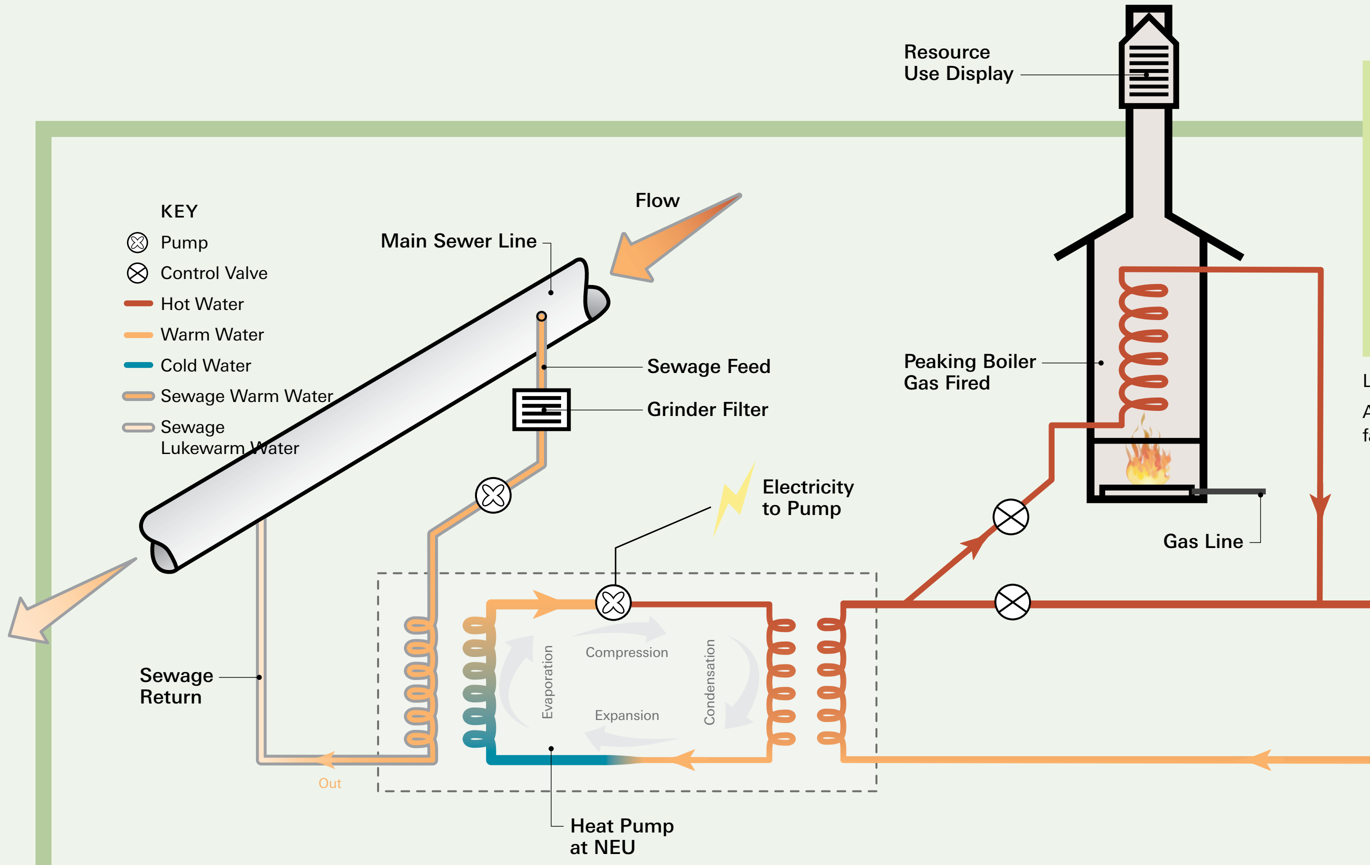
SEFC Taps into a Local, Renewable Heat Source

The SEFC NEU is a community energy system designed to use and distribute heat energy from a variety of renewable sources. In the first phase of development it will get the bulk of its energy from heat recovery from an existing municipal sewer line adjacent to the SEFC site. This means that heat is captured and used in close proximity to its source, rather than transferring it from an off-site sewage treatment plant, reducing the cost and inefficiencies of transmission over a distance. The NEU's localized sewer heat recovery system is the first application of this technology in North America and is ideal in a dense urban environment. "This type of sewage heat recovery system should be replicable and transferable to future urban district energy projects that will be developed in other areas," says Baber.



Left: Schematic of the Neighbourhood Energy Utility

Above: The NEU sewage heat pump photographed on the factory test stand at Trane's plant.

A distribution pipe system runs beneath the streets at SEFC, delivering thermal energy in the form of heated water from the Energy Centre to each of the buildings. Pipes are well insulated in order to reduce or eliminate energy loss through the distribution process.

How it Works

You cook a pot of pasta – and drain the boiling water down the sink. Water from hot showers, clothes washers and dishwashers join it – "waste" heat that represents a significant amount of available energy. But how does the warmth captured from the sewer become usable energy to heat a condominium at SEFC?

The answer lies in a heat exchange process integrated with a new municipal sewage pump station. Similar to a geo-exchange (or geothermal) system, heat pumps transfer thermal energy from the warm sewage supply to a higher temperature range that's effective for residential space heating and domestic hot water. While similar in concept, sewage heat recovery is more efficient and cost effective than typical geo-exchange systems. The heat source (raw sewage) has a higher temperature than ground-source heat (on average 18 degrees Celsius as opposed to 8), so it requires less energy to upgrade. Secondly, accessing the sewer line is less invasive and less capital cost intensive than drilling into the earth to access geothermal heat. It also utilizes a continuous supply of waste heat, closing the loop on a fundamental energy >> waste >> energy stream. According to the City of Vancouver, the sewage heat recovery will supply approximately 70% of the neighbourhood's annual heating and hot water energy demand, and will produce 50% less greenhouse gas emissions compared to conventional energy sources.

PROFILE

Chris Baber

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NEU Manager, City of Vancouver

As the City of Vancouver's NEU Manager, Chris Baber has played the lead role in implementing the Southeast False Creek Neighbourhood Energy Utility. His involvement has ranged from management of NEU infrastructure, business development and bylaw enactment to regulate energy services, to managing the utility once it is operational.

Baber and his team have overcome many challenges along the way throughout concept design, implementation and construction. Beyond the technical and schedule challenges, complexity was added through stakeholder engagement requirements and the implementation of a new municipal utility business model that needs to (through its customer rates) recover its costs associated with capital intensive renewable energy infrastructure while being cost competitive with traditional forms of heating.

Baber's job description changed considerably as the project moved from concept stage to implementation and operations. By assembling and managing a skilled team of City staff, consultants and contractors, the project's challenging objectives were achieved. Having worked hard to address the challenges, Baber says, "I am excited to get the plant up and running and build on this experience to see district energy expanded to serve other areas of this city."