

City of Fort St. John: Passivhaus

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Fort St. John Passive Solar House. Source: Marken Projects.

The Project

The City of Fort St. John (population, 18,609) is constructing a passivhaus demonstration project based on the German Passivhaus standard. The passivhaus is an alternative to a typical single-family home that will deliver a 90 per cent reduction in space heating energy demand compared to a typical single-family detached dwelling without significantly increasing the cost to build the house. For this project, the city is going purely electric for space heating and domestic hot water. The passivhaus will reduce greenhouse gas (GHG) emissions through the displacement of natural gas use, and through using less energy as a whole.

As a demonstration project, it is intended to show developers and future homeowners how they can build and live in a house that has all of the characteristics of a single-family detached

BY THE NUMBERS

Project type: Passivhaus
Year of implementation: 2012
Project lifespan: 25 years
Cost: \$300,000
GHG savings (projected): 99% reduction from typical 'business as-usual' built single-family detached dwelling in Fort St. John, BC
Financial savings: 90% reduction in space heating and cooling costs from typical 'business as-usual' built single family detached dwelling in Fort St. John, BC (i.e., \$200 per year vs. \$2,000 per year, respectively)

dwelling, with a significantly lower utility bill. Projections show that the house will have \$100-\$200 utility bill for space heating per year based on current prices — significantly less than the \$2,000 per year average bill.

Project Motivation

The project is being implemented to demonstrate extreme energy efficiency potential for single-family homes and is intended to show how building green is not necessarily expensive.

According to Marty Paradine, community energy manager for the City of Fort St. John,

“The selling features of a passivhaus include the greater comfort for the same cost as a regular single-family detached dwelling, plus greater savings over the lifetime of owning the building in terms of energy use.”

The City would like to illustrate to developers and future homeowners that they can have a

passivhaus house that requires 90 per cent less energy demand for the same cost per square foot. Using air-source heat pumps in the house with backup mini baseboard heaters, the passivhaus will emit 0.05 tonnes of GHGs per year — over a 99 per cent reduction in tonnes of GHGs relative to a typical single-family detached dwelling; a single-family detached dwelling emits either to ten tonnes of CO₂ per year, on average.

The City also hopes to draw some attention to undeveloped land in the city and how it could be developed in a similar, sustainable manner.

Overcoming Barriers

Developers in Fort St. John are most often focused on constructing single-family homes as quickly as possible to accommodate job growth in the oil and gas sector. Fort St. John is hoping to demonstrate to builders that passive solar house construction is feasible in northern B.C. and that offering this kind of construction could be a competitive advantage over time, as the province becomes even more proactive on climate action.

Homebuilders in Fort St. John often have to compete with the oil and gas sector for tradespeople. This drives labour costs up in the City, and Fort St. John is currently grappling with how they will address this challenge.

Building Community Support for Projects

The construction of the passivhaus, projected to be complete in the autumn of 2012, continues to garner attention in the community. Fort St. John sees the financial benefits of the project as the most compelling way to promote the project. The City highlights that this house will only generate a \$100 heating bill for the year. It has greater comfort at almost the same cost as a single-family detached dwelling, but uses far less energy.

Once the demonstration project is constructed, the city will evaluate its performance over the course of the year and decide whether to proceed with introducing more passivhaus buildings in the future.

Impact of Provincial Policies, Programs and Grants

Since the passivhaus was conceived as a demonstration project, the carbon tax did not have a significant economic impact on the business case. However, the carbon tax has helped the business cases for similar projects and has convinced City Council to explore new and innovative energy efficiency projects.

“By having the carbon tax in place, we can say that these energy efficient features will save us money, because we have to pay the tax every year based on how much fossil fuel we consume,” said Paradine.

“Without the tax, I think there is less of an argument for why municipal governments are even in the business of energy efficiency in general.”

The carbon neutral requirements, as defined in the Climate Action Charter, are also helping to build corporate and community understanding about the impacts of various energy sources, their production, consumption and associated environmental and economic costs and opportunities.

Summary

Fort St. John's passivhaus is a demonstration project for developers and prospective homeowners. Depending on how well the passive solar house performs, the city intends to build more of these types of projects to further develop their sustainability profile, and to show leadership on climate action in the province.