

NO CAR
NO FURNACE

NO PROBLEM

HOW ONE EDMONTON FAMILY'S
COMMITMENT TO AN ENERGY-FRUGAL
LIFE INSPIRED THEIR DREAM HOME.

"Open up! Open up!" Standing on the doorstep, I hear the pint-sized bundle of energy even before I see it, as five-year-old Luc struggles with a door stuck tight by a January thaw-freeze cycle.

Inside, the excitement continues. "We're going to watch a movie!" Luc exclaims, bouncing backward onto the couch in glee. He's clutching *Ice Age*, a title whose irony strikes only later as I reflect on the spectre propelling his parents' journey: global warming.

For Luc and his three-year-old brother Jacob, watching a movie is an event. So is riding in a car. And if the rack of half-dry clothes in the corner of the living room is any indication, the clothes dryer is as foreign to them as the army of dodos they're about to meet in the movie.

And that's not all. Before year end, the two boys and their parents, Conrad Nobert and Rachel Amores, will be living in what aims to be Alberta's first-ever LEED Platinum certified residential building - and Edmonton's second net zero energy house, a structure designed to produce at least as much energy as it consumes over the course of a year.

As the kids settle into their parents' bedroom with *Ice Age*, Nobert takes me for a tour of what's becoming known as the Mill Creek Net Zero Home. Just down the street from the family's current abode, it's framed and wired, but still a skeleton - albeit with a beautiful fir beam above the front porch, rescued from a liquor store.

"What about this house makes it net zero?" I ask, and Nobert is off and running. In two days he'll be describing how this house is put together at the Telus World of Science, so it's all fresh in his head. Sixteen inches of insulation. A seal so tight that all the cracks add up to no more than a dessert plate. Large south-facing windows. Cement flooring to augment thermal mass.

"Insulation is boring, right?" he says, wondering for a moment whether it makes for good reading. "People want to put solar panels up before they even seal their house." Yet the more complex parts of this house would make little sense without superior insulation and a painstaking seal.

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PHOTOS BY
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Conrad Nobert and Rachel Amores with their sons, Jacob and Luc. The family will soon be living in a house that produces as much energy as it consumes over the course of a year.





Above, Luc plays on a wide window ledge made possible by 16-inch walls filled with cellulose fibre insulation, a design feature that cuts heat loss by more than one-third over conventional construction.

Right, the Nobert-Amores family relaxes in light flooding in through a large south-facing window; passive solar will provide 54 per cent of the net zero home's annual heating requirements.



That said, the design also demonstrates that a dash of complexity can amplify the impact of the mundane. Take window awnings. They're standard issue in energy-efficient houses, but because the sun's angle shifts from season to season, placement is always a compromise. The awnings envisioned for this house will not only incorporate photovoltaic cells, but flex to maximize the sun's rays. (Exactly how those awnings will move has yet to be designed, a fact that makes Amores nervous. Nobert, always the can-do, is optimistic about the homebuilder's proposal for accomplishing this.)

There's a premium to be paid for such innovations. About \$75,000 of the house's \$550,000 price tag can be attributed to the net zero design. "The first \$20,000 gave us 85 per cent of the benefit," Nobert says. "It's only because of our level of dedication that we spent the extra \$55,000. My point being, every new house should spend that first \$20,000."

A grey water system that will collect water from the home's three showers to flush toilets is adding \$3,500 while saving about \$60 a year. Solar panels will cost \$40,000 while returning about \$800 a year. Personal values rather than anticipated paybacks drive such decisions, Nobert readily admits. "But people don't question the \$40,000 they put down on a Sierra.

What's the payback on your car?"

On the flip side, being green will rack up savings. For starters, there's no furnace. None. Baseboard heaters will fill in any heating gaps. That alone will save more than \$9,000. The family will use so little natural gas that it makes no sense to connect to gas lines, saving more than \$350 a year while adding self-sufficiency. The house will be on the electrical grid, but is designed to feed more electricity back than it consumes. Thus: net zero. "Green can be more expensive, but sometimes it will save money if you do it right - if you push it far enough," Nobert says.

Theirs will also be a flex house, another concept that captures the imagination. Many families shift from house to condo as they age, Nobert notes. "But our plan is to create our condo right here. We're using a lot of energy to build this house in the first place. We want it to be able to work for us as long as possible."

Already, the home is plumbed and wired to allow a self-contained suite upstairs. The main floor will be barrier free, with a fully accessible bathroom.

The motley crew of *Ice Age* animals has experienced many adventures by the time we rejoin Amores and the boys in the family's current home. "It's boiling in here. You turned up the heat, didn't you?" Nobert observes



mildly, and there's reason to believe he's right.

Amores cradles a magic bag to warm her hands; originally from the Philippines, she's no fan of the cold. Hearing that, I'm all the more impressed by her ability to flex with what some partners might dismiss out of hand as an obsession with green.

"GREEN CAN BE MORE EXPENSIVE, BUT SOMETIMES IT WILL SAVE MONEY... IF YOU PUSH IT FAR ENOUGH."

— CONRAD NOBERT

The two met at the University of Alberta in the early '90s, where Nobert graduated from computer science (1999) and Amores earned a zoology degree (1993) and an environmental science degree (1995) before completing NAIT's Computer Systems Technology program in 1999. Married that same year, each began working for NAIT soon after: Nobert as a computer programming instructor, Amores as a systems analyst.

"We were different people back then," Amores recalls. "It's funny because I did study in the environmental science program, but we didn't talk about living a different way. We were young and foolish - and thought we were invincible."

Truth be told, Nobert's youth held signs of his path to come. Growing up near Spruce Grove, he was the sort who'd rally friends to pick up roadside garbage. "My parents were never big consumers," he says. "Both lived close to the land as kids, growing up on farms. I think I just picked up their values and ran with them."

Theirs has been a meandering journey with stops and starts, yet always trending toward green. They no longer eat meat (other than seafood), shop locally, compost, garden - and of course, hang dry.

For a while, Nobert ran a Volkswagen Jetta on biofuel concocted in his garage from waste restaurant oil. But that proved time-consuming. What's more, he knew that a widespread shift to biofuel would quickly outstrip the waste oil supply and require newly grown crops, in his mind "an expensive, topsoil-destroying boondoggle."

Above left, the Mill Creek Net Zero Home will have 35 solar panels, making it one of Edmonton's largest residential systems. Above, the fir beam above the front porch was rescued from a liquor store.

HOME TOUR

Tour the Mill Creek Net Zero Home on June 6, 2009 as part of the Eco Solar Home Tour (ecosolar.ca). Watch for other upcoming tours at greenedmonton.ca.



HIGH def

LEED | /lēd | abbreviation - Leadership in Energy and Environmental Design is an internationally accepted building rating system that provides benchmarks, standards and certification for environmentally sustainable construction. In Canada, the rating system has been tailored for Canadian climates, construction practices and regulations.

Net zero | /not 'zē-(j)rō | adjective - produces as much energy as it consumes on an annual basis. | noun - such a state.

Green-collar | /grēn - 'kā-lor | adjective - Describes the type of job that, according to a United Nations Environment Programme report, not only contributes to preserving or restoring the environment, but has adequate wages, safe working conditions and worker rights. Green-collar jobs can be found in a variety of fields, from plumbing and electrical to engineering and architecture to administration, marketing and retail.

Above, seen from the rear, the more complex parts of this house, including solar panels, would make little sense without the superior insulation and seal.

Then, in July 2007, the family went car-free. "We debated it, believe me," Amores says. "But Conrad said, 'Let's just try it, and the second you want a car, we can buy one.' So I thought it's not forever."

Other than the occasional rental car, cycling fills in the transportation gaps, winter as well as summer. "I call it my zero-minute commute," Nobert says. "I could be putting in an hour in the gym; instead, I hop on my bike and appear at home with my workout done."

Being car free, coupled with the fact that both parents work three days a week, applies welcome counterbalance in a go-go-go culture, Amores says. "We've slowed down because we can't go fast."

What's more, they're saving \$25,000 by not building a garage behind their net zero home.

The journey to net zero had a detour of its own. Back in 2000, the couple hoped to live an energy-frugal life in the 1954 raised bungalow we're sitting in now. After \$25,000 in energy efficiency improvements, the home proved markedly snuggler but no more energy efficient than a standard new house. "And so we realized that, to get as far as we wanted to go, we would have to start from scratch," Nobert says.

In 2005, they bought a 100-year-old house two doors away, thinking they'd rent it out for a decade, then tear it down and build an energy miser. Escalating real estate prices prompted Nobert to dream of speeding up the timeline, and the dream grew legs when he caught wind of plans to build a net zero home in Edmonton with a team involving designer and homebuilder Peter Amerongen of Habitat Studio & Workshop. When Amerongen said they already had a lot in Riverdale for the net zero house, Nobert had a comeback: "Then we want to be next."

It meant a wait, but that gave Nobert time to deconstruct the old house. He saved Douglas fir and maple flooring for the new home. He saved windows for use as cold frames. He knocked out dozens of 2x4s with a sledge hammer, until tendonitis forced him to call a halt. By July 30, 2008, when the bulldozer came in, the house was little more than wood and plaster.

Now Net Zero Two is taking shape under Amerongen's watchful eye. "We're very much on the same page," the homebuilder says. "In fact, if anything, they're pushing me to go further, probably more than anyone else has ever done. I didn't think it was possible to get to net zero on that site without being impractical, but Conrad wouldn't let go."

Not that there weren't compromises. Nobert's desire to use a composting toilet, for example, fell prey to cost, round-the-clock venting needs and predictions of an occasional invasion of flies. "We're pretty dedicated," Amores says. "But flies in the bathroom?"

There's no doubt Nobert and Amores hope their net zero home will help spur a massive migration to green. Nobert has become somewhat of an evangelist for the cause, giving speeches, submitting to interviews and tracking the home's construction on his website, greenedmonton.ca. Beyond building with care, the couple is determined to use this home in a way that proves we can reduce our dependency on fossil fuels. That's what it will take, they believe, to leave Luc and Jacob a world in which life can survive.

"Conventional thinking was that natural gas is pretty cheap, so it doesn't make sense to do what we're doing," Nobert says. "That thinking is what we're trying to turn on its head."

Not to outrun an ice age, but to stop global warming in its tracks. ■

ZERO IN

GET INSIDE THE HOUSE THAT WILL PRODUCE AS MUCH ENERGY AS IT CONSUMES OVER THE COURSE OF A YEAR.



10,391 kWh Estimated total amount of energy needed annually for heating, hot water and appliances

BETWEEN 8,000 AND 8,500 kWh Amount of energy the solar electric system will generate annually

2,500 kWh Amount of energy the solar hot water collectors will produce annually

Rear view of the Mill Creek Net Zero Home.

DESIGN BY HABITAT STUDIO & WORKSHOP LTD.
ILLUSTRATION BY DEREK LUE

1 16-inch walls are filled with cellulose fibre insulation made from recycled newspaper, cutting total heat loss by more than one-third over conventional construction; six-inch walls are fitted with batts of insulation in traditional construction.

2 Large south-facing windows, coupled

with interior concrete floors that absorb heat during the day and then release it during the evening, provide 54 per cent of the home's annual heating requirements.

3 The 6-kW solar electric system, with 12 photovoltaic modules on the roof and 10 on each solar awning, will be one of Edmonton's

largest residential systems when fully installed.

4 Solar awnings will be moved seasonally to orient the solar modules towards the sun for maximum electricity production and to shade the windows in the summer.

5 Solar hot water collectors provide

90 per cent of the home's annual hot water consumption. The remainder is produced by electricity.

6 Interior wood trim and exposed beams were recycled from local sources, including the house that once stood where this one is being built.

7 A grey water collection system flushes toilets

with shower water. Water-efficient plumbing fixtures and toilets will save the equivalent of 734 bathtubs a year of water compared to a new home with fixtures that meet Edmonton's new water-efficient fixtures bylaw.

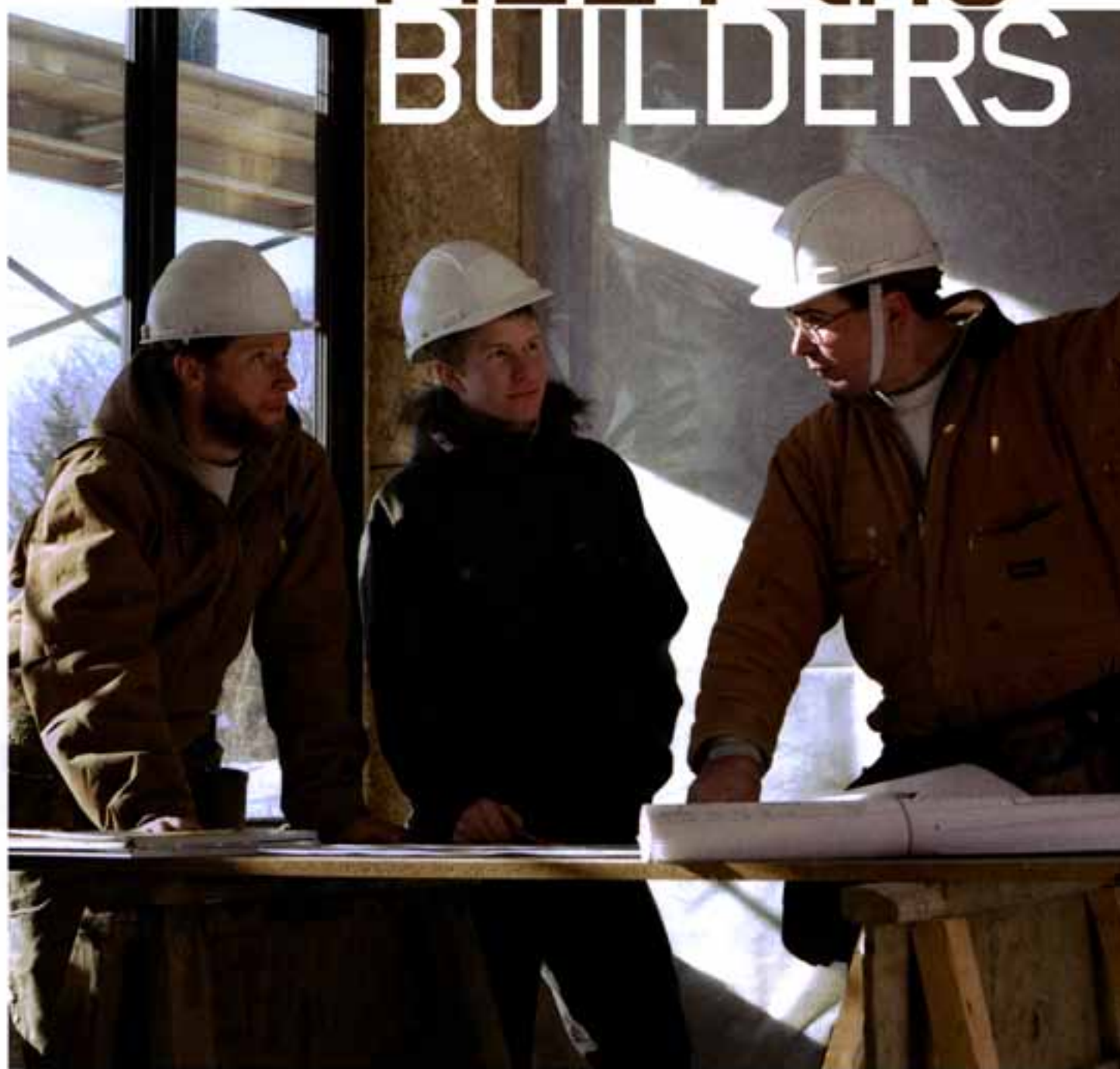
8 A locally manufactured light pipe - a tube that pipes sunlight into

the room - provides daylight to the windowless second-floor bathroom.

9 A selection of the most efficient appliances, plus the decision to hang-dry clothes instead of using a dryer, will reduce electricity use by 50 per cent over that of a typical new home.

- KRISTEN VERNON

MEET the BUILDERS



Above, the push to net zero has provided a welcome challenge for (from left) Mike Paul, journeyman plumber and gasfitter-first class; Paul Whincup, architectural technologist; and Bernie Schaloske, journeyman carpenter.

STORY BY
CHERYL MAHAFFY
PHOTO BY
JASON NESS



MIKE PAUL

Plumbing isn't the first place you'd expect to find beauty or forward thinking in a home. But contractors working with Mike Paul of Up-To-Code Mechanical expect the unexpected.

Take the solar thermal system Paul installed in Edmonton's first net zero house. "It's not only functional, but it looks wonderful," homebuilder Peter Amerongen says. "We had mechanical, chemical, electrical and structural engineers working this out, and he was sitting at the table with these guys, very familiar not only with plumbing concepts and flows, but with the physics necessary to make this work."

Paul began a plumbing apprenticeship on the rebound after partying through two years at the University of Alberta and losing his spot in forestry. "At first I wasn't totally set on plumbing as a career," he recalls. "But as soon as I entered NAIT and started to learn more about the codes and the trade, I was hooked."

Launching Up-To-Code Mechanical in boom time 2003, Paul now employs 11 and is still running to keep up, despite global shifts in fortunes.

It's a tribute to his curiosity about what's coming next, says Bernie Schaloske. "Demand hot water heaters, solar hot water collectors - those are challenges that float his boat."

PAUL WHINCUP

It's not every high school student who studies home lottery flyers for fun. Paul Whincup did, mentally manipulating the blueprints behind those dream homes.

Immediately after high school, Whincup joined Habitat Studio & Workshop as a jobsite labourer. Still intrigued by the bones of a place, he enrolled in Architectural Technology at NAIT while continuing to work part time.

Graduating in 2007, he traded the hammer for such electronic design tools as AutoCAD and SketchUp. Study any plans for a house designed by Peter Amerongen, and chances are you're seeing Whincup's draftsmanship.

Like most Amerongen homes, Net Zero Two took shape in SketchUp, a 3-D Google application that enables clients to envision and even adjust the design. Whincup then transferred the design to AutoCAD for a 2-D perspective that details the building's skeleton and circulatory systems. The push to net zero added a welcome challenge as he plotted out grey water systems, moveable awnings and more.

A 3-D vision of Whincup's own future includes a possible degree in architecture, although he's loath to leave a job that offers daily education. What's certain is that the place he'll someday design for himself will be kilojoules more efficient than the dream homes of his youth.

BERNIE SCHALOSKE

While others in carpentry class were building stairs, Bernie Schaloske and a classmate built two half-scale models of the wall system that makes the Riverdale and Mill Creek net zero homes warm and airtight. One model serves as a teaching tool at NAIT; the other is on display at the Riverdale Net Zero Duplex, where Schaloske discovered his calling after decades of occupational meandering.

Born into a broiler-raising brood in B.C., Schaloske traded sunny Shuswap for Edmonton in 1995 after his family sold the farm. Stints in market gardening and pharmaceutical inventory were followed by symphony marketing, which connected him with the city's musical community and with his life mate, but not with a career.

He got closer after adding landscaping and masonry to his resumé. But it wasn't until the father-to-be, who enjoyed renovating his first home, decided he needed year-round work that he signed on as a finishing carpenter and entered NAIT's Millwork and Carpentry program.

"I learned very, very quickly that there's a lot more to a carpentry ticket than I was ever going to learn by doing a ton of baseboards and window casings," Schaloske recalls. So when a classmate raved about the diversity at Habitat Studio & Workshop, he knocked on the custom builder's door.

A journeyman since February 2008, Schaloske is among the dozen or so NAIT graduates and apprentices building the Mill Creek Net Zero Home. "If there's one disappointment, it is that I could have figured this out a lot sooner," he says. "The consolation is that it's been a very, very interesting ride."

THE PLUMBER, THE DRAFTSMAN, THE CARPENTER - THESE THREE ARE AMONG THE DOZEN OR SO NAIT ALUMNI AND APPRENTICES CONSTRUCTING THE MILL CREEK NET ZERO ENERGY HOUSE.