

# QUAD-LOCK<sup>®</sup> PROJECT PROFILE

## Off the Grid - Whole Building Design



When Colin Dumais thought about building his new home he wanted to feel a connection to it, rather than it being a 'disposable asset' for his family. *"There's no one that passes their home from grandfather to father to son anymore, there's no emotional investment in the structure that houses and keeps our families safe and sheltered."*

Three years ago when the Dumais family were eagerly awaiting their first child, Colin thought about building a legacy home. Colin's new home started with a vision to build a self-sufficient home. He wanted it to be connected to the area so he modeled it after an early 20th century local CPR train station. Finally, he didn't want to live any different and he didn't want his home to cost any more to build.

Colin works as a technology specialist with an electric utility in Calgary, Alberta. His position gives him better vision than most of us on predicting the future of energy consumption and our fate as a planet of over-consumers. With little money, experience and time, he did what most of us do these days – he turned to the internet.

The internet is a big place full of lots of information, so Colin developed a set of criteria to research in his quest to build a self-sufficient home. His basic criteria for his home were:

1. the use of a low-temperature radiant heat source
2. high levels of insulation
3. air-tight building envelope

Colin felt that if he could find products that met his criteria, he would have found the basis for building his home.

Soon after logging on, Colin came across Quad-Lock's website – designing his home using Insulating Concrete Forms (ICF) in an R-40 configuration would deliver on 2 of his 3 criteria right away – high levels of insulation and being built with reinforced concrete, it would provide an air-tight building envelope. *"Using the R-40 configuration was a no-brainer, the additional cost of building with Plus Panels was about \$1.00/sqft (more than Regular Panels), over 2000 sqft that's \$2,000. I got 3 times the insulation value and a whole bunch of options."*

It's like a big puzzle when you design a home as a unified system. With R-40 insulation and an air-tight shell, the home has inherently low energy requirements. This leaves lots of options for heating. *"First we looked at a geothermal heat pump system, based upon our requirements, we would need 6 less wells than if our house was traditionally-framed – right there is a savings of \$12,000. We also experimented with a hydronic boiler that not only heats water but generates electricity. This is new technology, but neither of these were exactly what I was looking for. For the first year that we lived in the house, we used a super-efficient boiler, this can now be used as a back-up system to the solar thermal array we have now installed. Living completely without fuel costs and specifically on a solar thermal array wouldn't be possible, if not for the low energy requirements of this R-40 home."*

*"When all the pieces were put together, using a 'whole building' design approach, I was in positive cash flow from the moment I chose to work with Quad-Lock's Plus Panels. I believe the minimum standard is the building code – we need to be building well above the minimum."*

Since Colin works for an electric utility he has access to advanced monitoring and measurement tools for heating systems which he's included in his home. Colin measures flow rates and temperatures, for example, which floors need heat and when; he also measures domestic hot water temperature. *"I'm collecting the actual data on energy usage for my home – I can prove how much we use and where we use it".*

## Off the Grid - Whole Building Design...cont'd

*In the coldest month last winter, my heating system delivered 8 GJ of heating energy to keep the home warm. A traditionally built wood-framed home with 5400 square feet of conditioned space would have consumed at least 3 times more energy, for a total of 24 GJ. Consider that our national target is to save 1 ton of CO<sub>2</sub> annually per person to combat climate change, my home saved almost that amount in one month's heating fuel savings.*

*1 GJ of natural gas produces approximately 54kg of CO<sub>2</sub>  
(source: <http://www.eia.doe.gov/oiaf/1605/coefficients.html>)*

*Not to mention the price of energy –  
1999: 1 GJ was approximately \$2.00    Today: 1 GJ is \$13.00*



Hydronic Boiler Experiment



Original Super-Efficient Boiler



Distribution System

The solar water system generates a lot of energy and Colin needed a place to store it, so he added an in-floor radiant heat system into the concrete floors. But that wasn't enough, he needed a bigger 'storage area' for his excess energy. That's why he built a detached garage with Quad-Lock's R-40 ICF, too.

*"The garage's 40' X 30' footprint was a project unto itself. I built a basement under the suspended concrete slab parking area for my workshop and ran radiant heat tubes in the walls to store the additional thermal energy from the solar water system. I also added a 1,200 sqft in-law suite above the parking. We live in the Okotoks, which is Southwest of Calgary, Alberta. The winters can get cold here. I had to have a detached garage as the home design does not lend itself well to an attached garage."*

Colin wanted to build a home that would last and he did that. He wanted to build a home that wouldn't cost any more to construct than a traditionally-built home (built to the same energy efficient standards) and he did that. *"We have a home that will be a legacy for our family for generations."*