OAKRIDGE
VANCOUVER, BC

CREATIVENERGY

Innovation in energy design and sustainability

THE COMMUNITY

The Oakridge Centre Redevelopment is a joint project between Westbank and Quadreal Property Group. Originally constructed in 1959, Oakridge is a retail shopping centre situated on 28 acres of underutilized land at the intersection of Cambie and 41st, a highly central location and hub stop for the local LRT, the Skytrain.

The 5 million sq. ft. project will include 14 towers with 2,600 homes, nearly half a million sq. ft. of workspace for 3,000 creative economy workers, on million sq. ft. of retail space, a 10-acre city park, one of the city's largest community centres and daycares, a performing arts academy, a live music venue and numerous more informal performance spaces both within the shopping centre and within the park.

To meet the City of Vancouver's green building policy while allowing architectural freedom, Creative Energy has designed a low-carbon energy solution that meets both mandates.

A geo-exchange system will serve the entire development, reducing the greenhouse gas (GHG) emissions by approximately 68% (6,200 tonnes per year), and improve energy security in a manner that maximizes opportunities for its residents, businesses and institutions.

Creative Energy's innovative approach will locally produce reliable green energy with tangible environmental, economic and resiliency benefits for Vancouver for decades to come.

THE ENERGY SYSTEM

In 2015, Creative Energy's feasibility study identified Oakridge Centre as an ideal candidate for a local, low-carbon network. A further study was conducted in 2017 to ensure Oakridge Centre would be equipped with a flexible energy platform for growth, accommodating future technologies and preparing for future developments.

Creative Energy is developing one of the largest low-carbon district energy systems in Canada for the Oakridge redevelopment that will provide space heating, domestic water heating, and space cooling to meet needs of the entire development (as outlined in Table 1) with the potential to expand to neighbouring developments in the future.

From a discreet, centrally-located facility within the parkade of the development, the system generates energy using a closed-loop geo-exchange system, heat recovery, electric chillers, and a combination of electric and natural gas boilers for peaking.

SYSTEM DESIGN

Based on discussions with the City of Vancouver, a measurable metric of greenhouse gas emissions intensity (GHGI) is targeted for the development. The GHGI target has been set by the City is 5 kg of CO_2 emissions per square-metre of floor area, or a total 70 kg of CO_2 per MWh of thermal energy generated by the entire system. To achieve these targets, Creative Energy has designed an energy system tailored for Oakridge and the surrounding area. A closed loop geo-exchange field and waste-recovery system were chosen to accommodate Oakridge's high density population and convenient proximity to thermal energy.

The system will use a vertical closed-loop geo-exchange field comprised of hundreds of boreholes 150 to 300 metres deep. Based on the Oakridge energy demand estimates, the proposed facility and the associated vertical closed-loop geo-exchange system will meet or exceed the City of Vancouver's targets.

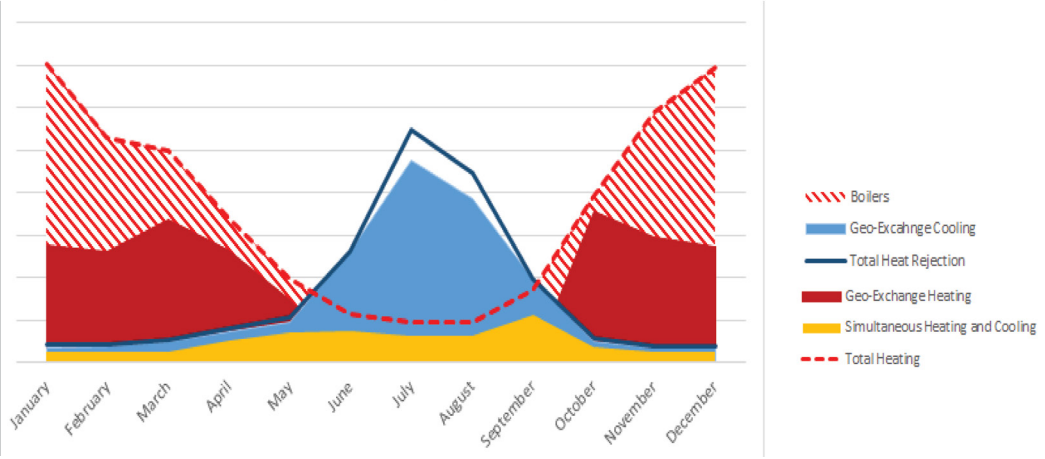

Table 1: *Annual load forecast estimate generated by Integral Group*

Our energy modeling estimates that approximately 15% of the annual heating energy will be satisfied by building heat recovery and over 50% will be delivered by our closed-loop geo-exchange system. The remaining 35% of the heating energy will be provided by a combination of electric boilers and high-efficiency condensing boilers.

Table 1 illustrates the annual energy generated by each component of the proposed Oakridge central plant, meeting the demand profile.

TECHNOLOGY SELECTION

The overall strategy for the Oakridge central plant to meet the GHGI target of 70 kg CO2 / MWh is to maximize heat recovery and heating energy supplied by the geo-exchange system. This requires the central plant to use specialized high-efficiency equipment that allows the transfer of energy (heating and cooling) to different parts of the facility.

The central plant uses heat recovery chillers and geo-exchange heat pumps to recover heating from simultaneous cooling and extract or reject heat from/ into the geo-exchange field. Additionally, high-efficiency boilers and cooling towers provide the short-term peak capacity and backup for the heat pumps.

The proposed plant equipment configuration is designed to be robust and highly flexible in redirecting differences between simultaneous heating and cooling loads to the appropriate end use or energy source or sink.

This plant configuration maximizes heat recovery between simultaneous heating and cooling and the optimal use of the geo-exchange field, the key feature in achieving significant GHG emission reductions. The geo-exchange and heat recovery are expected to produce over two-thirds of the thermal energy required for Oakridge.

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EXPANSION POTENTIAL

The area surrounding the Oakridge project has immense potential for both expansion and interconnectivity with other local energy systems.

Very near to the Oakridge Centre, the Oakridge Transit Centre redevelopment presents an opportunity to connect another customer to the Oakridge system.

While the Oakridge system is designed to meet the needs of the entire centre, there exists the ability to connect its DES with others in the area, pooling our energy footprint and expanding across the neighbourhood.

The twin sites of the BC Children's Hospital and BC Women's Hospital (~1km north of Oakridge) uses an existing steam plant and has a requirement to implement low carbon generation.

With other major nodes being developed between Oakridge and the hospital sites, there is tremendous opportunity to interconnect the two energy centres and establish a low-carbon, resilient energy network that advances the City of Vancouver's Greenest City goals.

50 YEARS CREATIVENERGY