City of Richmond

Report to Committee

To:	General Purposes Committee	**Date:**	February 14, 2025
From:	John Irving, P.Eng., MPA Deputy CAO Chief Executive Officer, Lulu Island Energy Company	**File:**	01-0060-20- LIEC1/2024-Vol 01
Re:	**Sewer Heat Recovery Central Energy Plant - Concept Design**		

Staff Recommendation

That, as presented in the staff report titled "Sewer Heat Recovery Central Energy Plant – Concept Design", dated February 14, 2025:

1. The concept design for the Sewer Heat Recovery Central Energy Plant be approved; and

2. The Sewer Heat Recovery Central Energy Plant project to be referred to the Major Projects Oversight Committee.

John Irving, P.Eng., MPA
Deputy CAO
Chief Executive Officer, Lulu Island Energy Company
(604-276-4140)

Att. 3

REPORT CONCURRENCE	
ROUTED TO:	**CONCURRENCE**
Policy Planning	☑
Development	☑
Parks Services	☑
Transportation	☑
REVIEWED BY SMT	**INITIALS:**
APPROVED BY CAO	

Staff Report

Origin

In 2023, Council approved the site location for the Sewer Heat Recovery Central Energy Plant (SHR plant) at 7500 River Road, on the eastern edge of the future Lulu Island Park (the future park). The purpose of this report is to present the concept design of the SHR plant for Council approval.

This report supports Council's Strategic Plan 2022-2026 Focus Area #2 Strategic and Sustainable Community Growth:

> *Strategic and sustainable growth that supports long-term community needs and a well-planned and prosperous city.*
>
> *2.3 Ensure that both built and natural infrastructure supports sustainable development throughout the city.*

This report supports Council's Strategic Plan 2022-2026 Focus Area #3 A Safe and Prepared Community:

> *Community safety and preparedness through effective planning, strategic partnerships and proactive programs.*
>
> *3.4 Ensure civic infrastructure, assets and resources are effectively maintained and continue to meet the needs of the community as it grows.*

This report supports Council's Strategic Plan 2022-2026 Focus Area #5 A Leader in Environmental Sustainability:

> *Leadership in environmental sustainability through innovative, sustainable and proactive solutions that mitigate climate change and other environmental impacts.*
>
> *5.1 Continue to demonstrate leadership in proactive climate action and environmental sustainability.*

Background

District energy systems centralize space heating, cooling and domestic hot water heating production on the neighbourhood scale. The City established Lulu Island Energy Company (LIEC) in 2013, a municipal corporation wholly-owned by the City of Richmond, to deliver district energy initiatives on behalf of the City. The City Centre District Energy Utility (CCDEU) expansion plan approved by Council in 2022, included construction of an energy centre in the Oval Village service area to provide service to LIEC customers utilizing low carbon sewer heat recovery energy.

Following on the success of the Alexandra district energy plant in the Alexandra Neighbourhood Park, the SHR plant will be the first permanent energy plant servicing the City Centre customers, delivering at least 70% of its energy demand primarily by recovering heat from the city's sewers via Metro Vancouver's Gilbert Trunk sewer utilizing sewage heat extraction and heat pump

technology. The SHR plant will replace existing temporary energy infrastructure utilizing natural gas, resulting in an annual reduction of approximately 9,750 tons of community greenhouse gas emissions at full build-out.

Analysis

The concept design stage was an iterative process that started in April 2024 and included numerous engagements with key City departments (Parks Services, Transportation, Policy Planning and Development) and the architecture and landscape architecture design team. The SHR plant's integration into the future park and adjacent urban neighbourhood prompted the architecture team to view the project from a wider lens creating a unique building typology when developing the design. The guiding principles for design development included:

- An inspirational design that signals the inception of the future park in the area, adapting elements from the Middle Arm Open Space Master Plan Concept adopted by Council in 2007;
- Resilience to climate change and future inland dike raising in line with the City's flood protection strategy;
- Integrate design features for the interim condition that can be later incorporated into the future park design;
- Promote attractive, flexible options for open spaces, public art, park programming and public amenities;
- Support access to the park for pedestrians and cyclists; and
- Enhance views towards the Fraser River and mountains.

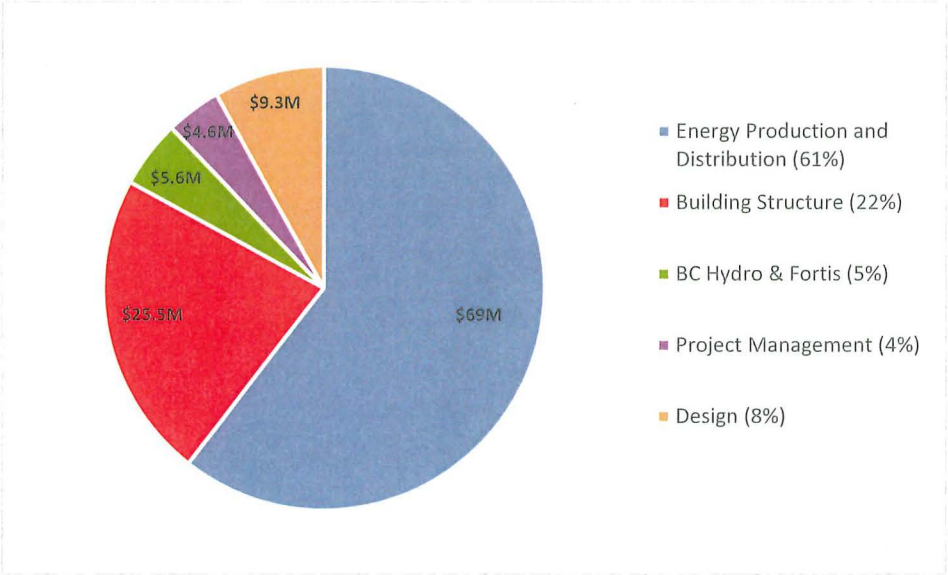
The concept design of the SHR plant is the culmination of the guiding principles noted above and the engagement workshops. Key elements of the design (Attachments 1 to 3) include:

- A contemporary, curvilinear building form that is conceived of as a landmark and a catalyst for the transformation of the surrounding mixed industrial/commercial area;
- Siting on the narrow eastern end of the future park to maximize open space and flexible programming opportunities on the park's central and western portions;
- Hybrid construction that utilizes concrete panels on the building's river side to allow for its partial burial (in coordination with future dike and park improvements), and a corrugated metal façade fronting River Parkway that speaks to the industrial heritage of the location;
- An accessible pathway that provides opportunities for public art murals and educational signage, connecting River Road and River Parkway along the building's west side;
- Signal a transition between the future park space and Urban Centre T5 (residential prohibited) land use areas to the north and east of the future park contemplated in the City Centre Area Plan (CCAP)
- A publicly-accessible green roof (accessed via the future park) that brings ecological and environmental benefits, and aligned with guidelines in the CCAP, provides a riverfront landmark view;
- Publicly-accessible washroom facilities that will eliminate need for additional structures serving this purpose in the future park;

An Advisory Design Panel (ADP) review of the proposed concept was held on October 3, 2024. The Panelists commended the project's refreshing building typology and the forethought put towards integrating the SHR plant in the future park, and noted that the building, in the interim condition, will enhance the neighbourhood and provide an effective transition between the existing industrial area and the future park with the several opportunities to integrate with and enhance the future park. The Panelists provided unanimous support to move forward with the proposed design. The comments of the ADP will be taken into consideration during the detailed design phase, which include exploring alternative material finishes for the overhead door and incorporating lighting into the building's exterior walls.

Based on the proposed concept design for the SHR plant, the estimated project cost is $114M. A cost breakdown is provided in Figure 1. As a part of the detailed design, LIEC staff will conduct further value engineering with aim to reduce project costs.

Figure 1: Cost Estimate Breakdown ($114 Million)



In summary, the SHR plant will enhance the future park and surrounding community through substantial reductions in greenhouse gas emissions, providing publicly accessible washrooms, elevated views of the river and mountains from the green roof, and opportunities to integrate into the future park elements and landform.

Should Council approve the concept design outlined in this report, LIEC staff will proceed with detailed design development, including consideration of ADP recommendations regarding the proposed facility's form and character. It is anticipated that minor adjustments to the drawings presented in Attachments 1 and 2 will be made as the detailed design proceeds to ensure the project remains on budget and meets operational and stakeholder needs. Facility construction is scheduled to commence in 2026, with site preparatory works scheduled to commence early Summer 2025 in order to facilitate the scheduled on-site facility construction activities. The plant is scheduled to be placed in-service late Fall 2028.

LIEC is a wholly-owned municipal corporation, whose projects are delivered outside of the City's funding sources and capital delivery program. However, considering the estimated project costs and to mirror the accountability and transparency of City capital delivery, the LIEC Board of Directors requests Council to consider referring this project to the Major Projects Oversight Committee.

Financial Impact

None. CCDEU projects are fully financed by Corix and the Canada Infrastructure Bank under the CCDEU Project Agreement. LIEC was awarded a $6.2 Million CleanBC Communities Fund grant towards the SHR plant and Metro Vancouver has authorized up to $20 Million in funding towards the project for the design and construction of the required sewage connection and conveyance infrastructure.

Conclusion

The proposed concept design of the SHR plant has been crafted through rigorous engagement and iteration to provide a climate-resilient, forward-looking design that integrates with the interim and future conditions of the area. Council approval of the recommended concept design is required in order to complete the concept development stage and proceed with the detailed design stage. The SHR plant will provide reliable, low-carbon heating services for the customers in the CCDEU service area.

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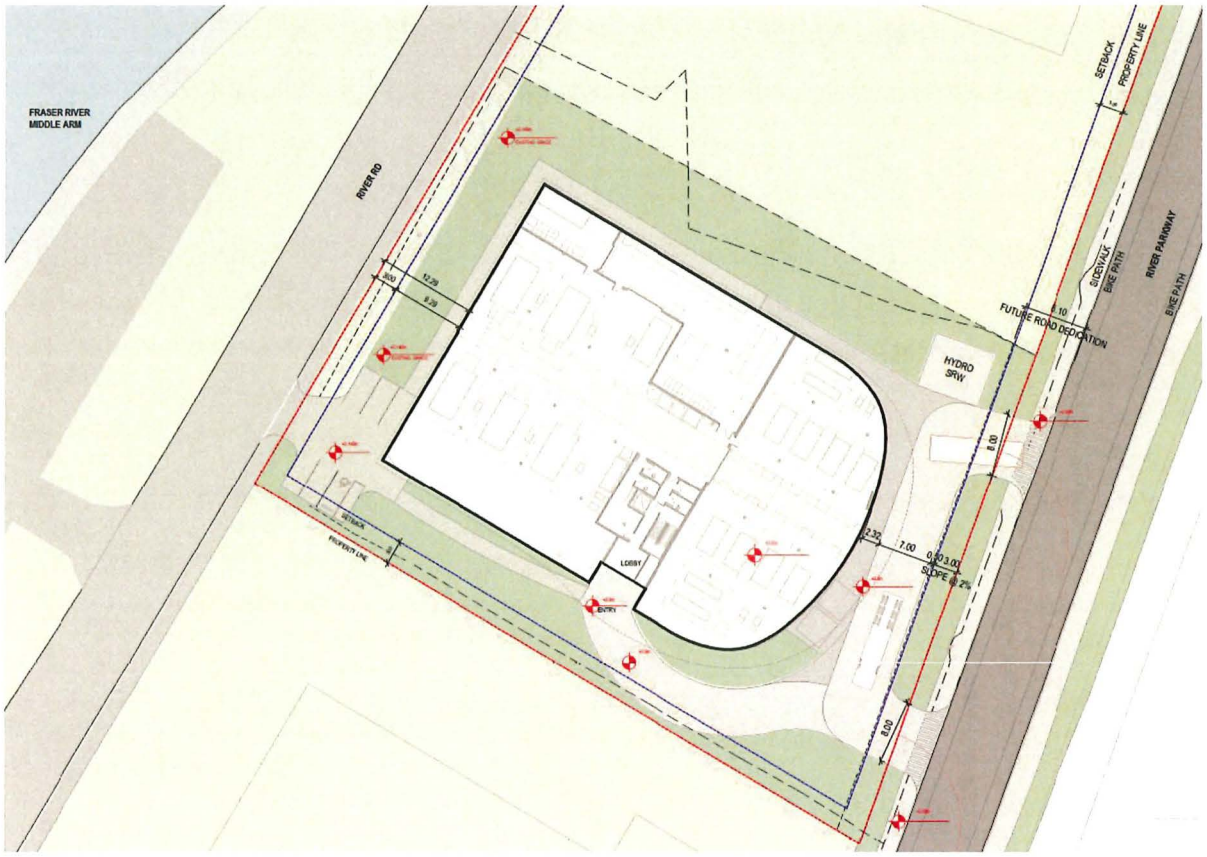
Att. 1: Sewer Heat Recovery Central Energy Plant – Site Plan
2: Sewer Heat Recovery Central Energy Plant – Renders (Interim)
3: Sewer Heat Recovery Central Energy Plant – Renders (Future Vision)

Attachment 1 – Sewer Heat Recovery Central Energy Plant – Site Plan

Figure 1: SHR Plant – Site Plan



Attachment 2 – Sewer Heat Recovery Central Energy Plant – Renders (Interim)

Figure 1: SHR Plant – Northwest Perspective (Interim Condition)

Figure 2: SHR Plant – North Perspective (Interim Condition)

Figure 3: SHR Plant – River Parkway Perspective (Interim Condition)

Attachment 3 – Sewer Heat Recovery Central Energy Plant – Renders (Future Vision)

Note: Future vision renders are intended for high level illustrative purpose to convey the scale of the SHR plant in the context of the future Lulu Island Park. Details of the park will be developed through the Lulu Island Park masterplan.

Figure 1: Future Vision – Northeast Aerial Perspective

Figure 2: Future Vision – SHR Plant Northwest Aerial Perspective

Figure 3: Future Vision – SHR Plant River Parkway Perspective

Figure 4: Future Vision – SHR Plant Park Pathway Perspective

Figure 5: Future Vision – Park User Perspective Facing Northwest