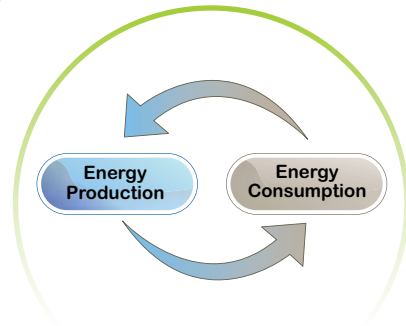




Avalon's first net-zero house, the Discovery 4 House, is built to test and demonstrate the latest in environmentally efficient building technologies and represents the platform for our future home building.

Measured annually, a net-zero house generates an amount of energy equal to the total amount needed by its occupants. Discovery 4 House combines state of the art energy efficient construction techniques and equipment with renewable solar energy to achieve this milestone.



## Discovery 4 House Hooked up to the Renewable Energy of the Sun

Solar energy is renewable energy with zero GHG emissions and unlike fossil fuels, solar energy is available just about everywhere on earth. The best part is that this source of energy is free and immune to rising energy prices. Solar energy can be used in many ways - to provide heat, lighting, mechanical power and electricity.

Renewable solar power provides all the energy required by Discovery 4's heating and electrical systems. Solar power for the heating system is captured by thermal solar panels located on the exterior south and west side of Discovery 4. Heated circulating glycol heats water for space and domestic hot water needs.

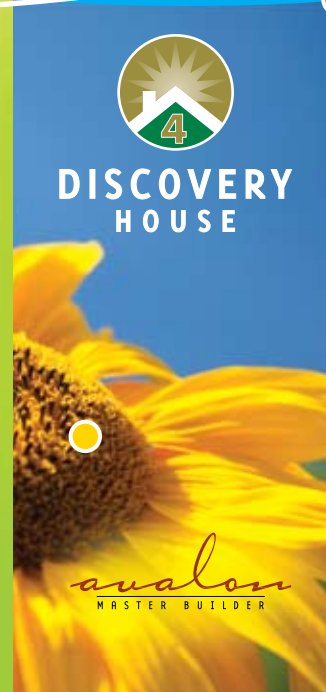
The roof top SunTech Photovoltaic solar system is designed to generate 8085 Kwh/ year and includes two Fronius inverters. The electricity is converted into usable 120v and distributed to the power grid of the home through a standard electrical panel. A bi-directional meter sends any excess power to the grid and draws power from the grid when necessary. To reduce power requirements, Discovery 4 House is equipped with LED, compact fluorescent and energy efficiency appliances throughout the house.

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**DISCOVERY  
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## The House is a System

Net-zero performance can only result from approaching the house as a system. The Discovery 4 House features three major interdependent parts, each impacting its overall performance - the building envelope, the mechanical systems and the renewable energy systems. All are optimized to end up with a durable, comfortable, and energy efficient environment.

When all the parts work together in an optimal way the reward is a durable, comfortable, healthy and energy-efficient home environment that people love to live in. Avalon's Discovery 4 House delivers on the key benefits of better homes: resource conservation, energy efficiency, comfort and affordability.



## High Performance Building Envelope

A net-zero house needs a wall, roof and foundation system that increases the effectiveness of the other systems. The Discovery 4 House building envelope is optimized for both insulation and air tightness.

Exterior walls are composed of factory manufactured structural insulated panels comprised of six and one-half inch poured polyurethane foam panels sandwiched between two sheets of oriented strand board. With this system,



the amount of on-site construction waste is substantially reduced. Most important for our net-zero house is the thermal rating of R-44, that's more than twice conventional construction standards while the panels virtually eliminate thermal transfer, moisture build-up and energy draining leaks from the home.

Starting from the ground up, Discovery 4 doubles the insulation of conventional homes, utilizing permanent insulated form work to pour the exterior foundation walls. Once complete, the interior frost wall allows homeowners to quickly finish the basement and add additional living space.

Significant heat loss through the roof and particularly at the roof wall connection, is prevented with a combination of blown in fibre insulation and sprayed in polyurethane insulation increasing the ceiling insulation from a building code standard of R-36 to an R-85 rating.

As with all Avalon homes, all exterior penetrations are sealed with low expanding foam insulation, delivering air barrier continuity.

Windows are typically the biggest source of heat loss in a home. Industry standard double glazed windows are replaced with triple glazed windows with 2 layers of low emissivity coating and 2 layers of argon filling increasing thermal resistance. Together, this significantly increases thermal resistance in winter and reduces solar radiation penetration during summer.

## The Mechanics of a Healthy Energy Efficient Home

Such a tight building envelope needs good ventilation to remove unwanted moisture, pollutants and allergens. Since Canadians spend up to 90 percent of our time indoors, a home with poor indoor air quality can contribute to the development of asthma, headaches, congestion and nausea. A high performance insulated and sealed building envelope combined with a right sized heating/cooling system creates a healthier, more comfortable, energy efficient home.

The Discovery 4 House heat recovery and ventilation system (HRV) improves indoor air quality by continually exchanging air throughout the entire house removing unwanted moisture, pollutants and allergens.

Discovery 4's primary heating system is a water furnace fan coil, which distributes solar heated, filtered, treated air throughout the home like a conventional forced air furnace without the need for natural gas. An electric tankless water heater brings the water up to final temperature if required. Domestic hot water is also withdrawn from this system.



Avalon's vision is to build 100% of all homes as net-zero homes by the year 2015 for no additional cost to consumers.

"We are continually innovating with new projects, exploring intelligent "green" home technology alternatives so that our customers can live in healthier, more comfortable homes that save money today and reduce their environmental footprint in perpetuity."

**Ryan Scott**  
President and CEO  
Avalon Master Builder.

Many of the green features showcased and tested in our Discovery homes have become part our standard specification package. Emerge Homes, a division of Avalon Master Builder, are truly different. We've created a unique environment that offers eco-friendly living, without forsaking the style and imaginative design that you wish for in a new home. Emerge Homes is currently building these exceptional detached laned homes in the great community of McKenzie Towne. Avalon's ZEN in Aspen combines the convenience of maintenance free living with eco-friendly style. These town homes are designed for living in balance with the environment and your pocketbook.

Visit our website for more details  
[www.avalonmasterbuilder.com](http://www.avalonmasterbuilder.com)