



## ECOTERRA™ HOUSE EASTMAN, QUEBEC

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ArcelorMittal Dofasco Steel Design, Spring 2013)

### DESIGN AND CONSTRUCTION TEAM

ECOTERRA HOME BUILDER:  
Les Maisons Alouette

DESIGNER:  
Les Maisons Alouette

PROJECT PARTNERS:  
Concordia University, Natu-  
ral Resources Canada, So-  
ciété d'habitation du Québec,  
Hydro-Québec, Les Boisées de  
l'Héronnière, BASF, Geonergy,  
Matrix Energy and Régulvar

STEEL ROOF SUPPLIER:  
Vicwest

STEEL DECK SUPPLIER:  
Canam Inc.



When Quebec-based Les Maisons Alouette designed a zero-energy home for the Canada Mortgage and Housing Corporation (CMHC) EQUilibrium Sustainable Housing Demonstration Initiative, it chose a combination of solar power, passive solar heating and geothermal energy to reduce the energy requirement of the house. Les Maisons Alouette was one of 12 CMHC EQUilibrium competition winners country-wide.

## Steel decking and steel roof in an energy-efficient home

The company built the factory-built, pre-engineered home in Eastman, Quebec and demonstrated it to the public for two years before selling it to a private owner.

The two-storey home has a footprint of 82.5 m<sup>2</sup> (888 sq. ft.) and 141 m<sup>2</sup> (1,517 sq. ft.) of interior space. There is a living room, dining room, kitchen, bathroom and laundry on the first floor and two bedrooms, an office and a bathroom on the second floor.

Les Maisons Alouette chose pre-painted galvanized steel standing seam roof, coloured QC6068 Black, of which 57.2 m<sup>2</sup> (616.7 sq. ft.) is south-facing, to comply with a subdivision covenant. That requirement, however, was well-suited for the solar array, manufactured by Michigan, USA-based UniSolar: The three kilowatt, thin-film photovoltaic array is laminated to the south-facing roof and is almost invisible. The result is a nearly seamless integration of the solar panels with the house.

Heat from a cavity beneath the metal roof is recovered for the clothes dryer, to help heat the hot water and to passively heat the basement floor space through a ventilated slab. To heat the 4m by 11m (13' by 36') room, the air in the roof cavity, which reaches 75°C (167°F) in the summer and 55°C to 60°C (131°F to 140°F) in the winter, is blown through Canam's P2436 profile 0.7mm (.0275") galvanized steel decking in the floor.

First, insulation, polyethylene sheets, polystyrene insulation and expanded metal grating was laid down, then the decking was laid down and covered with 125mm (5") of concrete. The cold formed steel decking acts as a hollow core for the heated air to blow through. The grating creates turbulence to give the air better contact with the steel decking, another innovative use of cold formed steel in residential construction.

The solar array can generate up to 3,420 kilowatt hours (3,420,000 watt-hours) a year. The array and the other energy efficient features of the house, which requires only 17% of the energy of the average Canadian home, result in a net energy consumption of nearly zero.





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