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[Highpoint House](#) is one of Solares' first double-stud construction projects, alongside [House at Roses Crossroad](#). Highpoint House is built on a hill on 25-acres in Ontario's Caledon region. Designed with passive solar principles, it is one of our most energy efficient projects, and has scored an extremely high 87 on the [EnerGuide](#) scale!

Our clients here are a close-knit family with a dynamic home life. A typical day could see them doing science experiments, playing musical instruments, running a home office, homeschooling, and even woodworking. From the very beginning their goal was a super high efficiency home for a reasonable budget. They originally wanted a concrete block house to maximize [thermal mass effect](#), as that's been a widely used approach in passive solar designed homes. They were surprised then, when we recommended *against* concrete in favour of a super-insulated, air-tight, [double-stud](#) stick frame approach!



In our experience, their location and budget is a great fit for double-stud construction. It can be more easily scaled, cheaper to construct, and the walls can be as thick as you want. This gives full control of how much insulation you can have for a relatively nominal price difference. Generally speaking, a concrete house and a double-stud house with the same insulation and air tightness will use the same amount of energy over a given period of time.



Our clients were keen to understand the details so they could make a comfortable and informed decision. Together we embarked on a rigorous research phase to compare the costs and benefits of the two approaches. The whole family participated in a collaborative process with us, and for their project the double-stud method came out on top!



For our analysis we hired Stuart Fix of [Renü Building Science](#) to do energy modeling of several versions of the house for comparison. It came down to two scenarios: one with concrete construction and one with double-stud stick frame. Our clients were happy to change their minds about construction method when they saw the results:



1. We could give them way more insulation with a double-stud approach; and
2. Double-stud came out much cheaper to construct in this case. Building them a concrete block house would have cost \$100,000 more than double-stud for the same size house.

These findings confirmed our recommendation. Concrete is a great building material because it's long-lasting and durable, but it is more expensive and labour-intensive than wood-frame construction. Also, high levels of thermal mass aren't as crucial to the success of a passive solar house as once thought. The thinking in the industry now is that high insulation and air-tightness levels are more important in making a house energy efficient.

Once the decision about construction was made, we worked with the family to design their home. The completed house is 2,000 square feet with a 1,000 square foot finished basement. The double-stud stick frame structure enabled

us to install a very high level of insulation with blown-in cellulose. Insulation values range from R-30 in the foundations, to R-50 in the walls, to an incredible R-70 in the roof. We also made sure to seal this house tight, and achieved a very low air leakage rate of only 1.39 air changes per hour!

The home's insulation and air-tightness work in tandem with a passive solar design approach that takes advantage of the site's plentiful morning sun. Consequently, it only requires minimally-sized, conventional forced-air heating and cooling systems, making for economical construction and operating costs. The resulting energy efficiency is so high that even with **50% more floor area** than their previous semi-detached house in Toronto (built in 2002), the fully detached Highpoint House uses about **25% less energy!** Even during the extreme cold spells of the past winter, the house stayed at a constant and comfortable temperature with minimal input from the furnace.

A walk through the main floor reveals a foyer, mud room, kitchen, a music room and a guest bathroom. The music room and guest bath are designed to be used together as a main floor bedroom suite if required. The second floor has two bedrooms, a family bathroom with laundry, and a family room. The basement has a science lab and a wood shop – including a full walkout for bringing in lumber and taking out finished work – as well as an office and bathroom.

We are so happy to have gone through this journey of (sustainability) discovery with this wonderful family. It was a full team approach, with incredible project management by Lejla Odobasic, and inspiring quality and attention to detail by builder Dave Metz and his team at [Metz Homes Ltd](#). This was our second time working with Dave and we can't wait for the next chance to work together! Anyone want to work with our two teams to build a home in the Caledon area?

Highpoint House is more than just an extremely efficient house— it's also a comfortable and beautiful place to be. While the large south windows are there to bring in light and warmth, they are also designed to take advantage of fabulous views, where often deer can be seen wandering through the fields. On our first day at the property, we walked through the fields searching for the perfect siting – just moments after finding it, we looked up to see a deer suddenly appear and walk right across our chosen viewpoint! We all shared a smile and knew it was a sign of the wonderful project to come.



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 (almost complete!) major renovation.

