



HOUSE AT ROSES CROSSROAD

ONE OF CANADA'S MOST ENERGY EFFICIENT HOMES

February 2014

The [House at Roses Crossroad](#) has earned our highest [EnerGuide](#) rating to date! With a score of EnerGuide 88, this house ranks among Canada's most energy efficient homes. EnerGuide doesn't provide a list of all the scores across the country, but Roses Crossroad's score is the highest that our energy testers at [Blue Green Group](#) have ever measured!

The house is the soon-to-be full-time home of owners David and Louise, who after spending many summers in Prince Edward County decided to move there from Toronto on their retirement. They wanted a highly energy efficient home – and the corresponding cost benefits – where they can be comfortable, live lightly on the land, spend time together, and host family and friends.

With Senior Project Manager [Melodie Coneybeare](#) at the helm, we designed a



a one-story house oriented on an east-west axis with a long south-facing exposure. On the south side are the Great Room with living, kitchen and dining areas, and the master bedroom and bathroom. On the north side are the guest bedroom and bathroom, two studies (one for David, one for Louise) and a spacious laundry/mechanical room. Connected to the east end of the Great Room is a large, screened-in porch, and starting in the summer they'll be planting a vegetable garden just off the kitchen.



The home's great success with energy efficiency is the result of our overall passive solar design approach, combined with extremely good insulation and air tightness, an iterative energy testing process, highly efficient mechanical systems, and active systems that offset energy usage.



Insulation, Air-Tightness and Process

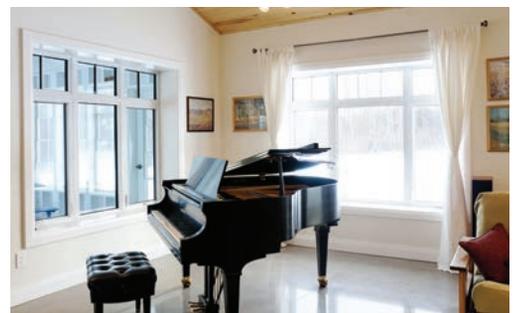
House at Roses Crossroad uses a 13 inch thick double-stud wall construction, made with 2x4 studs on the inside, a 4-inch gap, and 2x6 studs on the outside, and is filled with spray-applied cellulose insulation. The roof is insulated with 19-inches of blown-in cellulose. With insulation values of R48 in the walls and R70 in the roof, this house is extremely well insulated!



The windows are triple-glazed, argon-filled units from [Accurate Dorwin](#). We specified different R-values for the south windows compared to the ones on the north, east and west. The south-facing windows have a lower R-value so that the full potential of winter solar gain can heat the space and the in-floor heating tubes. In the summer when the sun is high in the sky, the south windows are shaded by three-foot overhangs. The windows on the north, east and west sides of the house have higher insulation values to keep out the winter cold, and sun angles make these orientations more difficult to shade in the summer.



To eliminate air leakage, the exterior house wrap ([Tyvek](#)) acts as air barrier, with a lot of care taken to seal every inch. In the ceiling a 6mil polyethylene sheet acts as air and vapour barrier. We also took measures to eliminate leakage at ceiling openings, an often difficult spot to seal. For example, we favoured track lighting over pot lights wherever possible, and where there are pot lights we installed a plastic enclosure (a bit like a boot) behind the light and sealed it to the same 6mil polyethylene to maintain a continuous air barrier.



To ensure we would achieved our goals, we hired Shervin and Greg of [Blue Green Group](#) to run a series of air tightness tests at various points before installing any drywall. Shervin conducted blower door testing, thermal imaging and smoke testing on three separate occasions so we could find any leaky spots and remedy them right away. Between our tests in June, July and September, the air leakage rate went down from 3.8 air changes per hour under test conditions (ACH@50Pa), to 2.1 ACH@50Pa, to the low final rate of 1.8 ACH@50Pa!



Mechanical Systems

This home has our usual suite of highly efficient, right-sized mechanical equipment, including an Energy Recovery Ventilator (ERV) by [UltimateAir](#) for fresh air circulation. We're especially excited about the in-floor heating system with recirculation pump!



A typical in-floor heating system comprises tubes in the floor that bring warm water throughout the house, radiating a consistent and gentle heat from the bottom up. The system here is just like that, with some unique additions: this house has zoned temperature sensors and a corresponding circulation pump.



The system works so that, for instance, on a clear winter day when the sun heats up the in-floor tubes on the south side of the house, the temperature sensors will tell the circulation pump to move that warmer water directly to the cooler parts of the house on the north side. The pump means that the boiler doesn't need to kick on in order to heat cooler rooms, but rather can be used more sparingly to maintain overall temperature of the system. In this way, the whole house maintains a consistent level of heat and comfort throughout with much lower energy usage.



Active Energy Systems

This home has both a solar PV array and a solar thermal system. Both systems are installed on the south-facing roof slope, which we designed and oriented particularly for this purpose.

The solar photovoltaic (PV) array is a 10kW solar panel system. Energy captured from the sun gets sold to the grid through the provincial [microFit](#)

program. David and Louise don't store any of this energy on site, but rather they're selling it to the province and using that to offset the cost of the small amount of energy they do use. So, when they're not at the house they're making money, and when they are at the house they're spending little or nothing at all.

The solar thermal system in this home not only pre-heats the domestic hot water, but it's also connected to the in-floor heating tubes. Typically a household will use enough hot water that all the pre-heated water gets used. However, when there's no one home to use the water, the latent energy in the water goes to waste. For David and Louise's house, when the domestic hot water tank is full, such as when they're away, the system channels the pre-heated water from the solar thermal system to the in-floor heating tubes. Yet more reasons the boiler can stay at rest!

Interiors

The interiors for this home are simple, clean and bright. The floors throughout the house, which encase the in-floor heating tubes, are polished concrete with fine to medium grain. The kitchen is an IKEA system with a custom butcher-block island counter.

The piece-de-resistance are the custom bookshelves and fireplace surrounds in the Great Room, beautifully installed with care by Kyle DenOuden of [Hickory Homes](#), who was the builder for the project. He paid great attention to detail in arranging the tiles in a subtle herringbone pattern – not an easy feat!

Congratulations and Well Wishes!

We'd like to specially acknowledge all of Melodie's hard work, design skills, and ingenuity. She did an excellent job bringing this project through from a beautiful dream to a beautiful home. Congratulations, Melodie!

David and Louise will be spending more and more time at their Roses Crossroad country home, moving from just weekends and holidays to full time in the next few years. We wish them well in their new space, full of visits with family and friends, food from their garden, and cost benefits from their incredibly efficient home!

For more information about Solares Architecture and our sustainable home projects, visit us at www.solares.ca!

And, as always, please visit our [blog](#) for the latest on Solares founders Tom and Christine's own major renovation!



