



Achieving Step Code 3 for Smaller Homes

Energy Efficient Laneway House

North Vancouver, BC

PRESENTED BY





THE CHALLENGE

Due to the smaller plots of land that they are located on and municipal by-laws, laneway homes face more constraints pertaining to their size, shape, and orientation. These restrictions make it more challenging to incorporate passive solar into the design of these homes. A compact HVAC system was also needed to maximize living space in this home.

PRO TIP

Establish a strong working relationship with a trusted insulation company that consistently does a meticulous job installing the polyethylene air barrier. This will help ensure that the project meets the stringent air tightness criteria for higher step codes.

BACKGROUND

Smallworks was founded in 2005 by Jake Fry, who has been a strong advocate for laneway housing in BC. Smallworks focuses on building small and sustainable homes, and always strives to exceed the standards for high performance green buildings.

HOME PROFILE

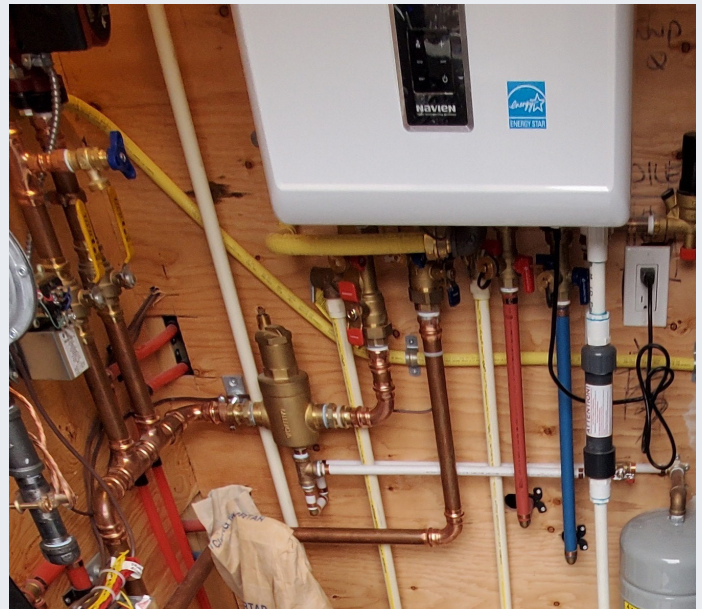
Location	North Vancouver (Climate Zone 4)
Construction	2021
Size	870 ft ²
Bedrooms	1
Bathrooms	1.5
BC Energy Step Code Level	
Targeted	Step 3
Achieved	Step 3

THE SOLUTION

Step Code compliance is the result of quality work and strategic design and material selection. Meticulous installation of the sealed polyethylene air barrier to the walls and ceilings ensured a very good level of air tightness.

Open cell spray foam insulation was selected as the best method to achieve a high degree of insulation, adequate air sealing, and proper venting in the roof assembly, given its design with concealed gutters and no soffits or overhangs.

This laneway home faces north, and strategic window placement creates a bright space that is warm in the heating season and stays cool without air conditioning in the summer. In addition, a central recirculating ventilator is used to ensure healthy indoor air and thermal comfort.



RADIANT FLOOR HEATING

With a small footprint and a high degree of insulation, this laneway home has a smaller heating load than a typical home. Smallworks selected a combi-boiler that efficiently serves the home's hot water and radiant slab hydronic heating system to ensure efficient operation, comfort, and ease of use for the homeowner. The tankless system also saves space, which is important for these types of homes.

TEAMWORK

Although the design of the home is very important, Smallworks recognizes that the execution of the design is critical to the success of the build. By forming long-standing collaborations with smaller trade companies, all members of the build team have absorbed Smallworks' sustainable building philosophy and practices, leading to better results with each new project. In particular, relying on their trusted insulation provider was instrumental in achieving high degrees of air tightness for this home.

"We have built well over 300 homes and in my experience the combi system is the best system for a small home. It is ideal not only for its small physical footprint but efficiency in energy consumption."

Jake Fry, Smallworks





RENEWABLE NATURAL GAS¹ (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-carbon² energy that can help customers reduce overall GHG emissions. Visit [fortisbc.com/rngbuild](https://www.fortisbc.com/rngbuild)

¹Renewable 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.

*Rebates are subject to change. For current rebate information, visit www.fortisbc.com/newhome

PROJECT DETAILS

ENVELOPE	
Airtightness	2.19 ACH ₅₀
Attic Insulation	R32
Foundation Insulation	N/A (slab on grade)
Under Slab Insulation	R12 (3" EPS under slab and 2.5" XPS slab edge)
Wall Construction	2x6
Wall Insulation	R24
Window/Wall Area	14.4%
Windows	Vinyl frame, double glaze, argon filled, 1.4 U-value

MECHANICAL SYSTEMS	
Space and Water Heating	Condensing natural gas combi boiler (95% AFUE), in-slab radiant (main fl.), hot water baseboard radiators (upper fl.), and natural gas fireplace
Cooling	N/A
Ventilation	Central recirculating ventilator

LOADS & REBATES	
Heating Load (TEDl)	48 kWh/m ² per year
Mechanical Load (MEUI)	87 kWh/m ² per year
Natural Gas Consumption	25 GJ per year
% More Efficient than Typical New Home	23.2%
FortisBC Home Performance Rebates*	\$4,000 Step 3 Rebate + \$800 Energy Advisor Support

²When 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 (gCO₂e/MJ). FortisBC's current RNG portfolio lifecycle emissions for stationary combustion are -22 gCO₂e/MJ. This is below B.C.'s low carbon threshold for lifecycle carbon intensity of 30.8 gCO₂e/MJ as set out in the 2024 Greenhouse Gas Reduction Regulation amendments.

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