NEW GLASGOW DHS DESIGN CONSIDERATIONS

The energy centre burns fuel to produce hot water, which is delivered to substations using the transmission network. Heat is then transferred to the distribution piping system using water-water heat exchangers. The distribution piping delivers the hot water to connected buildings and returns the cooled water back to the substations through the distribution piping network. At a customer building, the Heat Transfer Unit (HTU) ensures that sufficient heat is delivered to the building's space heating and domestic hot water systems, while measuring the amount of heat consumed.

Beyond technical performance, the DHS design was strongly influenced by several key aims:

Community-Wide Network – The DHS is intended to serve the entire community of New Glasgow, beginning with the highest density areas and most of the largest buildings followed by expansion, over time and in phases, throughout the residential areas. The goal was to ensure all residents and business in New Glasgow benefit from the infrastructure development and operation.

Low Cost of Heat – The energy centre is designed to supply heat at a low cost by selecting boilers that can use low-cost, low-quality fuels, for units with a high capacity factor[1] as well as reserve plants that can be installed with low capital cost. The levelized cost of heat from the heat-only reserve plants, with a low capacity factor, is impacted more by capital cost than fuel cost. In addition, the temperature of the heat network was chosen to reflect the existing in-building heat distribution systems in New Glasgow, minimizing costs for retrofit. The goal is to provide heat to the residents of New Glasgow with low-cost heating over the long term.

Resiliency – Recognising that heat delivery to homes and businesses is an essential service, the DHS has been designed with N+1 redundancy, meaning peak heat demand can be met if any one of the heat plants is unavailable.

Economic Development – The primary fuel considered for the New Glasgow is biomass because it is the lowest cost fuel available in the region but also because its use supports broader regional economic development. Establishing a market for low-quality wood aids local woodland owners and primary forest products (e.g., lumber) producers.

Greenhouse Gas Reductions – A primary goal of the DHS is to eliminate most greenhouse gas (GHG) emissions from the building sector in New Glasgow. Selection of sustainable biomass with strict procurement criteria as the primary energy source reflects this goal.

Air Quality – By centralizing heat generation and selecting high-efficiency boilers with post-combustion flue gas treatment, the air quality in New Glasgow can be significantly improved. The energy centre is designed to ensure air pollutant release is a large reduction from business-as-usual for building heat in the town.

Electricity Generation – The scale of the New Glasgow DHS is sufficient to justify the installation of one or more combined heat and power plants (CHPs) that can generate electricity as a higher-value by-product while supplying heat for the heat network. Revenue from electricity sales reduces the net cost of heat for network customers. Co-generation of heat and power in a single facility is a more efficient process than generating each separately, as is now the case in Nova Scotia. In addition, Nova Scotia is facing a large electricity supply shortfall and rapidly increasing prices which makes co-generated renewable electricity a valuable contributor to decarbonization of the broader province.

[1] Capacity factor is the actual energy production (use) of the plant relative to its capacity