



# Beautiful, Modern Design (and Energy Efficient!)

Achieving Step Code 5 with Natural Gas

Campbell River, BC

PRESENTED BY

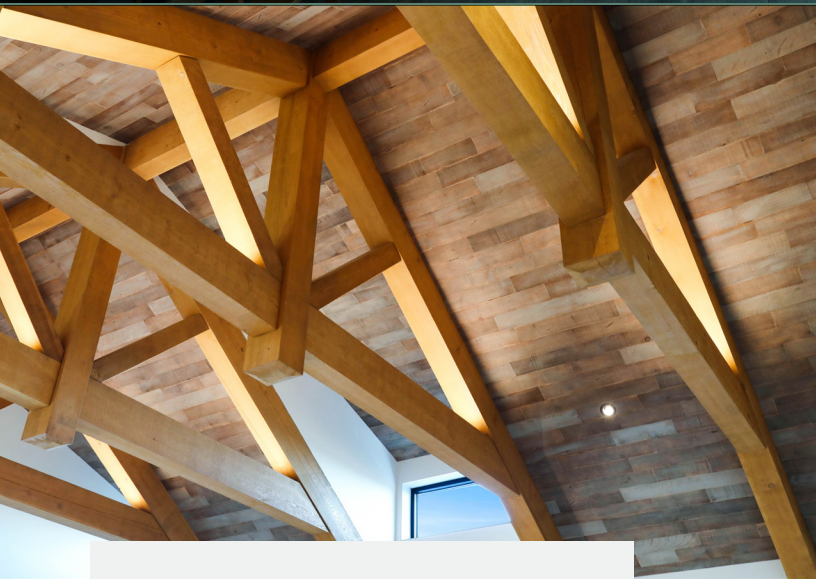






## THE CHALLENGE

Inspired by the homes they saw during their travels in North Africa and how natural cooling was achieved through their dome-like structures, the homeowners requested cathedral ceilings at either end of their home. Including this architectural style required careful planning to achieve a high degree of insulation and to ensure that the extra space did not require additional heating during the winter seasons.



## PRO TIP

Work with your HVAC provider to conduct a pressurized test once the air ducts are installed. This allows you to identify any leaks and gain their professional input on any recommended improvements to optimize the forced air distribution system.

## THE SOLUTION

The builder and homeowner incorporated passive solar design, with North/South orientation, strategic placement of windows and overhangs, and careful material selection. The roof is made from a highly reflective standing seam metal and the windows are double glazed. To insulate the roof assembly, and achieve a high degree of air tightness, the builder used a parallel chord truss with R40 fiberglass batts in the cavity, and polyethylene air barrier on the underside.

## BACKGROUND

Hargrave Construction is a family run business, established in 1983 and specializes in custom homes. Throughout the years, Hargrave has incorporated techniques and design elements to improve the energy efficiency and overall comfort of their homes.

## HOME PROFILE

<b>Location</b>		Campbell River (Climate Zone 5)
<b>Construction</b>		2020
<b>Size</b>		2,600 ft <sup>2</sup>
<b>Bedrooms</b>	3	<b>Bathrooms</b> 2
<b>BC Energy Step Code Level</b>		
<b>Targeted</b>		Step 5
<b>Achieved</b>		Step 5



*This home demonstrates that a Step Code 5 home can be achieved with modern architectural features, and natural gas space and water heating.*

## THE PROJECT UPGRADES

The home is well insulated and careful attention was given to the weather membranes and airtightness layers. Hargrave Construction used their tried and tested approach of working with a 2x6 wall frame, R22 batt insulation and adding 1.5 inches of foam on the exterior. The walls were wrapped with Tyvek weather air barrier and the interior walls were painted with vapour barrier primer.



Photo credit: Homeowner

## WORKING WITH AN ENERGY ADVISOR

In selecting an energy advisor, Hargrave looked for someone that had experience building homes with passive solar designs and a good understanding of available building products and their suitability to different applications. The real-time feedback and support from their energy advisor has helped yield excellent results. It is also rewarding to have another member of the team that shares the same goal of achieving energy efficient homes!

## ESTABLISHING A CONSISTENT TEAM

Hargrave Construction works with a trusted team of trades people on all their projects to ensure the high quality of their builds. Working with a familiar team has been a key to Hargrave's success, as it facilitates communication and coordination between all trades. This is particularly key to ensure proper air sealing during construction, but has helped to establish the standards and best practices expected by the company through all aspects of each build.



## RENEWABLE NATURAL GAS<sup>1</sup> (RNG)

For projects where the gas system is the preferred option from a technical and customer perspective, connecting to our gas system gives access to RNG—a low-carbon<sup>2</sup> energy that can help customers reduce overall GHG emissions. Visit [fortisbc.com/rngbuild](https://www.fortisbc.com/rngbuild).

<sup>1</sup>Renewable Natural Gas (also called RNG or biomethane) is produced in a different manner than conventional natural gas. It is derived from biogas, which is produced from decomposing organic waste from landfills, agricultural waste and wastewater from treatment facilities. The biogas is captured and cleaned to create RNG. When RNG is added to North America's natural gas system, it mixes with conventional natural gas. This means we're unable to direct RNG to a specific customer. But the more RNG is added to the gas system, the less conventional natural gas is needed, thereby reducing the use of fossil fuels and overall greenhouse gas emissions.

FortisBC Energy Solutions Managers are here to help. Contact us to discuss your next new construction project. [www.fortisbc.com/energyteam](https://www.fortisbc.com/energyteam)

## PROJECT DETAILS

### ENVELOPE

<b>Airtightness</b>	0.57 ACH <sub>50</sub>
<b>Attic Insulation</b>	R59 (effective)
<b>Foundation Insulation</b>	R18 - 4.25 inch rigid insulation on crawlspace walls
<b>Under Slab Insulation</b>	N/A
<b>Wall Construction</b>	2x6 walls with 1.5 inch rigid insulation on exterior
<b>Wall Insulation</b>	R26 (effective)
<b>Window/Wall Area</b>	20%
<b>Windows</b>	Vinyl frame, double glaze, argon filled, 1.1-1.4 U-value

### MECHANICAL SYSTEMS

<b>Space Heating</b>	Condensing natural gas furnace (96% AFUE), Natural gas fireplace (70% efficiency)
<b>Space Cooling</b>	AC (18 SEER)
<b>Ventilation</b>	HRV (71% efficiency, 59 cfm flowrate)
<b>Water Heating</b>	Condensing natural gas tankless (96% efficiency)
<b>Other Gas Equipment</b>	Fireplace, cooktop, and double BBQ outlet

### LOADS, COST & REBATES

<b>Heating Load (TEDl)</b>	19 kWh/m <sup>2</sup> per year
<b>Mechanical Load (MEUI)</b>	28 kWh/m <sup>2</sup> per year
<b>Natural Gas Consumption</b>	44 GJ per year
<b>% More Efficient than Typical New Home</b>	44%
<b>Incremental Cost</b>	\$20,000 - \$25,000
<b>FortisBC Home Performance Rebates</b>	\$10,000 Step 5 Rebate + \$800 Energy Advisor Support

<sup>2</sup>When compared to the lifecycle carbon intensity of conventional natural gas. The burner tip emission factor of FortisBC's current Renewable Natural Gas (also called RNG or biomethane) portfolio is 0.27 grams of carbon dioxide equivalent per megajoule of energy (gCO<sub>2</sub>e/MJ). FortisBC's current RNG portfolio lifecycle emissions for stationary combustion are -22 gCO<sub>2</sub>e/MJ. This is below B.C.'s low carbon threshold for lifecycle carbon intensity of 30.8 gCO<sub>2</sub>e/MJ as set out in the 2024 Greenhouse Gas Reduction Regulation amendments.

\*Rebates are subject to change. For current rebate information, visit [www.fortisbc.com/newhome](https://www.fortisbc.com/newhome)

Photo credits: LSP Media