



# Builder Goes Above and Beyond

Achieving Step Code 5 With Natural Gas

Quesnel, BC

PRESENTED BY





## THE CHALLENGE

When homeowners choose the design of their home and builders only have a limited opportunity to provide input, the design may incorporate elements that are not conducive to achieving higher levels of the Energy Step Code. In this particular case, the design included a more complex shape with many corners and many windows facing south and west. The home is also located in a colder region of BC (120 km south of Prince George).

## THE SOLUTION

The builder used thicker walls with more insulation to compensate for a less than ideal design. In addition, natural gas equipment was used to improve occupant comfort and reduce the operating costs associated with heating the home and hot water. Natural gas equipment was also chosen due to the homeowner's familiarity with this type of system and the low up-front cost.



## BACKGROUND

Icon Homes is a small custom home builder who specializes in smaller affordable homes suited to rural communities. They have been building higher Step Code homes for over 3 years and are one of two Certified Net Zero builders in Northern BC.

## HOME PROFILE

<b>Location</b>	Quesnel (Climate Zone 6)	
<b>Construction</b>	Spring 2019	
<b>Size</b>	4,200ft <sup>2</sup>	
<b>Bedrooms</b>	5	<b>Bathrooms</b> 3
<b>BC Energy Step Code Level</b>		
<b>Targeted</b>	Step 5	
<b>Achieved</b>	Step 5	

## PRO TIPS

- Tighter homes require smaller sized equipment and installers will be persuaded that right-sized HVAC equipment will be able to meet the home's heating load.
- Using mechanical equipment that is readily available from local suppliers makes it easier to maintain the equipment in the long-term.
- Builders who are looking for cheaper options to build better homes should learn from other builder's experiences.

*This home demonstrates that achieving Step Code 5 with natural gas space and water heating is possible.*



## THE PROJECT UPGRADES

The home construction incorporated insulated concrete forms in the foundation and double-framed 2x4 walls, with additional rigid insulation applied to both. Icon Homes also installed an air barrier on the outside of the home and made sure to tie the barrier over the walls and into the interior of the home to improve the home's airtightness.



## ENSURING HOMEOWNER SATISFACTION

Convincing homeowners to invest in their building envelope can be challenging when they're more concerned with more tangible finishes such as flooring and kitchen counters. This is especially true in cases where homeowners are less interested in the sustainability of their home. Promoting non-energy benefits can be beneficial. For instance, this homeowner was interested in the fact that a tighter envelope is more resilient to smoke from forest fires - this is important in an area that has seen many forest fires in recent years. In the end, the homeowner was very happy with the design of their home and the benefits related to its ultra-high energy performance.

## FURTHER CONSIDERATIONS

The home didn't employ a tankless gas water heater since sediments from well water systems can be a concern. The hot water system includes a recirculation system with a timer to ensure that hot water is available at a moment's notice, without running the tap.

## BUILDER INGENUITY

Icon Homes has an excellent working relationship with their energy advisor and sees the value in including them from the beginning of the process. Icon found so much value in mid-construction air testing they have purchased their own blower door equipment to further facilitate the testing. This allows them to test the home's airtightness at their convenience so that they can gauge the effectiveness of different approaches and identify and address issues early in the construction process. The builder has tested a variety of envelopes and decided that a simple double wall construction is the easiest and most cost-effective method.



## PROJECT DETAILS

### ENVELOPE

<b>Airtightness</b>	0.61 ACH <sub>50</sub>
<b>Attic Insulation</b>	R59 (effective)
<b>Foundation Insulation</b>	R42 - Insulated concrete form and rigid insulation on exterior
<b>Under Slab Insulation</b>	R12.6 (effective)
<b>Wall Construction</b>	Double frame (2x4) walls with 2 inch spacer and 1.5 inch rigid insulation on exterior
<b>Wall Insulation</b>	R43 (effective)
<b>Window/Wall Area</b>	17%
<b>Windows</b>	Triple pane, low-emissivity, argon filled, 1.1-1.4 U-value

### MECHANICAL SYSTEMS

<b>Space and Water Heating</b>	Condensing natural gas furnace (Dettson, 45,000 BTU, 96.7% AFUE)
<b>Cooling</b>	Roughed-in
<b>Ventilation</b>	Small duct high velocity air distribution system, Venmar, 75% efficiency, 59 cfm flowrate
<b>Other Gas Equipment</b>	ENERGY STAR natural gas-fired storage water heater (John Wood, 151L 40USG), range

### LOADS, COST & REBATES

<b>Heating Load (TEDl)</b>	26 kWh/m <sup>2</sup> per year
<b>Mechanical Load (MEUI)</b>	40 kWh/m <sup>2</sup> per year
<b>% More Efficient than Home Built to BC Building Code</b>	52%
<b>Incremental Cost</b>	\$30,000 (5-8% more expensive than similar home built to BC Building Code)
<b>FortisBC Home Performance Rebates</b>	\$8,500

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

For rebate information, visit [www.fortisbc.com/newhome](http://www.fortisbc.com/newhome)

All photo credits: Homeowner