

## Factor Four

REDUCING ENERGY AND MATERIALS USE FOUR-FOLD

### BACKGROUND

BCIT is discussing the possibility of expanding the existing district energy system to provide space heating to two buildings in the Factor Four. As part of the expansion, a biomass system has been proposed to augment/offset natural gas used by the boilers that provide heat to the existing district energy loop. The project is at the business case stage and has the support of a number of departments.

Note: some of the facts contained in this case study are different from the real project. The changes were made to simplify the exercise.

### SCOPE

Evaluate the following two options and provide a recommendation to the Board:

1. Business as usual (continue to operate as currently); and
2. Extend district energy loop to Factor Four and install/operate biomass system.

### ADDITIONAL INFORMATION

- Natural gas at Fortis BC Rate 5
- As a Public Sector Organisation, BCIT is required to operate with carbon neutrality
- Discount rate = 6%
- Life cycle of both scenarios = 20 years
- Labour escalation rate (in-house and consultant) = 2.5%
- Inflation rate = 2%
- Natural gas escalation rate = 2.5% per year

#### Existing System (Business as Usual):

- A district energy loop provides hot water for space heating to several campus buildings. Natural gas-fired boilers provide heat to the loop.
- The two subject buildings in the Factor Four are currently outside the district energy loop. Their space heat is currently provided by one natural gas-fired hydronic system in each building. Together, they consume 2,400 GJ natural gas annually.

#### Biomass System:

- Biomass system can be connected to existing loop.
- Joinery and Carpentry generate 265,000 kg per year wood waste (40 cubic yard bin each week) and dust 4 cubic yard bin each day.
- Thermal content in wood waste and dust streams estimated to be 4,500 GJ/year.
- Current hauling and disposal costs are haul away \$12,000 per year.
- All waste is currently being landfilled at Vancouver Landfill in Delta.
- The system will include a 20-metre stack to meet regional air quality requirements.
- Costs to design, permit, install, and commission the system will be \$450,000

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**Factor Four Goal:**

- Target four to ten-fold reductions in energy and materials consumption for the Factor Four.

**Factor Four Vision:** “to demonstrate the wisest energy and GHG management in BC on our campuses. Student, staff, and faculty groups will design, share and implement creative and innovative ways to eliminate waste and use energy efficiently. We will use only the energy we really need, in the most efficient way possible, to deliver excellent services.”

**Support/Stakeholders:** BCIT’s Campus Planning, Safety and Security, and facilities departments have each endorsed the proposal for a biomass system. Other programs and BCIT will also benefit.

