



Better Choices  
Better Homes  
Better Lives

# Eco-Solar Home Tour – 2011

Saturday, June 4, noon to 4pm

## Site #4: Belgravia Green – Net Zero Energy Project

**Address:** 11536 74 Ave  
**Hosts:** Effect Home Builders, homebuilder  
**Parking:** available on street  
**Rating:** middle house: net zero energy (modified EnerGuide rating 100+), east house: net zero ready (EnerGuide 94), and west house: near net zero (EnerGuide 90)

### A. Net Zero Energy – different houses, different options

- Belgravia Green is a development of three houses side-by-side in the Belgravia neighbourhood. Each house features different environmentally-friendly designs that compliment the aesthetics of a modern house.
- These houses are under construction. Come and see the design, the space, the different wall construction and the different technologies used. Come and learn from the builder on what it takes to make these houses.

### B. Why these houses are on the Eco-Solar Home Tour...

- These three houses show how a similar amount of money spent on different technologies can get you a much more efficient home.
- The show home as a net zero house costs about \$108,000 more to build than the equivalent-sized standard house. A net-zero ready configuration of the home on this lot would be only \$38,000 more and be ready to easily add its solar-electric system at any time in the future.
- Each of the homes uses efficient technologies while staying close to this type of budget. In each home this extra money has been used in different ways to create its ultra-low consumption of energy from the grid.

- West house, near net-zero energy: the money was for insulation and a geo-thermal heat pump.
- Middle house, net-zero energy: the extra money was for the insulation, an air-thermal heat pump and a large solar-electric system.
- East house, ready for net-zero energy: the extra money was for insulation and a smaller solar-electric system.
- Each technology has its unique features. It is very informative to have all three houses side-by-side on the tour so that everyone can compare and learn.
- All three homes will have EnerGuide ratings of more than 86 and so will qualify to receive the Alberta government's pro-active energy efficiency incentive of \$10,000 to the homeowner.

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**Note:** Items with a "➔" symbol here are presented on the Tour. "❖" will not be presented. "•" are information points.



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### **C. Main Features – elegant architecture, respectful of the environment**

- Three renewable energy systems will be incorporated into the houses: passive solar space heating, geothermal space heating and solar electricity. The passive solar exposure was reduced at these sites because of the shade from the beautiful, mature boulevard trees. This resulted in much larger solar-electric systems than would be needed where the passive solar exposure was high.
- **West house:** – is near the net zero energy goal. This house has expanded-polystyrene insulated walls, triple-glazed windows, and a geo-thermal heat pump heating system.
- **Middle house:** – achieves the net zero energy goal. The house has expanded-polystyrene insulated walls, triple-glazed windows, passive solar heating with thermal mass in a structural concrete floor and an air-thermal heat pump heating system. A large solar-electric system generates all its electrical energy.
- **East house:** – is near net-zero energy and ready to meet the net zero energy goal. This house has cellulose-insulated double-stud walls, south-facing triple-glazed windows, and electric baseboard heaters. The house will reach the net-zero energy goal whenever in the future the homeowners install a large solar-electric system on the garage and the east-facing roof.

### **D. Technology Details**

- **Wall Systems** Two wall systems are used in the project:
  - 300 mm (12”) thick R-48 expanded polystyrene (EPS) NASCOR system. This is combined with a “Pink Wood” material coating to resist fire, water and mildew.
  - 400 mm (16”) thick R-56 double stud wall system.
- **Foundations** All the foundations use Insulated Concrete Forms (ICF) systems with additional EPS in the interior walls. The basement foundations all achieve an R-41 rating.
- **Windows** The homes feature triple-glazed windows with three low-E coatings, argon gas fill, and insulating spacers.
- **Insulation** Expanded polystyrene (EPS) is a non-toxic, chlorofluorocarbon-free (CFC) material that is resistant to mould and rot. It is used under the basement slabs, in the ICF basement forms, and in the NASCOR wall system. The cellulose fibre used in the double-stud walls and attics is made from post-consumer recycled paper and is blown in densely and with a special binder to prevent settling.
- ❖ **Ventilation** Each house is tightly sealed to reduce natural heat loss. Good air quality is ensured by incorporating a heat recovery ventilator to exchange the air in the house and recover up to 88% of the heat from the exhausted air.
- **Passive Solar** The net-zero energy house uses a thermal-mass concrete floor supported with special Hambro floor joists. The floor absorbs, stores and distributes passive solar heat from the windows. A special diamond polish finish will make the floors really attractive.
- ❖ **Solar electricity** A large solar photovoltaic system is on the net zero home and can be easily added into the other two whenever the homeowners wish. This system will generate all the electrical energy for the house over the year. All excess electricity is fed back into the electrical grid at any sunny and cloudy time of the year.
- ❖ **Heating Systems** The three houses feature different heating systems:
  1. geo-thermal heat pump: extracts heat energy from the ground by circulating liquid through three boreholes and pumps the heat into the house. Typically extracts two times more heat from the ground than the electricity used to operate it.
  2. air-thermal heat pump: extracts heat energy from outdoor air and pumps it into the house. Typically extracts from zero to three times more heat from the air than the electricity used to operate it, depending on outdoor air temperature.
  3. electric baseboards: extract heat energy from electricity and distribute it around the house. 100% efficient. Very simple, very inexpensive to install.