A rendering of Lonsdale Energy's sewer-heat recovery center, left. Once commissioned in late 2027, the two-story, 6,500-square-foot facility will include three high-temperature water-to-water centrifugal electric heat pumps, sewer intake-and-return tie-ins, district heating distribution pumps, staff space, an odor control system and an output capacity of at least 5 MW. North Vancouver is a city of about 58,000.

Small footprint, big impact

Lonsdale Energy takes a leap toward sustainability with a new sewer heat recovery energy center

By Joanna Linsangan

North Vancouver, British Columbia, encompasses just five square miles, roughly the size of Disneyland, and – like the Magic Kingdom – is a happy place.

Named Canada's most livable city in 2024 by The Globe and Mail, a national newspaper, North Vancouver offers an unparalleled blend of urban amenities and outdoor adventure. Residents can kayak in the morning, ski in the afternoon and unwind in vibrant public spaces by evening – all without leaving the North Shore of Burrard Inslet. This mix is what makes the city so special.

North Vancouver, population 58,000, is also committed to energy sustainability and innovation, and Lonsdale Energy, a municipally owned utility that has been operating the city's district energy system since 2003, plays a central part in that mission. One in four residents is connected to the utility's system, with projections targeting one in three by 2030.

The biggest challenge so far has been finding underutilized city-owned construction space.

To meet growing energy demand and help preserve the natural environment, the utility is building a sewer heat recovery energy center to reduce greenhouse gas emissions and help achieve the city's goal of becoming net zero by 2050.

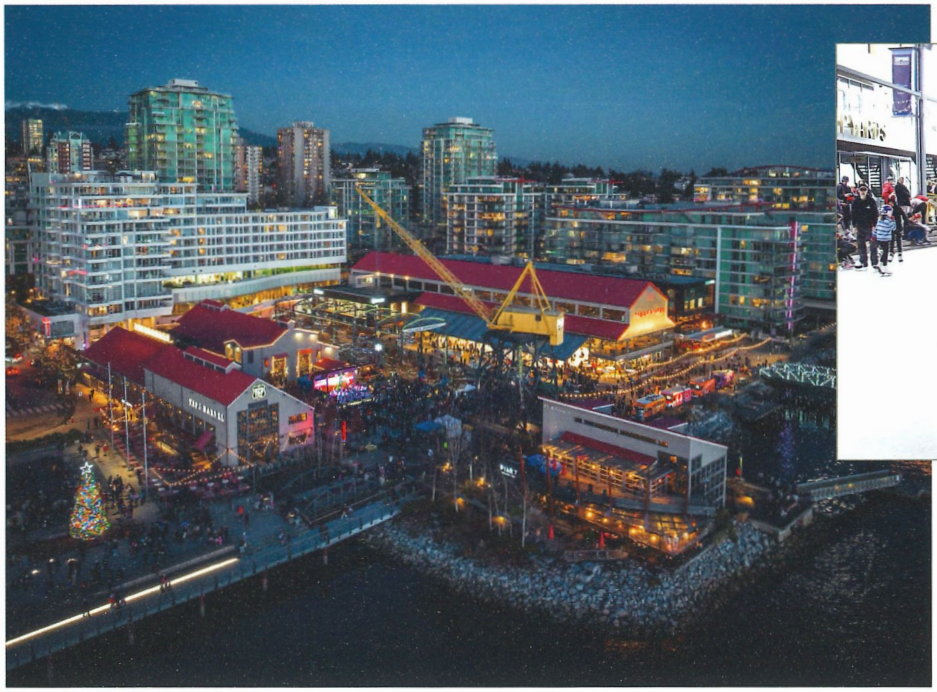
This project is a cornerstone of Lonsdale Energy's five-year business plan, which aims to supply 40% of its district energy from low-carbon technologies by 2027.

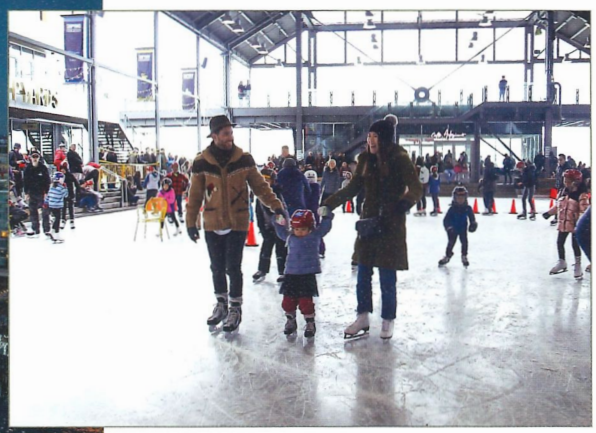
It is one of several recent examples of an emerging trend toward adoption of sewage-energy recovery initiatives that include ones in Colorado, New York and Vancouver, the largest city in British Columbia.

MAXIMIZING MAJOR POTENTIAL IN A MUNICIPAL SLIVER OF SPACE

The biggest challenge so far has been finding underutilized city-owned construction space within the already densely populated area.

The city was able to dedicate a tiny plot of land to the project that was previously used for storing construction





Lonsdale Energy's customer base includes the Shipyards District, a waterfront retail neighborhood with restaurants and entertainment attractions that include an ice skating rink from which the utility already harvests waste heat for redistribution to help heat nearby homes and businesses.
Lonsdale Energy

materials. The narrow, 700-square-metre lot – less than two-tenths of an acre – came with obvious physical constraints that posed challenges. Bordered by a creek, a major truck route and industrial buildings – and with an eagle's nest on the land – the site was ideal given its proximity to the local wastewater sewage trunk line, which will be the company's source to tap waste heat.

Once operational in late 2027, the facility will include sewage-handling and electrical equipment, space for staff and high-temperature water-to-water electric heat pumps with a collective heating capacity of at least 5 MW.

The plant's innovative approach to energy recovery also enhances broader efficiency. Heat pumps and sewer heat recovery at this location can deliver, for instance, more than three times more efficient energy than electric baseboard heaters.

STRIKING THE RIGHT BALANCE IN A STREAMSIDE, PARK-LIKE SETTING

Lonsdale Energy will use materials that enhance project durability while minimizing its environmental impact. Low-carbon concrete will support the primary mechanical spaces of the building on the ground and first floors.

To harmonize with the natural beauty of the city, wood will be incorporated in interior and exterior construction. A "curtain wall" design is being considered to allow natural daylight to illuminate a public view of inner workings, fostering a connection between the building and the community. Project design follows a layout to encourage public access with room to display educational information about Lonsdale Energy and district energy.

Situated beside Mosquito Creek, the site abuts a rich habitat for spawning salmon, eagles, herons, otters and beaver. The project aims to complement this habitat by preserving existing trees, planting new ones, restoring disturbed ground and removing invasive weeds from the surrounding area.

Restoration work will improve ecosystem functions, such as stabilizing soils to prevent erosion and providing shade to cool both stream and air temperatures. Additionally, the building's "green roof," seeded with wildflowers, will contribute to the city's pollinator meadows program, enhancing biodiversity and creating valuable habitat for bees, butterflies and hummingbirds.

Broader long-term intentions

The utility is developing a carbon neutrality road map to help achieve its ambitious goals along a timeline running from 2030 to 2050. This year, Lonsdale will add electric boilers to its generation portfolio with the intention of immediately reducing emissions by 1,300 metric tons and increasing low-carbon energy sales from 16% to 25% in 2025.

Specific carbon emission reduction targets:

- 2027 – 40% of energy sales supplied by low-carbon energy
- 2030 – 60% of energy sales supplied by low-carbon energy
- 2040 – 80% carbon emission reduction (from 2007 levels)
- 2050 – Net-zero operational carbon emissions

System snapshot: Lonsdale Energy

Reliability rate in 2023	99.9% uptime
Number of energy plants	8
Distribution network length	9.3 miles
Total heating energy capacity	40 MW
Total cooling energy capacity	1 MW
Energy sources	Natural gas, renewable natural gas, heat recovery, solar thermal heat, geo-exchange
Number of connected buildings	119
Total square footage served	9.3 million square feet
Piping type	Pre-insulated steel welded pipe
Piping diameter range	3 to 10 inches
System pressure	150 PSI
System temperatures	167/131 F
System water volume	238,000 gallons

Source: Lonsdale Energy

HELPING MAKE A COASTAL CITY MORE RESILIENT TO CLIMATE CHANGE

Natural gas accounts for 84% of Lonsdale's energy use today. Other sources include geo-exchange, heat recovered from an outdoor skating rink, solar energy from panels on top of the city library and renewable natural gas harvested from organic waste.

The utility's sewer heat recovery plant brings broad benefits:

- Emission reductions: The project will eliminate approximately 7,600 metric tons of CO_2 emissions annually, equivalent to removing 2,700 cars from the road.
- Resilience: By adding another renewable energy source to its district system, Lonsdale increases its ability to manage supply chain disruptions.
- Cost savings: Less reliance on natural gas will mitigate municipal exposure to rising carbon emission pricing, ensuring competitive rates for customers.
- Cleaner air: Residents will benefit healthwise as the utility aligns with city climate targets to avoid irreversible environmental damage.
- Less strain on the electrical grid: As in other jurisdictions, consumer demand for electricity is increasing in metropolitan Vancouver. Lonsdale's waste-heat project will help reduce pressure on local electrical grids by using a separate technology that also has a high coefficient of performance.

Lonsdale Energy's new sewer heat recovery plant is a transformative step toward achieving municipal climate goals. The project not only supports North Vancouver's ambitious environmental targets but sets a potential example for other small municipalities looking to adopt innovative renewable community energy technologies.

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