob Lewis
D-4	**MAURICE, B. (MAURICE)** – Letter dated March 16, 2023 submitting request for Interested Party Status
D-5	**HANDELSMAN, S. (HANDELSMAN)** – Letter dated March 17, 2023 submitting request for Interested Party Status
D-6	**KITS POINT RESIDENTS ASSOCIATION (KPRA)** – Letter dated March 23, 2023 submitting request for Interested Party Status by Eve Munro
LETTERS OF COMMENT	
E-1	SḴWX̱Ú7MESH ÚXWUMIXW (SEŃÁḴW) **-** Letter of Comment dated January 19, 2023
E-2	MUNRO, E. (MUNRO) **-** Letter of Comment dated May 3, 2023