Case Study

Valleyview Town Hall

Valleyview, Alberta

July 21, 2025

Background

The Valleyview Town Hall, completed in 2018, is one of the most ambitious municipal buildings in Alberta. It aimed to become North America's first **Passive House Plus** institutional building. Located 350 km northwest of Edmonton at a latitude of 55.0686°N, the Town of Valleyview experiences dramatic seasonal shifts in temperature and daylight, which created some unique challenges for energy-efficient design.

This project was envisioned not just as office space, but as a future-ready, high-performance civic building. Designed to meet **net-zero energy** targets using Passive House principles, the two-story building with a basement reflects a resilient and climate-responsive approach to municipal and public infrastructure.

To achieve its ambitious energy goals selected by the municipality, the facility integrates a highly efficient Passive House building envelope, optimal solar orientation, and renewable energy sources. The design-build process prioritized lifecycle cost minimization, occupant comfort, long-term durability, and adaptability.

This case study highlights how the Town of Valleyview and its design team tackled the technical and climatic challenges of building in northern Alberta. We spoke with Oscar Flechas, the building's architect, to learn more about the project's design intent and lessons learned.

About the Project

Author/Contributor: ENBIX - Alberta Ecotrust, Oscar Flechas
Location: Valleyview, Alberta
Year completed: 2018
Size: 850 m²
Architect: Oscar Flechas - Flechas Architecture
Owner/Developer: Town of Valleview
Energy Consultant: Marken Design + Consulting
Contractor: Scott Builders Inc.

Interview Questions

Why Passive House?

Although initially unfamiliar to stakeholders, Passive House was chosen for its long-term economic and environmental benefits. The Town of Valleyview showed leadership by selecting a design-build team with experience in high-performance buildings and a proven ability to meet energy targets within budget.

Valleyview's extreme temperature range and limited winter daylight made achieving Passive House certification ambitious. In fact, experts in Germany (where Passive House originated) were skeptical it could even be done in this climate. But the team pushed forward, determined to prove its feasibility in northern Alberta.

Were there any programs or grants associated with the project?

Yes. Choosing a Passive House approach enabled the Town to access green building incentives, including funding from Alberta's Municipal Climate Change Action Centre (MCCAC). A grant of $18,000 helped pay for the installation of 25 kW of rooftop solar PV, enabling the building to produce 26,945 kWh annually. This helps save money and cuts GHG emissions by 17 tonnes annually. The MCCAC funding also helped the building achieve Passive House Plus certification.

What were the goals?

The building was designed to be the first Passive House certified commercial building in Alberta and, at the time, the first Passive House Plus institutional building in North America. This is more impressive as Valleyview has such significant fluctuations in temperature and sunlight at this latitude (55.0686°N). To meet these goals, the design combined on-site renewables and solar energy credits to supply 100% of the building's annual energy demand.

The Town of Valleyview's goals for this project were to:

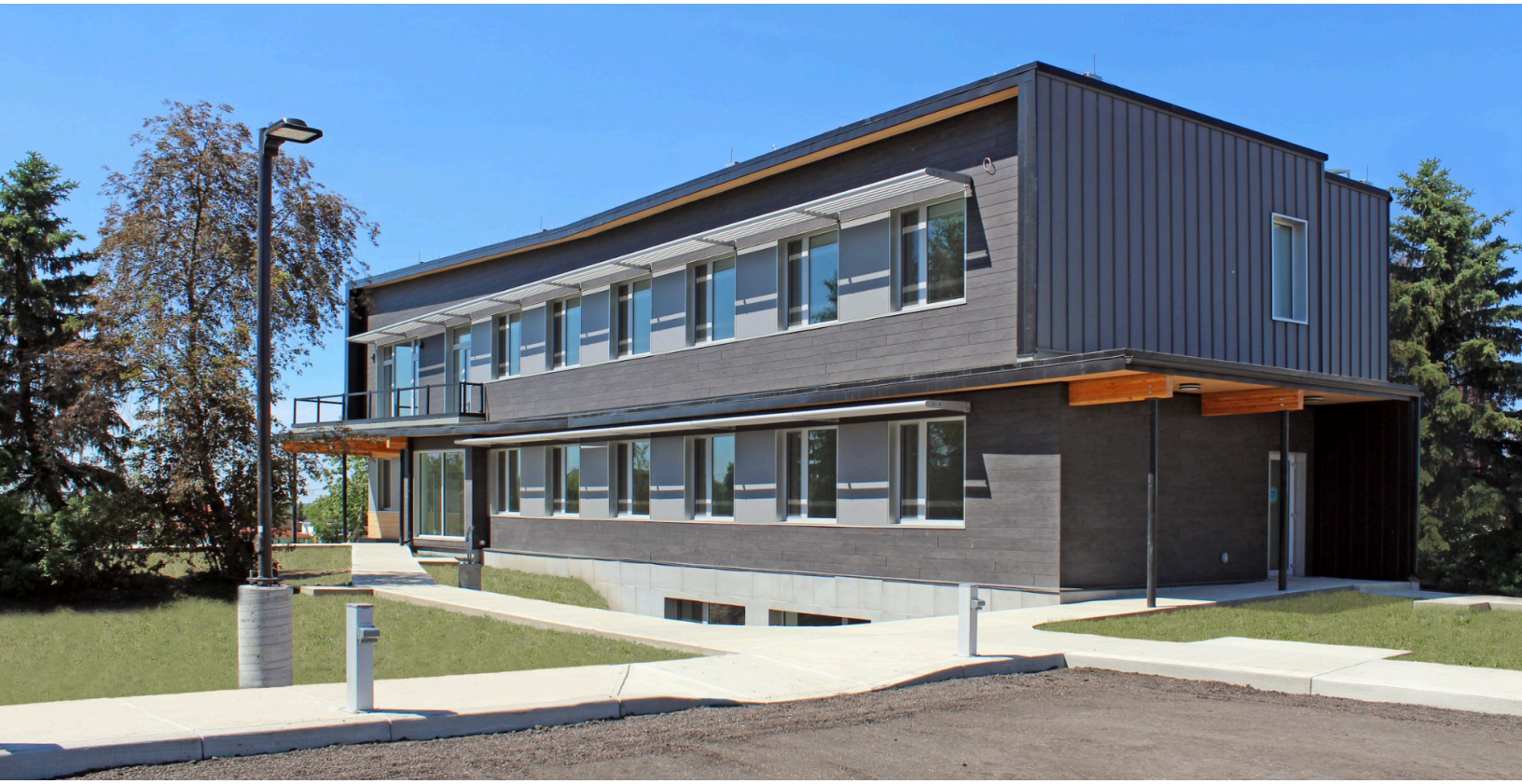
- Keep lifecycle costs low.
- Prioritize energy efficiency and occupant comfort.
- Use a simple, durable design with low-maintenance systems, focusing on passive design over complex technologies.
- Create a facility designed to last 75+ years and evolve with community needs
- Construct a "net-zero energy ready" facility affordably, with the ability to reach full net-zero energy in the future.

Exterior front view of the municipal building

What were the learnings?

The original plan was for the project to be net-zero ready, with prewiring for solar PV and installation deferred until the panels' costs came down. However, the team chose to pursue net-zero energy from the start, meaning solar PV would be fully installed from day one rather than added later.Valleyview's small occupancy allowed the building to qualify as a Part 9

structure under the Alberta Building Code. This opened the door (literally) to using light commercial "Passive House certified" doors. This was an essential moment in the project, as part 3 commercial Passive House-certified door systems that accommodate typical hardware (automated closers, card readers, panic bars) were not locally available. Standard commercial doors, although widely available and compatible, tend to have poor thermal performance and air tightness. The use of Passive House-rated doors and hardware is required for certification and helps maintain overall energy performance.



Exterior view of the back south side of the building

Solar orientation was an important consideration in this northern climate. The building's layout has working areas along the south-facing facade, where exterior shading (fixed to the building) helps shade the sun in the summer while allowing for passive heating in winter.

By reusing the old town hall's footprint, the team minimized site disturbance, preserved adjacent parkland, and optimized the building's orientation for passive solar gain.

The Passive House Plus standard is more stringent than energy use alone, and also requires excellent indoor air quality. To achieve this, the building includes a high-efficiency energy recovery ventilator (ERV) and variable refrigerant flow (VRF) systems for balanced heating and cooling across all levels. Low-VOC interior finishes (paint), adhesives, and flooring were specified to improve indoor air quality. The flooring and composite wood products are specified to contain low amounts of volatile organic compounds (VOCs) and be free of other toxins.

Interior view of the modern, well-lit hallway with offices

Recognizing the importance of psychological well-being, workspaces are positioned next to operable windows with views of the adjacent park. Outdoor spaces, including a balcony and seating area, support a strong visual and physical connection to nature.

Another Passive House requirement is for the durability of materials and assemblies. Materials like glass fibre reinforced concrete (GRC), high-pressure laminate, and metal siding were selected for their resilience. The building envelope uses Passive House certified windows within a rainscreen system that allows any moisture that gets in to dry out. The wall assembly is airtight and vapour-open, which prevents condensation and extends the lifespan of the building envelope materials.

To accommodate changing needs over the building's life, an area for future physical expansion is included within the existing building envelope. Accommodating future expansion and reconfiguration meant that the size and spacing of the windows had to be carefully considered to accommodate potential changes to the functional layout.

Sourcing (Passive House) certified components and higher-quality materials/components requires knowledgeable suppliers and competent installers. Procurement posed a significant challenge, as it was crucial to ensure that the necessary materials were available for construction and delivered on time.

Interior view of the entrance area

Another key learning is the misconception that Passive House buildings are “bulletproof.” While they are highly efficient and very durable, they still require regular maintenance and informed operation. Comfort is also subjective. What feels like an ideal temperature to one occupant may not be the same for another. Some occupants reported discomfort with specific temperatures, highlighting the need for ongoing monitoring and adjustments. These challenges are often made worse when an operator or maintenance staff member with

expertise leaves the building or project. Therefore, it's always important to document system operations and train facilities staff to ensure smooth long-term operation.

What was the cost? What were the costs of building higher than code minimum?

Cost data was not disclosed in this case study. However, it was emphasized that long-term savings in energy use and maintenance were important to the business case for Passive Houses.

Technical:

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Contractor: Scott Builders Inc.
Energy Modelling Consultant: Marken Design + Consulting
Indicative Design: Kobayashi + Zedda Architects Ltd., ReNu Engineering Inc. and Williams Engineering
Civil Engineer: Helix Engineering
Landscape Architect: Kinnikinnick Studio Inc.
Electrical/Mechanical Engineer: Integral Group
Structural Engineer: Laviolette Engineering Ltd.
Commissioning Agent: Bair Balancing

Airtightness: Concept taped OSB at wall and roof locations. Taped transitions at ICF junctions. Fully sealed vapour barrier under slab. Expandable foam and fully taped windows.

"Despite the advantages provided by the site's orientation and fenestration considerations, the extreme winter climate conditions remained a significant challenge, as keeping a steady indoor temperature of 20°C (68°F) while it's -40°C (- 40°F) outside demands more energy than is required by the Passive House standard. In cold climates, high levels of airtightness are crucial.

Given that the building is located in a remote region in Canada and the builders and trades were not all familiar with Passive House requirements, a Taped OSB approach helped minimize the learning curve and maximize the chances of obtaining superior results. Detailing and on-site education were key to a successful performance.

The crew required a small workshop organized by SIGA and had a chance to evaluate the implementation results at the mid-construction blower door test. This gave the crew confidence about the work done to

that stage while ensuring the quality of workmanship in a project that, based on the contract, was required to meet the demanding requirements of the Passive House Standard." - p.1 (Valleyview Town Hall Drawings)

ACH50 = 0.41/h

Exterior Wall: Above grade - Continuous exterior wood fibreboard, ventilated facade and mechanical cavity wall with mineral wool insulation. Below grade, Insulated Concrete Forms (ICF) and mechanical cavity wall with mineral wool insulation.

- Gypsum Board
- 2x6 Framing - Insulated
- OSB Sheathing
- 2x10 Framing - Insulated
- Wood Fibre Board
- U-value = 0.097 W/(m²K)

Roof:

- Gypsum Board
- 2x4 Framing - Insulated
- OSB Sheathing
- Timber Roof Truss - Insulated
- U-value = 0.053 W/(m²K)

Basement floor/floor slab: Concrete slabs with EPS insulation below slab

- Concrete slab
- EPS below slab
- U-value = 0.122 W/(m²K)

Window Frame:

- Euroline, THERM 4700 Series
- PVC frame with insulation fillings of expanded polystyrene
- U-value = 0.76 W/(m²K)

Glazing:

- Euroline Cardinal Glazing THERM 4700
- U-value = 0.63 W/(m²K)
- Solar factor (g) = 57%

Entrance door:

- Euroline, THERM 4700 Series
- U-value = 0.85 W/(m²K)

Renewables:

- 28 kW PV array on south-facing roof

Primary Energy (PE) demand: 110 kWh/m2/a
Primary Energy Renewable (PER) demand: 46 kWh/m²/a
PER production: 95 kWh/m²/a

Mechanical & Electrical Systems:

Ventilation: Tempeff ERV with two heat exchanger cores eliminates the need for extra electricity to defrost the system - Zehnder, ComfoAir 550/350 ventilation unit HRE: 84%
Heating/Cooling: Mitsubishi Minisplit VRF air source heat pump units, two outdoor units and eight indoor AHUs provide simultaneous heating and cooling in the building if required. There is no dehumidification.
Hot Water: Two electric RHEEM Heat Pump Hybrid Hot Water Tanks for domestic hot water on each level.

Energy Performance:

Annual Heating Demand: 13 kWh/m²/a
Heating load: 14 W/m²
Annual Cooling Demand: 0 kWh/m²/a
Cooling load: 1 W/m²
Airtightness: ACH50 = 0.41/h

All photos and drawings are courtesy of Oscar Flechas and used with permission. Alberta Ecotrust and ENBIX would like to thank Oscar Flechas for his contributions and participation in this case study.

Conclusion:

Valleyview Town Hall is a bold example of what's possible when communities invest in high-performance, sustainable, resilient infrastructure. Designed to thrive in Alberta's harsh northern climate, it shows that smaller municipalities can lead by example, incorporating renewable energy and planning for long-term adaptability.

With strong leadership from the Town of Valleyview and a committed design-build team, the project overcame climate, supply chain, and technical challenges to deliver a net-zero building that will serve the community for many years.

Click here to view the architectural drawings and details.