Achieving Step Code 4 with Natural Gas

Energy Efficiency and Lower Operating Costs

Campbell River, BC

PRESENTED BY

ICF

FORTIS BC™

THE CHALLENGE

The builder had experience building Step Code homes but this was their first attempt at achieving a higher Step Code level. The home was built on a standard city lot and the builder wanted to include pieces of natural gas equipment.

PRO TIP

To improve airtightness, the builder used rubber gaskets on building extrusions then acoustic-sealed the openings and sealed up the home. This helped reduce leaks from penetrations for electrical, mechanical, and plumbing fixtures.

BACKGROUND

HARGRAVE CONSTRUCTION is a family run general contractor and home builder business in British Columbia. Throughout the years, Hargrave has incorporated techniques and design elements to improve the energy efficiency and overall comfort of their homes.

HOME PROFILE

Location	Campbell River (Climate Zone 5)
Construction	Summer 2019
Size	2,600 ft^2
Bedrooms	3
Bathrooms	3.5
BC Energy Step Code Level	
Targeted	Step 5
Achieved	Step 5

* Achieved Step Code 4 with natural gas.

THE SOLUTION

It was important to optimize the home's airtightness and insulation on both the interior and exterior of the home. Both insulated concrete forms (ICF) and R22 batts were used to help insulate the home from the elements. The builder also used commercial grade Tyvek air barrier; one of the best products on the market in their opinion. The air barrier was used throughout the entire home, including walls, ceilings, and floors and it was wrapped in on itself to further minimize leaks. To optimize the energy performance of the home, the design also minimizes corners and avoids crawl spaces.

OVERCOMING COST BARRIERS

Hargrave believes this home was 10-15% more expensive to build compared to an equivalent Step 2 home. While this may seem substantial, their perspective is long-term. The cost premium is paid back through the ongoing utility cost savings. Unfortunately, the market does not always consider the costs of operating a home over the lifespan of a mortgage; however, some lenders are starting to offer "green mortgage" options.

REDUCING AIR LEAKAGE

They completed a mid-construction blower door test to identify and address any issues with air sealing, since an airtight envelope is critical to a home's energy performance. This has become standard practice for most of the homes Hargrave builds. Their tests continue to identify problems with sizable leaks around pot lights. To address this issue, Hargrave seals up pot lights with foil tape prior to installing them to significantly improve their airtightness.

WORKING WITH AN ENERGY ADVISOR

Working with an energy advisor was critical to achieving Step 4 with natural gas. The energy advisor that Hargrave worked with was extremely knowledgeable about passive home design and building envelopes, which allowed the home to be better designed from the onset.

PROJECT DETAILS

ENVELOPE	
Airtightness	0.76 ACH_{50}
Attic Insulation	R46.5 (effective)
Foundation Insulation	R22 (Insulated concrete forms)
Under Slab Insulation	R12 (effective)
Wall Construction	2x4 (living room) 2x6 (rest of home)
Wall Insulation	R23.4 (effective)
Window/Wall Area	32%
Windows	Triple pane, argon-filled, 0.8 U-vale, (R7.2), solar factor 0.55
MECHANICAL SYSTEMS	
Space Heating	Dual-Fuel heating system, Condensing gas furnace (Lennox 98% AFUE) and Central air-source heat pump (Lennox SEER 18, HSPF IV 9.6), fireplace
Cooling	Air-source heat pump (Lennox SEER 18)
Ventilation	Lennox, 75% efficiency, 74 cfm flowrate
Water Heating	Condensing tankless gas water heater (Rinnai 0.93 EF)
LOADS, COST & REBATES	
Heating Load (TEDI)	18 kWh/m^2 per year
Mechanical Load (MEUI)	32 kWh/m^2 per year
% More Efficient than Home Built to BC Building Code	43%
Incremental Cost	10-15% more than the similar home in the same subdivision built to BC Building Code
FortisBC Home Performance Rebates	$4,500

FortisBC Energy Solutions Managers are here to help. Contact us to discuss your next new construction project. www.fortisbc.com/energyteam

For rebate information, visit www.fortisbc.com/newhome