

GETTING TO NET ZERO IN LAVAL

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When Construction Voyer inaugurated six Net Zero Energy condominiums in Duvernay recently, the 43-year-old firm was not introducing a new concept to the world.

The use of high-efficiency materials and innovative building practices to drive down energy usage — and costs — is not new; individual elements like insulation, sealing techniques, solar power and high-efficiency cooling and heating systems have been around for some time.

But what makes Condos Val-des-Ruisseaux unique, said Jean-François Voyer, co-owner and director of business development at Construction Voyer, “is that we’ve put them all together. Instead of just saying we will put more insulation to lose less energy, we determined how much energy we would need to generate to operate the homes. How do we calculate? So we’ve established a standard.”


Measured over a year, a Net Zero Energy home produces as much energy as it consumes.

Most similar projects achieved until now in Quebec have been single homes, Voyer said.

“We are putting this on a community level with available technologies that are off the shelf, instead of developing something that doesn’t already exist.”

Canada’s first Net Zero Energy six-plex was built as part of a national initiative financed and supported by industry and Natural Resources Canada’s ecoEnergy Innovation Initiative announced in the 2011 federal budget. The goal was to build cost-effectively on a community scale. The NRC put up \$1.96 million, rolling out projects in Laval, Calgary, Guelph, Ottawa and Halifax. Owens Corning Canada and other partners matched the NRC amount in cash and in kind.

The design features a host of energy-efficient features, starting with a new air barrier system by Owens Corning, advanced heating and cooling technology, LED lighting, triple-pane windows, and an

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energy monitoring system to track energy consumption in real time.

The flip side of conservation is generation: energy required for the six condos is generated by 146 rooftop solar photovoltaic panels.

“Over the past 10 years, NRC has been doing one-off projects,” said Salvatore Ciarlo, Owens Corning Canada’s technical services director. “It was using materials and technologies specially developed for a single project.”

The results were expensive homes that are unaffordable for most consumers. “That was until we came together with the NRC and five builders to get to a level of affordability and production, using cost-effective building and off-the-shelf technology.”

The result, Ciarlo said, is proof “that it is possible to raise the bar when it comes to building energy-efficient homes that are affordable to the average consumer.”

To put it in perspective, a typical house experiences about 3.5 air changes per hour; the Net Zero building has to be 1.5 per hour according to the R-2000 standard, the pinnacle of Canadian efficiency standards. Ciarlo said the Duvernay project is at 0.7 changes — 80 per cent below the norm.

Central to the conservation effort is the insulation — specifically, Owens Corning’s CodeBord: three-inch rigid panels manufactured in Valleyfield, and installed with high performance taping and compression gasket systems to achieve air tightness in excess of the toughest

national standards.

Currently, the majority of homes are sealed with spray foam, what Ciarlo calls “trying to wrap a gift from the inside. We don’t use expensive materials, we just put our foam board outside, sealed in a specific way that makes it much easier to achieve a higher level of performance.” Inside are fibreglass batting, high-performing windows and appliances, and mechanical systems designed to achieve maximum cooling and heating efficiency.

Construction Voyer has built more than 6,000 residential units in the region but the process required some training.

“The tough part was to build a model of the home where we could measure the effect of the choices we make,” Voyer said. “We were backed by digital models to calculate energy needs and consumption.”

Past one-off projects bore incremental costs of \$115,000 to \$150,000 per house, he said, but using the currently available technologies brought it down to \$45,000 to \$50,000.

“Voyer had an additional challenge to put on upon themselves,” Ciarlo said. “By developing a multi-unit building, they had to think about all those owners sharing the energy and what that required.” One result was additional solar panels on the sides of the building.

The units include air conditioning, garage, and large cement balconies, and the building is located in a quiet sector of Laval, close to Rivière-des-Prairies, just east of the A-25 bridge and minutes from Montreal. The location and design of the six-plex was chosen to blend into an existing development with a similar look.

“We’ve built in an integrated project where we have the same type of buildings with the same look and layout, so we can compare to what is being sold,” Voyer said.

Two of the units are already sold, and the condos are fetching about eight per cent more than their conventional equivalent. Units measure from 768 to 1,408 square feet. A two-bedroom condo is priced at about \$295,000, tax included.

Depending on local energy costs, investments in Net Zero housing make enormous sense, he said — especially in Ontario where hydro costs are much higher than in La Belle Province. “But even in Quebec there is a good payback,” Voyer said.

“Of course, occupants should be aware of how to live in a Net Zero environment. They have to monitor their habits and usage of energy, TVs, and lighting.

“If everyone in the house starts taking many long hot showers and baths all the time, that will drive consumption up. Hot water is a major component of energy use. If they are mindful and consider these things, they will consume only as much energy as they will produce with the solar panels.”

Solar panels generate different levels of energy — day and night, summer and winter — and the consumption patterns of people



From the outside, Construction Voyer’s Val-des-Ruisseaux’s condos in Duvernay, Laval, look like any other home, but they’ve been built in accordance with Net Zero Energy initiatives. PHOTOS COURTESY OF CONSTRUCTION VOYER



Solar panels adorn the rear of Construction Voyer’s multiplex in Duvernay, Laval. Having six independent condo units under one roof also necessitated installing extra panels on the side of the building (below).

change according to the season and time of day. With panels hit hard by sun and producing more than is consumed, the energy is sent back to Hydro-Québec and something special happens: “Your meter goes into negative mode, and the numbers drop,” Ciarlo said.

So what does a hydro bill look like? “Very close to zero,” he replied, laughing. “It’s marginal.”

No maintenance is required; all homeowners must do is consult their meters and monitor their usage via a web platform. Each homeowner has access to real-time consumption reports.

Armed with the vital experience of the Net Zero exercise, Jean-François Voyer is now looking to nudge new homebuyers along with him. “Instead of the whole package, one interim step would be to get people to build Net Zero-ready — that is, all the elements in place and installed except for the final, energy-producing element: the panels themselves.

“We’ve proven we can get to Net Zero affordably,” Voyer said, so people should be getting to Net Zero-ready for when it makes sense from a cash-flow perspective to invest in energy generation, the solar panels.

Ciarlo agrees.



“The path has started and in a few years it will be mandated as building codes change,” Ciarlo said. “The best response is to ‘future-proof’ your house and shield yourself from rising energy costs.”

It’s easy to tell a framing contractor to use three-inch instead of two-inch studs, he noted. “It’s no big deal.

“Insulation and air barriers are the low-hanging fruit of energy conservation and represent only about \$15,000 to \$20,000 of the

incremental costs.”

Voyer hopes to see a regular financing regime put into place — much like the generous government subsidies for electric cars.

“That’s exactly what we want,” he said. “We hope to see more financing from any level of government.

“If the government’s objective is to save energy, then incentives would be a logical choice.”

For more information about the NRC ecoEnergy Innovation Initiative



A ribbon-cutting ceremony at Val-des-Ruisseaux’s Net Zero Energy condominiums in Duvernay drew, from left to right: Martin Cormier, director of APCHQ; Salvatore Ciarlo, Owens Corning Canada; Pascal Voyer, Construction Voyer; Angelo Iacono, Alfred-Pellan MP; Jean-François Voyer, Construction Voyer; and Ray Khalil, city councillor.