March 1, 2022

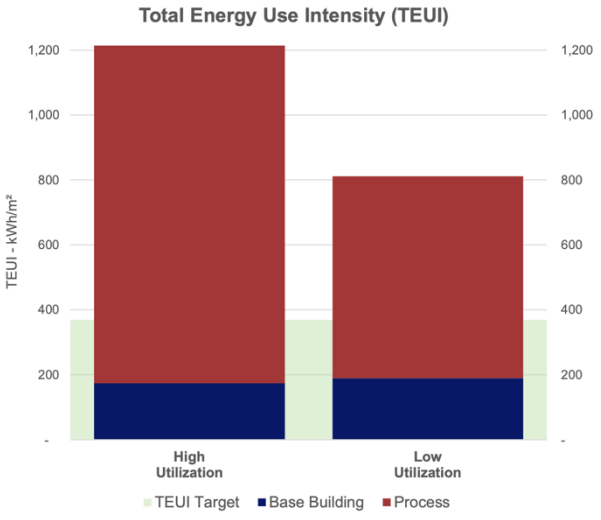
SUSTAINABILITY SUMMARY
UBC – Food and Beverage Innovation Centre

Energy and Emissions

- Energy use intensity
  - The design brief has a stated EUI target goal of 370kWh/m2/year. In discussions with UBC Sustainability, it was noted that the target was not developed while considering the program-specific equipment for FBIC. Preliminary modelling shows the EUI to be significantly higher, with loads 810-1214 kWh/m2/year (low and high utilization scenarios). To better understand the energy demands of the building, the loads are broken down into the following categories:
    - Process Loads: 621 -1040 kWh/m2/year (low and high)
    - Base Building Loads: 189 – 173 kWh/m2/year (low and high)
  - In FBIC's Sustainability Workshop #2, it was acknowledged that the specific project loads were significantly higher than anticipated and that a more appropriate target would need to be determined for this project.
  - While the process loads of the building are high, the base building loads are well within the target EUI.
  - FBIC's total EUI will be considered as two separate measures, process loads and Base Building loads. This is to ensure the design team continues to push the energy efficiency of the base building, where the design team has agency to reduce overall energy consumption.

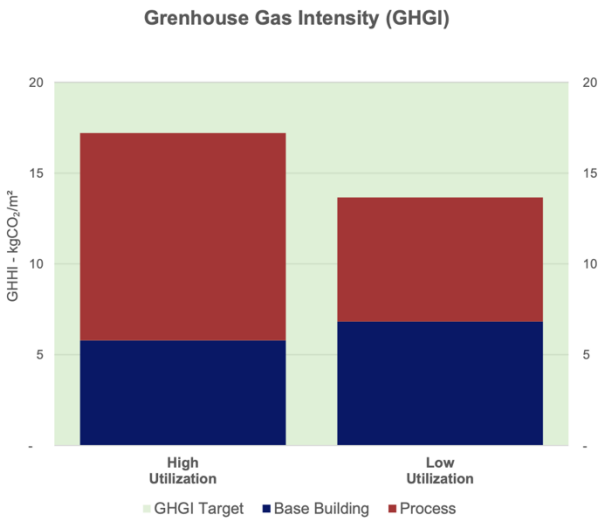
Target TEUI 370 kWh/m²	High Utilization	Low Utilization
Base Building	**kwh/m²**	**kwh/m²**
Heating - UBC DES	76.3	94.9
Heating – ASHP	17.8	22.9
Cooling – ASHP	13.5	11.4
Ventilation Fans	31.4	25.9
DHW - UBC DES	6.8	6.8
Pumps	2.8	2.6
Receptacles	9.0	9.0
Lighting	16.0	16.0
Process Loads	**kwh/m²**	**kwh/m²**
Cooling	15.0	15.0
Refrigeration	102.9	102.9
Process Equipment	886.0	496.5
Steam Generation	36.7	6.9

Total	**1,214.2**	**810.8**
Base Building	173.6	189.5
Process Loads	1040.6	621.2



- Greenhouse Gas Intensity.
    - The Design Brief has stated a Greenhouse gas intensity target (GHGI) (GHGI) 20 KgCO2e/m2. While the overall energy consumption of the FBIC is significant, the GHGI is within the original design brief target. The design team has focused on electrification as the primary method of GHG reduction, with support from the DES to decrease loads where most effective.

Target GHGI 20 $kgCO_2/m^2$	High Utilization	Low Utilization
Base Building	**$kgCO_2/m^2$**	**$kgCO_2/m^2$**
Heating - UBC DES	4.4	5.5
Heating – ASHP	0.2	0.3
Cooling – ASHP	0.1	0.1
Ventilation Fans	0.3	0.3
DHW - UBC DES	0.9	0.9
Pumps	0.0	0.0
Receptacles	0.1	0.1
Lighting	0.2	0.2
Process Loads	**$kgCO_2/m^2$**	**$kgCO_2/m^2$**
Cooling	0.2	0.2
Refrigeration	1.1	1.1
Process Equipment	9.7	5.5
Steam Generation	0.4	0.1
Total	**17.2**	**13.7**
Base Building	5.8	6.8
Process Loads	11.4	6.8



- District Energy System
    - FBIC will be connected to the academic district energy system.
- Other Energy-Efficient Features
    - Due to the large process loads and ventilation, the mechanical design becomes the focus of energy efficiency
        - Air-Side Heat Recovery
        - UBC District Energy System
            - Low Carbon Generation
            - Continued decarbonization
        - Air-source Heat Pump
            - Offset demand on UBC DES system during times cooling is not required

Water

- Rainwater Management
    - The site falls within the area of campus that allows for rainwater infiltration; however, the small footprint of the site may be challenging.
    - The removal of the sidewalk on the south side of Hospital Lane, along with the street works needed for this project, may provide an opportunity for adequate infiltration strategies.
    - The project will intend to meet the requirements for one credit under LEEDv4 Rainwater Management.
- Indoor Potable Water Consumption

- Drought tolerant planting is being used within the landscape strategy of the project, consistent with the larger work on the Central Connector.
- The potable water usage for fixtures within the project is low due to the low occupant count; however, water-efficient fixtures are specified.
- The team is currently exploring options for metering large pieces of equipment to reduce process water loads.

Materials and Resources

- Life Cycle Assessment
  - The project has prioritized light-framed wood structure for the overall material efficiency and inherent low embodied carbon characteristics.
  - The proposed primary building exterior is corrugated metal siding with exceptional durability and is 100% recyclable at the end of life.
  - The project specification will request Environmental Product Declarations on significant building components and known sensitive product categories.
- Zero Waste Ready
  - A robust recycling and organics program is inherent with the main programmatic use and has been factored into the base building design with significant area provided within the building.
- Bird-Friendly Design
  - Bird-Friendly glass frit has been included in the primary material specification for the project.

Climate Adaptation

- The proposed design is based on the predicted climate in 2050.
- At its core, the proposed building is designed for flexibility. The building is designed to accommodate to allow for the replacement of equipment within the building as technology changes and also to accommodate changes to the base building systems in the future.
- Indoor air quality is currently addressed through the filtration system designed for the building.
  - MERV 8 filters are proposed for the Exhaust Air systems with heat recovery and the Supply Air Systems pre-filter.
  - MERV 13 filters are proposed for the Supply Air Systems Final Filters.
  - If desired, space for Carbon filters could be added to allow UBC to add Carbon filtration for periods of extreme smoke. Our design team will wait for input from UBC.

Biodiversity

- The overall landscape design intends to provide spaces for moments of learning and education. The East and West corners provide hardscape areas that allow for the observation of the processes in the laboratories of FBIC, while the landscape on the north side of the building provides a natural aesthetic with native PNW planting with indigenous values.
- The north landscape planting area is designed with a diverse collection of native plant species following an aesthetic that highlights and honours the traditional forest understory landscape of the Pacific Northwest. This shady space within the landscape is intended to support a variety of species and demonstrate pocket ecosystems that can connect with the broader campus plant palette context in the future.
- The composition of landscape elements intends to contrast wild spaces and urban features that reconcile the highly built environment with its natural history and traditions, creating a landscape as a testimony of the culture and occupation of the land.