BUILDER INSIGHT

BC HOUSING

Vancouver House in Vienna

Vancouver House is the sister project to Vienna House in Vancouver, two projects that demonstrate sustainability and innovation in construction. The collaboration provides a unique opportunity to share knowledge and best practices in housing design.

The design for Vancouver House was selected through a developers' competition in 2019 which focused on the issues of timber construction and energy efficiency to address issues surrounding both the housing crisis and the climate crisis. It embodies the Viennese four pillar model of subsidized housing.

Social Sustainability	Architecture	Economy	Ecology
sustainability for daily use	quality of urban structure	costs for the land plot	climate-friendly and resource-saving construction
affordability by efficient planning	quality of building structure	costs for building	healthy and environmental-friendly construction
living in the community	quality of flats and floorplans	costs for tenants and contract conditions	quality of green and public spaces
living for changing needs	quality of design	price-quality ratio, maintenance costs	diverse quality of green and public space

Table 1. Viennese four pillar model of subsidized housing. (source: City of Vienna)

Figure 1. Rendering of Vancouver House (source: Rüdiger Lainer + Partner)

FACTS AND FIGURES

Construction timeline: April 2024 –January 2026

Residential Units: 107 + kindergarten

Site Area: 4,713 m^2

Total Gross Floor Area: 10.432 m^2 (above the adjacent terrain)

Net Floor Area: 7.305 m^2 (leasable space)

Building Height: 16.24 m (12 m on average)

Volume of Mass Timber: 1.137 m^3 of CLT + 126m^3 of GLT + 256m^3 of solid timber

Annualized Whole Life Carbon Emissions: 7.8 kgCO2e/m^2/year

Total Energy Use Intensity: 30.1 kWh/m^2/year

PROJECT TEAM

Owner: Frieden Gemeinnützige Bau- und Siedlungsgenossenschaft

Land: Frieden Gemeinnützige Bau- und Siedlungsgenossenschaft

Architect: Rüdiger Lainer + Partner Architekten ZT GmbH

General Contractor: PORR Bau GmbH

Design BIM Consultant: Plandata GmbH

Structural Engineering: RWT Plus ZT GmbH

Mechanical and Electrical: RWT Plus ZT GmbH

Fire Suppression: Kunz + iFSS

Energy Modeling: RWT Plus ZT GmbH

Embodied Carbon Modeling: RWT Plus ZT GmbH

Civil: RWT Plus ZT GmbH

Landscape: zwoPK Landschaftsarchitektur

Building Code: Rüdiger Lainer + Partner Architekten ZT GmbH

Building Envelope: Rüdiger Lainer + Partner Architekten ZT GmbH

Acoustical: RWT Plus ZT GmbH

Elevator: Rüdiger Lainer + Partner Architekten ZT GmbH

Project Management: Rüdiger Lainer + Partner Architekten ZT GmbH

Research Management: Rüdiger Lainer + Partner Architekten ZT GmbH

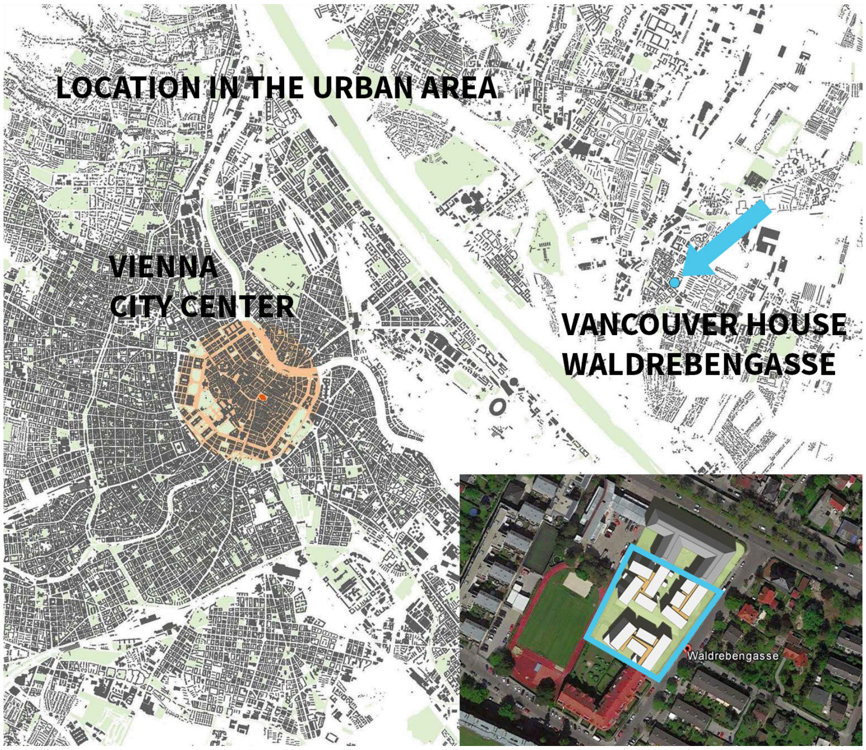

Figure 2. Location of Vancouver House, 3 Waldrebengasse (source: Rüdiger Lainer + Partner)

Vancouver House in Vienna

In Vienna, the Vancouver House project on Waldrebengasse uses an innovative construction system for 108 units and a kindergarten (shown in purple in the floorplans in Figures 3-6) in three buildings. The units are designed for

- regular apartments (red)
- smaller and less expensive apartments (pink)
- single parents (yellow)
- assisted living (light and dark orange)
- “housing first” residents (green)

The building is designed to be reconfigurable to change the unit mix if community needs change over time. There is one apartment for a dedicated childcare worker (bright yellow). “Housing first” units are intended for those who were previously homeless, including single mothers with small children. Assisted living units are intended for those with mental and physical challenges who can live on their own with some assistance . These units are located in one building and are accompanied by units for caregivers. At least one caregiver is available 24 hours a day.

Figure 3. Fourth floor (source: Rüdiger Lainer + Partner)

Figure 4. Second and third floor (source: Rüdiger Lainer + Partner)

Figure 5. First floor (source: Rüdiger Lainer + Partner)

Figure 6. Ground floor (source: Rüdiger Lainer + Partner)

Figure 7. Vancouver House, Waldrebengasse, Vienna, Austria December 1, 2025 (source: Scius Advisory)

Figure 8. Vancouver House and surrounding neighbourhood December 1, 2025 (source: Scius Advisory)

The four storey buildings have large balconies and sit comfortably in the surrounding environment. Vancouver House is close to shopping and transit in a quiet residential neighbourhood. To the north, an athletic field owned by the local fire department provides additional daylight and visibility, which also benefits the kindergarten's playground on that edge of the property. The design allows daylight to reach all of the units.

Figure 9. Children's playground with athletic field to the north. (source: Scius Advisory)

Figure 10. Inner courtyard. (source: Scius Advisory)

Figure 11. Initial sample layout (source: Rüdiger Lainer + Partner)

Typological Diversity

The units are designed with Typological Diversity, meaning their use can be changed over time. The interior walls can be relocated in the future if the unit mix needs to be revised. This approach means that smaller apartments could be reconfigured into a larger unit without having to reroute services, and vice versa. Service connections for potential new units are provided along the core. In Figures 11-13, service connections and support columns are shown in red. The interior walls are shown in their default position in Figure 11. They can be moved to create smaller apartments with larger shared living spaces, communal kitchens and home office space as shown in Figure 12. They can also be reconfigured into office spaces with open plans and meeting rooms as shown in Figure 13. It is typical for buildings in Vienna to be designed to last 200 years, making a change of use likely over their lifespan.

Figure 12. Smaller apartments with larger shared living spaces, communal kitchens and home office.
(source: Rüdiger Lainer + Partner)

Figure 13. Office spaces
(source: Rüdiger Lainer + Partner)

Open Building System (OBSYS)

In the original Open Building System (OBSYS) design, Cross Laminated Timber (CLT) exterior walls and a concrete core supported a clear span of 7.5 meters with a timber concrete composite floor. Heating and cooling are provided by a radiant floor system connected to groundwater wells. Heat pumps provide warm water and solar PV on some of the rooftops provides energy to run the systems. Services are distributed horizontally along the core wall (Figure 15), with additional electrical services in the floor.

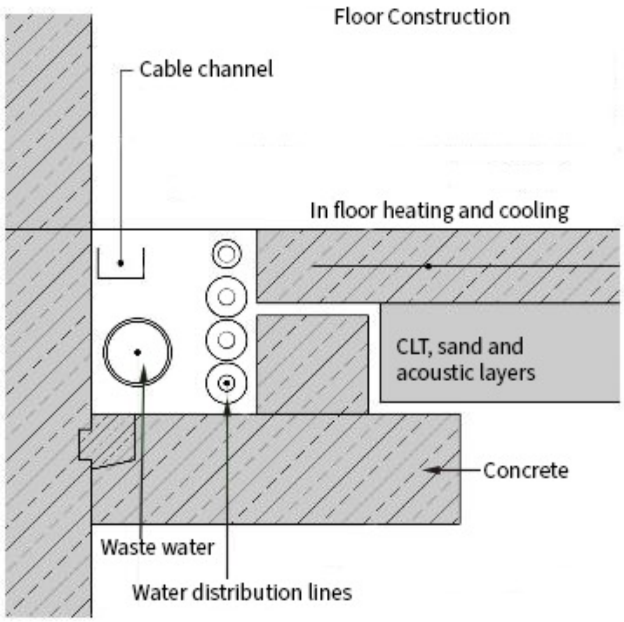

Figure 15. Service channel for OBSYS. (source: translated from Rüdiger Lainer + Partner)

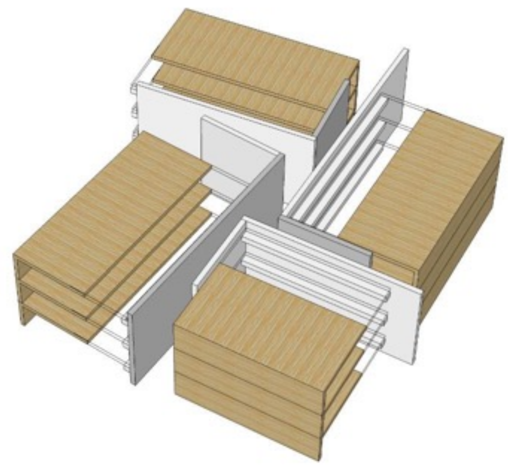

Figure 15. CLT walls and floors connect directly to the concrete core in the original design. (source: Rüdiger Lainer + Partner)

Value Engineering

Supply chain and labour challenges were encountered in the early 2020's that greatly increased costs and resulted in a value engineering phase and redesign. The completed building design replaced the exterior CLT walls with prefabricated light wood frame and changed the floor to a 22 cm CLT panel. An additional load axis comprised of spruce glulam columns and beams was added, reducing the span to 4.5 or 5 metres. While this adds the column features into the living spaces, the unit flexibility and Typological Diversity remain. The balconies are also no longer a cantilever design and the parkade on the ground floor has additional reinforced concrete to carry the load.

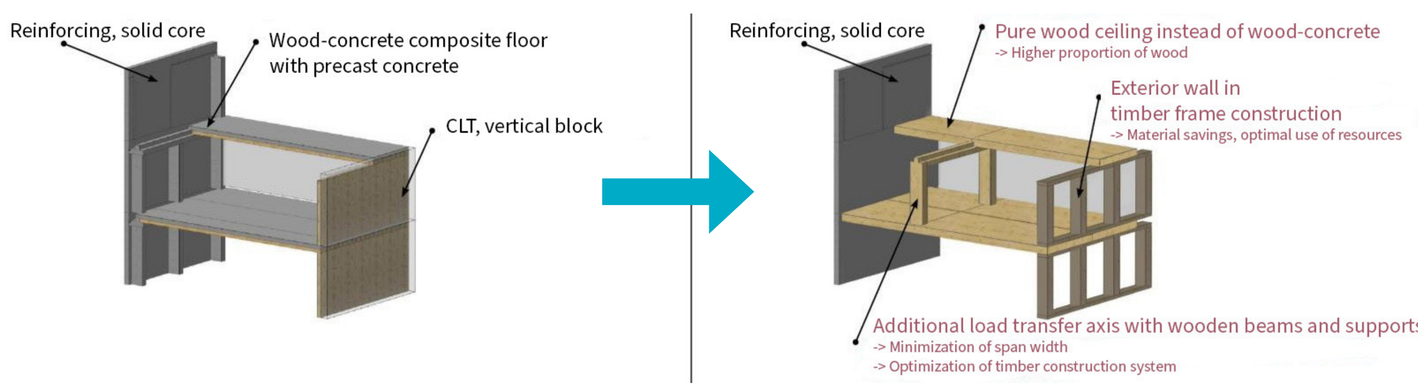

Figure 16. Redesign resulting from Value Engineering. (source: Rüdiger Lainer + Partner)

In the 2019 competition, the units were priced at a 60 €/m² initial financial contribution plus a 7.5 €/m² monthly rental fee, including operating costs and Value Added Tax (VAT). Despite the increase in costs, savings from the redesign allowed the developer to limit the price increase for the units to a 60 €/m² initial financial contribution plus an 8.49 €/m² monthly rental fee. For example, a two-bedroom unit measuring 65 m² rents for 550 € a month, including tax and water. Electricity and heat are an additional fee. This rate is quite low for similar sized units in this area. There have been ten times as many applications as there are units available.

Figure 17. Interior of Vancouver House before the unit partitions were installed. (source: Rüdiger Lainer + Partner)

Figure 18. Interior of a 2 bedroom unit at Vancouver House. (source: Rüdiger Lainer + Partner)

Figure 19. Living room of a 2 bedroom unit at Vancouver House. (source: Scius Advisory)

Figure 20. Entryway of a 2 bedroom unit at Vancouver House. (source: Scius Advisory)

Prefabricated Exterior Wall Panels

The cladding is a "baked" spruce, modified for cost savings from the original choice of larch. The prefabricated light wood frame exterior wall panels were delivered to site complete with cladding and windows and each floor level was watertight after the installation. This allowed interior work for the floors to begin immediately. The structure was assembled from December 2024 to March 2025.

Figure 21. Exterior wall panels loaded onto a truck for delivery to Vancouver House. (source: Rüdiger Lainer + Partner)

CLT Ceilings

The CLT ceilings are covered on top by a moisture barrier film, followed by an 11 cm layer of large grain sand mixed with rubber and then an acoustic mat. A 6.5 cm layer of concrete sits above that, containing the radiant floor tubing. This is then covered with the wooden flooring.

Figure 22. A layer of large grain sand mixed with rubber placed above the CLT. (source: Rüdiger Lainer + Partner)

Glulam Columns

The glulam columns are stacked from floor to floor. Where the CLT floors meet the glulam columns, the CLT is cut around the base of the column. This eliminates issues of compression of the CLT due to the weight of the floors above. The glulam and CLT system has a 90-minute fire rating. The CLT ceiling is exposed in all of the rooms, including the bathroom. This is not a common feature for social housing projects in urban areas.

Figure 23. Connection of glulam column and beams at Vancouver House. (source: Scius Advisory)

Interior Walls

Different rates of expansion or shrinkage between the drywall and glulam are accommodated by an aluminum joint with a spring, located where the interior non-loadbearing walls (drywall with metal studs) connect to the CLT ceiling.

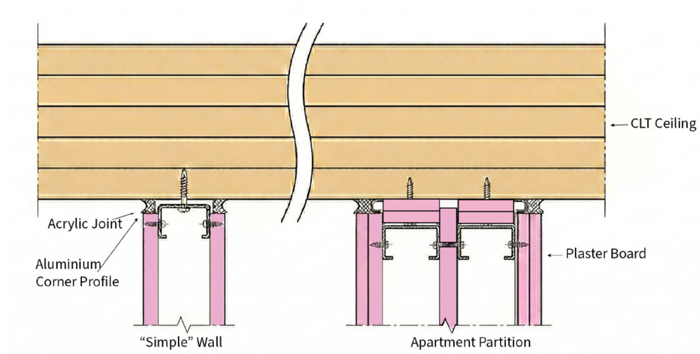

Figure 24. Aluminum joint on interior non-loadbearing walls.. (source: Rüdiger Lainer + Partner)

Figure 25. Washroom with CLT ceiling (source: Scius Advisory)

Figure 26. Bedroom with CLT ceiling (source: Scius Advisory)

Figure 27. CLT ceiling and Glulam Beams in Bedroom (source: Scius Advisory)

Parkade

The parkade has a space for 70% of the units. However, the site is less than a ten minute walk to public transportation. It is expected that many of the parking spaces will not be used. Ten of the spaces can be reconfigured into an amenity room. This part of the parkade, shown in Figure 28, is above ground level, providing daylight and fresh air. Once tenants move in, they will have the opportunity to decide how the amenity area will be used and can construct a temporary wall to separate it from the parking area. Locating the amenity space here allowed more units to be built in other parts of the building.

Figure 28. The parkade area has been designed so that it can be converted to an amenity room in the future. (source: Scius Advisory)

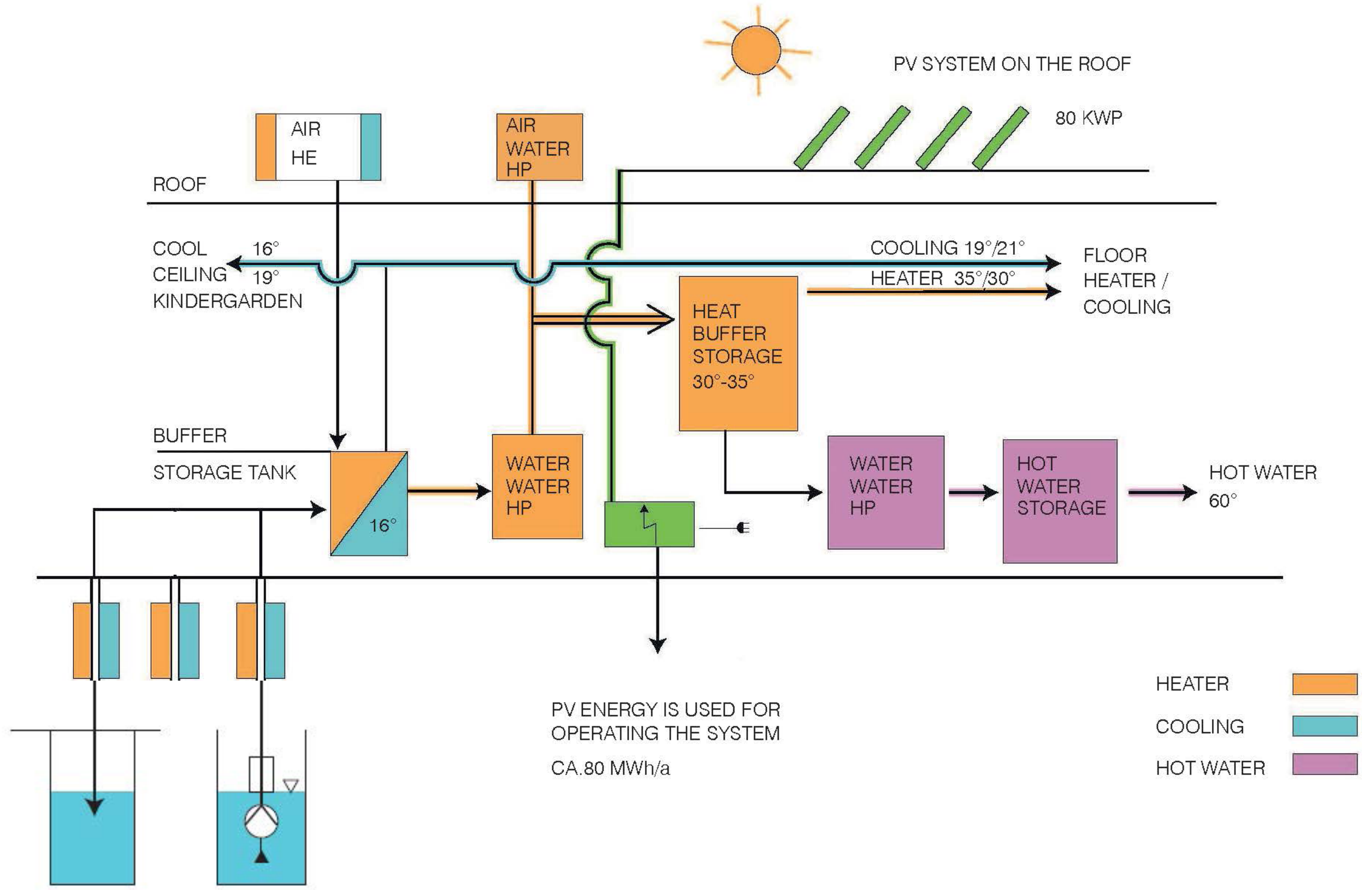

Figure 29. A diagram depicting the heating, cooling and hot water systems at Vancouver House. (source: Rüdiger Lainer + Partner)

Energy Supply

A combined heating and cooling system that is fossil fuel-free is required for construction of new residential buildings in Vienna. This is typically achieved using a combination of air or water heat pumps or groundwater/borehole systems. In Vancouver House, a solar photovoltaic (PV) system on the roof is used to provide energy to operate the system, generating 80 megawatt hours annually. Heat exchangers and heat pumps that draw from rooftop air and a groundwater system provide the necessary heating and cooling and hot water. Heating and cooling is provided to the units through a radiant floor system.

Comparing the energy system to the one designed for Vienna House in Vancouver, Vancouver House has higher heating demand but less cooling, resulting in lower overall intensity and demand.

	Vancouver House in Vienna	Vienna House in Vancouver**
Heating Energy Demand	26.2 kWh/m²/yr	13.5 kWh/m²/yr
Total Energy Use Intensity	30.1 kWh/m²/yr	56 kWh/m²/yr
Primary Energy Demand (Vancouver House) / Primary Energy Renewable (Vienna House)*	48.9 kWh/m²/yr	67 kWh/m²/yr
Annualized Whole Life Carbon Emmisions	6.8 kg/m²/yr	7.8 kg/m²/yr

* for Vienna House, the Primary Energy Renewable is calculated as part of Passive House certification

** calculated at Building Permit stage and verified by the Passive House certifier, to be updated prior to final certification

Table 2. A comparison of the energy systems at Vancouver House and Vienna House. (source: Rüdiger Lainer + Partner, Introba)

Exterior Spaces

The rooftop has additional gathering spaces, with sheltered patio areas for grilling and picnic tables. There are many planters for residents to grow vegetables. Solar panels occupy rooftop areas without planters or patios. The planters on the rooftop of the assisted living building are at a lower height and have space to allow a wheelchair to fit beneath on one side. The exterior railing is also higher for this rooftop.

Ground floor play spaces next to the kindergarten and nestled between the buildings provide different structures and equipment for use by children of different ages. Spaces used for the kindergarten can be used by other children after school and on weekends.

Figure 30. Rooftop with pavilions and planters (source: Scius Advisory)

Figure 32. Play space under construction (source: Scius Advisory)

Figure 31. Planters on the rooftop of the assisted living building (source: Scius Advisory)

Figure 33. Playground equipment nestled between buildings (source: Scius Advisory)

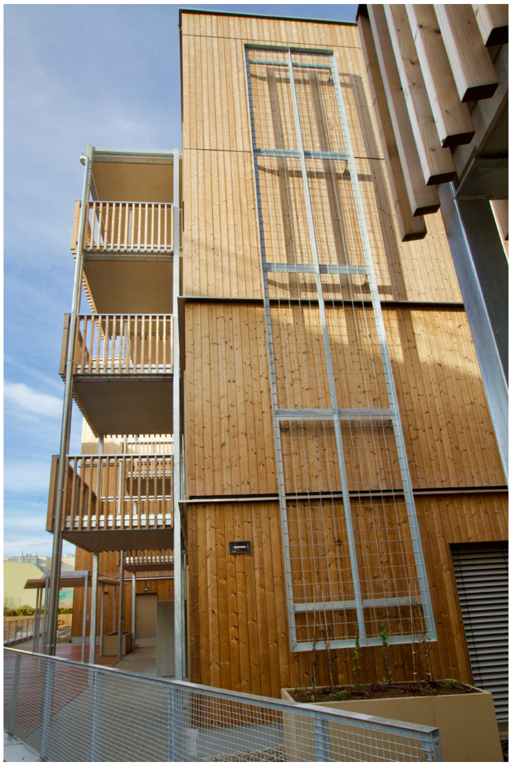

Figure 34. Planters for Waldrebe to grow beside the buildings. (source: Scius Advisory)

Figure 35. A clematis vine growing on a trellis. (source: Thorncroft Clematis)

Waldrebe is a Clematis vine that grows quickly and can climb to reach heights of 12 metres, with branches 6 cm in diameter. The vines produce flowers in a variety of colors and attract bees and hummingbirds. Planters have been located throughout the property to grow the flowering vine that the street, Waldrebengasse, is named for.

Lessons Learned

Vancouver House is part of a cooperation with the Vienna House project in Vancouver, British Columbia (Figure 36). The cooperation, which is carried out jointly with the Energy Planning Department of the City of Vienna, includes sharing knowledge and an exchange of experiences with the focus on energy efficient residential buildings. Vancouver House is based on the traditional experience of the Canadian partners in the field of timber construction and, by linking the field of energy efficiency, follows an innovative path that is of interest to both sides. For more information on Vienna House, please see the website: viennahouse.ca.

The project team in Vienna has shared the following lessons learned:

- Flexible structures allow for adaptation to technical and economic changes.
- The OBSYS system defines the options for the final selection of materials and systems based on current economic parameters.
- Multiple uses of the underground parking garage and open spaces create added value and balance economic changes.
- Cooperative planning processes closely integrate architecture, technical planning, and the developer from the very beginning.
- The use of industrial prefabrication reduces risks and stabilizes costs.
- Strategic approaches determine the feasibility of urban timber construction projects.
- You always build a house together!

Project Status

Vancouver House was in the final stages of construction when these photos (Figures 7-10, 18-20, 23, 25-28, 30-34) were taken on December 1, 2025. Tenants began moving in January 13, 2026.

Figure 36. The Vienna House project in Vancouver, British Columbia (source: Bright Future Studio)

BC MASS TIMBER Demonstration Program

Since 2020, the Province of British Columbia (B.C.) and Forestry Innovation Investment have invested over $11.1 million through B.C.'s Mass Timber Demonstration Program (MTDP) to help with the incremental costs associated with the design and construction of 22 building projects and 8 research projects that demonstrate emerging or new mass timber or mass timber hybrid building systems and construction processes.

NATIONAL HOUSING STRATEGY

The Vienna House Multi-Unit Affordable Housing Demonstrations Initiative received funding from Canada Mortgage and Housing Corporation (CMHC) under the National Housing Strategy Demonstrations Initiative. The views expressed are the personal views of the author and CMHC accepts no responsibility for them.

Acknowledgement

BC Housing gratefully acknowledges funding support from the Mass Timber Demonstration Program for this bulletin series. Our sincere appreciation to More Than a Roof Housing Society and the entire project team for their cooperation. We would also like to thank Oliver Sterl of Rüdiger Lainer + Partner for his collaboration and the tour of Vancouver House.

About BC Housing Research Centre

BC Housing's Research Centre works in collaboration with housing sector partners to foster excellence in residential construction and find innovative solutions for affordable housing in British Columbia. Sharing leading-edge research, advances in building science, and new technologies encourages best practice. The Research Centre identifies and bridges research gaps to address homelessness, housing affordability, social housing challenges and the needs of distinct populations. Mobilizing knowledge and research expertise helps improve the quality of housing and leads to innovation and adoption of new construction techniques, Building Code changes, and enhanced education and training programs. Sign up to receive the latest news and updates from BC Housing's Research Centre at **www.bchousing.org/subscribe**.

BC HOUSING

1701-4555 Kingsway, Burnaby, BC V5H 4V8 Phone: 778-452-6454
Toll-free: 1-866-465-6873 Email: research@bchousing.org www.bchousing.org