

Commercial Wood Design

McFarland Marceau Architects Ltd.

Bioenergy Research and Demonstration Facility, Vancouver, BC



Strength, beauty, versatility and cost-effectiveness are all beautifully showcased in this innovative wood building. The spans are extraordinary and the arches demonstrate innovation. The jury noted the fact that this is a building designed to produce energy with wood and is built out of wood is unique and interesting.

High resolution images available. Please e-mail mmclaughlin@wood-works.ca

The Bioenergy Research and Demonstration Facility (BRDF) is a 1,950 sq.m heavy timber-framed cogeneration project on the UBC Vancouver campus. In collaboration with Nexterra and General Electric, UBC commissioned this combined heat and power (CHP) plant to supply the campus grid with clean, renewable heat and power through biomass gasification. The CHP plant will produce two megawatts of electricity (enough to power 1,500 homes) and 8 per cent of the UBC base steam power load by using syngas extracted from wood chips and municipal wood trimmings. UBC greenhouse gas emissions will be reduced by 4,500 tonnes annually with 12 per cent of the campus natural gas heating demand displaced. The BRDF is the first cogeneration plant of its kind in North America that produces heat and power for a university campus. Funding partners included NRCan, the Province of BC, FP Innovations, BC Bioenergy Network and Sustainable Development Technologies Canada.

LIVING LAB DEMONSTRATION: WOOD INNOVATION AND POWER COGENERATION: UBC implemented the University Sustainability Initiative (USI) in 2010 and mandated that the BRDF become a demonstration facility to showcase not only energy cogeneration by gasification, but also cross-laminated timber (CLT) construction as part of the USI initiatives "Campus As A Living Lab" and "University As An Agent Of Change". UBC collaborated with FP Innovations who expedited CLT testing and authored North American standards for CLT construction, allowing the BRDF to become one of the first institutional scale buildings in North America to be constructed with CLT panel technology.

DESIGN CONCEPT: The design of the building results from the integration of functional needs, sustainable systems and educational objectives. The building is composed of two main areas: the plant area – a large volume containing the gasification equipment, and a public area – a two-storey lower volume containing viewing and research lab facilities. Taking the form of a wedge rising from east to west, the building is designed to accommodate varying sizes of process equipment while controlling its inevitable impressive scale.

Generous interior and exterior glazing convey the demonstration nature of the project, with views into the floor plant and its innovative wood structure. Outside, a wooden boardwalk stretches the length of the south elevation, affording shaded views from the wooded landscape into the plant floor. Inside, the upper floor includes public viewing areas flooded with daylight filtered by the trees outside.

The demonstration research laboratory allows learning opportunities for students, staff, industrial and community partners, with direct access into the plant machinery hall from the upper viewing areas via an elevated catwalk system serving both operational and demonstration purposes. Considerable efforts were deployed to preserve the beautiful grove of mature trees located immediately south of the plant. Such proximity brings an added dimension, metaphorically, to a building constructed out of wood and devoted to the production of power and heat from wood waste.