

NEU Technology

An adaptable, renewable and innovative energy solution. BY CHRIS BABER

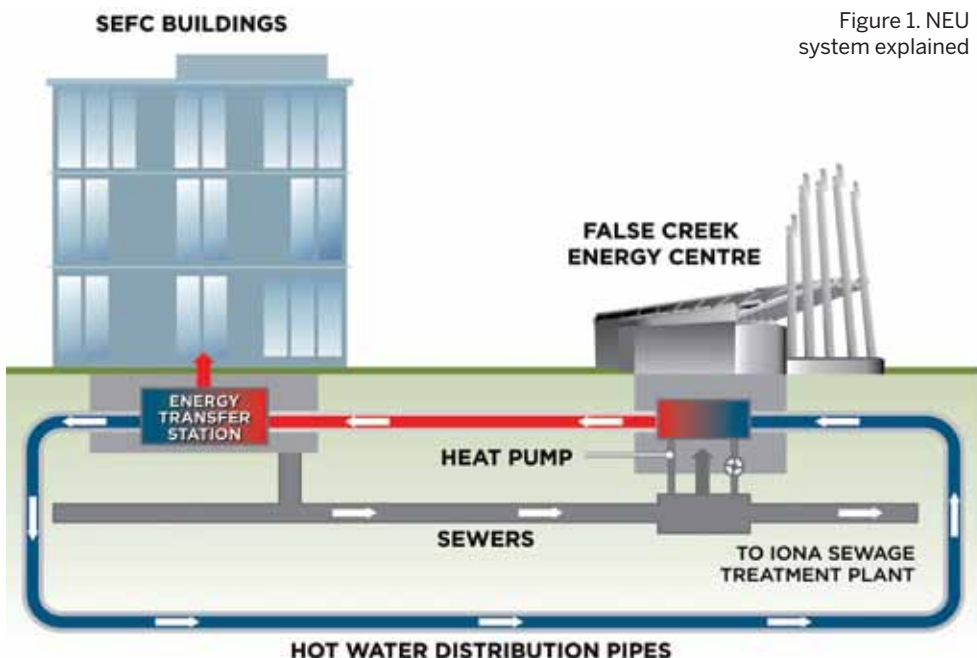


Figure 1. NEU system explained



pumped away to the sewage treatment plant outside of the municipal boundary.

During the Olympic Games period, this sewage heat recovery process supplied 70 per cent of the total thermal energy demand of the Athlete's Village, with efficient natural gas boilers making up the balance.

From the Energy Centre, a system of insulated underground pipes circulates hot water around the neighbourhood, distributing heat from the Energy Centre and from solar collectors atop of some buildings. Energy transfer stations in each building exchange energy with the circulating hot water, metering the building's energy production and consumption for billing.

From the energy transfer stations, space heat and domestic hot water is delivered to residents by each building's mechanical system. These systems are owned and managed by the property holders, and can include radiant floor/ceiling systems, baseboard heaters and forced-air systems.

The NEU can be readily adapted to a variety of renewable energy sources. This flexibility lets the system keep pace with advances in technology, future-proofing customer buildings and ensuring long-term energy security and affordability.

MOVING FORWARD

Building on the success of the NEU, Vancouver is committed to expanding renewable energy systems across the city. A new partnership with BC Hydro will drive a number of sustainable initiatives: identifying redevelopment areas with high potential for neighbourhood energy systems, and working directly with large greenhouse gas emitters on opportunities to switch to low-carbon heat sources. **CB**

Chris Baber, P.Eng. served as project manager for development of the NEU on behalf of the City of Vancouver. Beyond the day to day management of the new utility service, Chris is active in the development of new district energy opportunities elsewhere in the city. Chris graduated from the Civil Engineering, Environmental Option from UBC in 1998 and is a practicing professional engineer. Contact him at chris.baber@vancouver.ca.

The Neighbourhood Energy Utility (NEU) provides heat and hot water to the new Southeast False Creek (SEFC) community, including the Olympic Village. As the City of Vancouver's first renewable-energy based district heating system, it launches a program to reduce greenhouse gas emissions by replacing fossil fuels with greener energy sources. When development in the SEFC area is completed (around 2020), the NEU will provide thermal energy services to more than six million square feet of buildings and 16,000 residents.

In Vancouver, 54 per cent of greenhouse gas emissions come from buildings. To reduce these emissions, the city plans to make all new buildings in Vancouver carbon neutral by 2020. This will require both aggressive energy efficiency measures and greater reliance on renewable energy, especially for heating.

The green technology used by the NEU is truly innovative — it's the first utility in North America to source waste heat recovered from untreated urban waste water. Solar thermal collectors on the roofs of buildings in the Olympic Village will also supply energy to the NEU.

NEU Benefits

Environmental: The NEU reduces greenhouse gas emissions by more than 50 per cent compared to conventional energy sources; sewage heat recovery supplies more than 70 per cent of the annual energy demand.

Social: The use of renewable energy in a system adaptable to future clean energy technologies stabilizes energy costs for customers, compared to more volatile fossil fuel prices.

Economic: The NEU is a self-funded utility that provides a return on investment to taxpayers. For developers, its centralized economies of scale make it a more cost-effective way to meet renewable energy targets than stand-alone mechanical systems in individual buildings.

How the NEU Works

The NEU consists of three key components:

- 1) the False Creek Energy Centre that supplies thermal energy in the form of heated water
- 2) an insulated hot water distribution pipe system that distributes thermal energy to SEFC buildings and
- 3) heat exchangers and meters that transfer thermal energy from the distribution pipe system to customer buildings for space heating and domestic hot water supply.

The False Creek Energy Centre, integrated with a municipal sewage pumping station, recovers heat from untreated urban wastewater, a renewable energy source. Sewage that flows into the pump station is diverted to a traveling screen filter that removes solids from sewage, prior to the raw sewage being sent to the heat pump. Similar to a geothermal application, heat pumps are used to transfer the heat energy from the sewage to the NEU's hot water distribution system. Heat pumps use a refrigerant evaporation-compression cycle to transfer heat from a low grade source (sewage) to higher grade source (hot water). After heat is recovered from the sewage, the sewage is recombined with the filtered solids and