EQuilibrium™
HEALTHY HOUSING
FOR A HEALTHY ENVIRONMENT

Project Profile: EchoHaven—Calgary, Alberta

This Project Profile highlights EchoHaven, one of the winning entries in the Canada Mortgage and Housing Corporation (CMHC) EQuilibrium™ Sustainable Housing Demonstration Initiative—a national initiative to design, build and demonstrate sustainable homes throughout Canada.[1]

Figure 1—The southern façade of the EchoHaven EQuilibrium™ Project

Project Description

The EchoHaven EQuilibrium™ project is a new home with a main floor and finished lower floor with a south facing 'walk-out'. The living area (heated space) is 225.3 m^2 (2,425 sq. ft.); the total area, including exterior walls and attached garage, is 306.4 m^2 (3,298 sq. ft.).

EchoHaven is located in a new 25 building lot development in the City of Calgary. Echo-Logic Land Corporation created the vision for the sustainable community and is the developer.

The 2.6 hectare (6.4 acre) south-east sloping development features and protects wetlands and indigenous

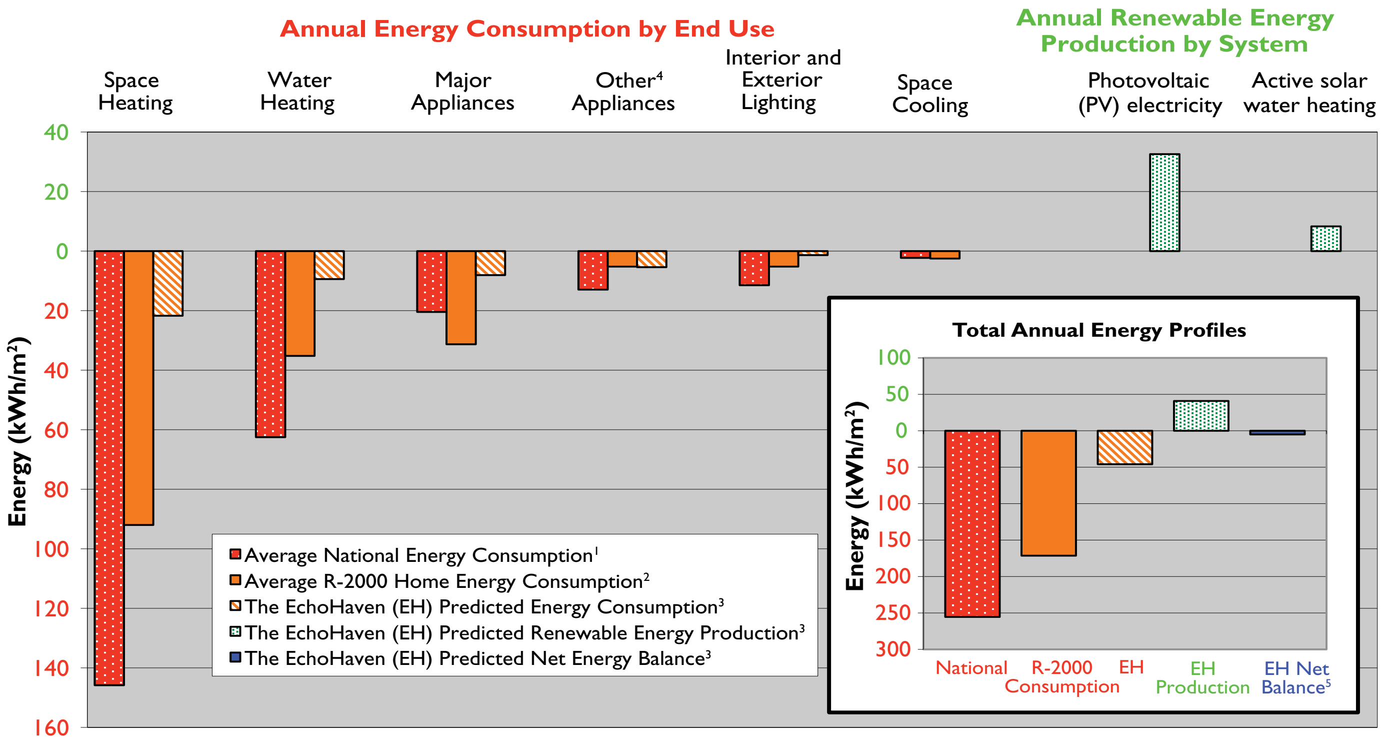
Key Features

- Site-sensitive building location, orientation and design
- Highly energy-efficient building envelope to reduce space conditioning needs
- On-site active solar thermal heating panels, a dedicated 5.46 kW photovoltaic (PV) array, and a planned community PV array
- Rain water harvesting for site irrigation, toilet flushing and clothes washing
- Heat recovery ventilation and low pollutant emitting materials and finishes
- Chemical free insecticides, herbicides, organic fertilizers and Integrated Pest Management controls

[1] To find out more about this initiative and the other EQuilibrium™ homes, visit the CMHC website www.cmhc.ca or www.equilibriumhousing.ca.

Canada

CMHC SCHL
HOME TO CANADIANS



1 Source for National and R-2000 Energy Data: Residential Secondary Energy by End Use, 2004; Energy Use Handbook Data: 1990 and 1998 to 2004, Natural Resources Canada, 2006.
2 R-2000 Home values are based on the Canadian Centre for Housing Technology (CCHT) houses built to an earlier R-2000 standard in the 1980s.
3 Values are predicted based on Natural Resources Canada's HOT2000 and RETScreen modelling software. Actual results may vary.
4 "Other Appliances" includes small appliances such as televisions and other consumer electronics, toasters, microwave ovens and vacuum cleaners.
5 EH Net Energy Balance = EH Energy Consumption + EH Renewable Energy Production

Figure 2—Energy Profile: Comparison of Canadian National Average[1], R-2000 Home[2] and predicted EchoHaven (EH) Annual Residential Energy Consumption and Production

vegetation such as aspen stands and prairie grasses. The site sensitive building orientation and design optimizes solar exposure, utilizes the terrain to shelter the home from the northern winds, preserves desirable views, and integrates the house with its natural surroundings. The developer intends to preserve over 60% of the natural features, in part by clustering building lots in the least environmentally sensitive areas and minimizing site grading and other disturbances. Each lot is relatively small, thereby helping limit house size and associated resource consumption, as well as reducing the impact of residential development on the ecological integrity of the site. Each lot also has guaranteed solar access. Homes are close to public transit and the intent is that occupants will share planned community amenities such as a common photovoltaic (PV) array, a greenhouse, a community building, and a composting and recycling centre.

In keeping with the requirements of the CMHC EQuilibrium™ Sustainable Housing Demonstration Initiative, the key objective of the EchoHaven team was to design and build a home that features a healthy indoor environment, energy efficiency, low environmental impact, significant resource conservation, affordability considerations, and that is predicted to produce almost as much energy as it consumes in a year (a near net-zero energy home) from on-site renewable energy systems.

The home can be adapted to accommodate a family, empty nesters, a home office, or a secondary suite. The 119.1 m^2 (1,282 sq. ft.) main floor living area utilizes an open-concept design with a combined dining/living room, kitchen with insulated cold storage room for non-perishables, 3 piece bathroom, master bedroom with combined 4 piece ensuite and walk-in closet, and second bedroom. The dining/living room opens on to a deck over the garage. There is also a 12.1 m^2 (131 sq. ft.) loft area above the kitchen.

The 94 m^2 (1,012 sq. ft.) wheelchair accessible lower floor contains an open area, a bedroom/office room, the laundry room, workshop/ mechanical room and heated storage area. There is also an unheated garage and storage area.

The EchoHaven design considers the entire home as an integrated system. It takes into account a variety of factors including the home's impact on, and interaction with, the surrounding environment. The choice of building materials took into consideration their production, transportation, and the manner in which they would be used. The walls and roof trusses were prefabricated and shipped to the site. Prefabrication of the exterior wall trusses allowed for construction under controlled conditions, and minimized site waste. The well insulated, air-tight building envelope, and energy-efficient mechanical systems, appliances and lighting fixtures are predicted to reduce the household energy requirements, on a per m^2 basis, to 18% of the energy requirements for a typical Canadian home. In addition to the passive solar space heating, radiant electric panel heating (installed behind the ceiling drywall) with programmable thermostats has been designed to provide excellent occupant comfort. Electricity for the space heating and other household needs will be offset, in part, by the 26 module 5.46 kW PV array on the home and the planned community array, both of which are tied to the electrical utility grid. Two flat-plate solar thermal collectors, connected to a 341 litre (75 imp. gal.) hot water storage tank, and an on-demand backup electric heater provide domestic hot water. During the first year of occupancy, renewable energy generation, energy and water consumption, and several indoor air quality parameters will be monitored to assess the building's performance.

Occupant Health and Comfort

EchoHaven has been designed to provide a healthy indoor environment with superior air and water quality, natural lighting in all regularly occupied rooms, and building elements to help ensure a quiet home. An indoor air quality management plan was in effect from commencement of construction. For example, absorptive materials that were installed or stored onsite were protected from dust and moisture, and the heat recovery ventilation (HRV) system, including ducts, was sealed to prevent the intrusion of dust and debris into the system during construction.

Indoor air quality and thermal comfort for the occupants were optimized with the careful placement of operable windows to engender natural air flow and air exchange. A high-efficiency HRV ensures continuous exchange of stale air with fresh air while helping to control moisture, odours and other contaminants that may be generated in the home. The HRV system incorporates exhaust booster fans for the bathrooms and kitchen to improve system effectiveness. Air quality was enhanced by installing easy-to-clean, non-porous surfaces, such as concrete flooring sealed with environmentally friendly, water-based concrete sealants and sustainably harvested meranti[2] hardwood stairs, as well as recycled glass countertops. The use of synthetic materials was minimized, and where painting, sealing or gluing was required water based substances with low levels of volatile organic compounds (VOCs) were used.

The retention of natural site features (e.g. trees) in the development will help attenuate external noise. Noise management strategies for the interior include the highly insulated and well-sealed building envelope, triple-glazed windows, and quiet kitchen and laundry appliances.

The risk of soil gas infiltration into the home (e.g. methane, radon, and water vapour) was minimized with the installation of a perforated pipe in the gravel bed below the house, the use of subslab polyethylene and

[2] Meranti is the common, or trade name given to a variety of tropical hardwood tree species in the *Shorea* genus.

rigorous air leakage control around slab and below-grade foundation wall penetrations such as floor drains and water pipes. The perforated pipe is attached to a solid pipe which surfaces in the mechanical room and is attached to an inline fan which vents any subslab soil gas outdoors.

The windows sit in thick walls, and smaller openings are splayed toward the interior to increase sunlight penetration into the home during the day. The large windows on the south face of the house, combined with the strategic placement of windows on the west on the second floor, ensures that occupants enjoy good daylighting for much of the day in commonly occupied areas.

Interior glazing was used throughout the house to spread daylight into interior areas of the home that would otherwise require electric lighting during the day. Interior glazing materials included recycled glazed doors, translucent resin panels (with recycled content), and glass.

A manual exhaust fan on a timer was installed in the garage to help control levels of carbon monoxide and other pollutants associated with operating vehicles and other devices with combustion engines. A carbon monoxide detector located in the entry area from the garage provides additional protection.

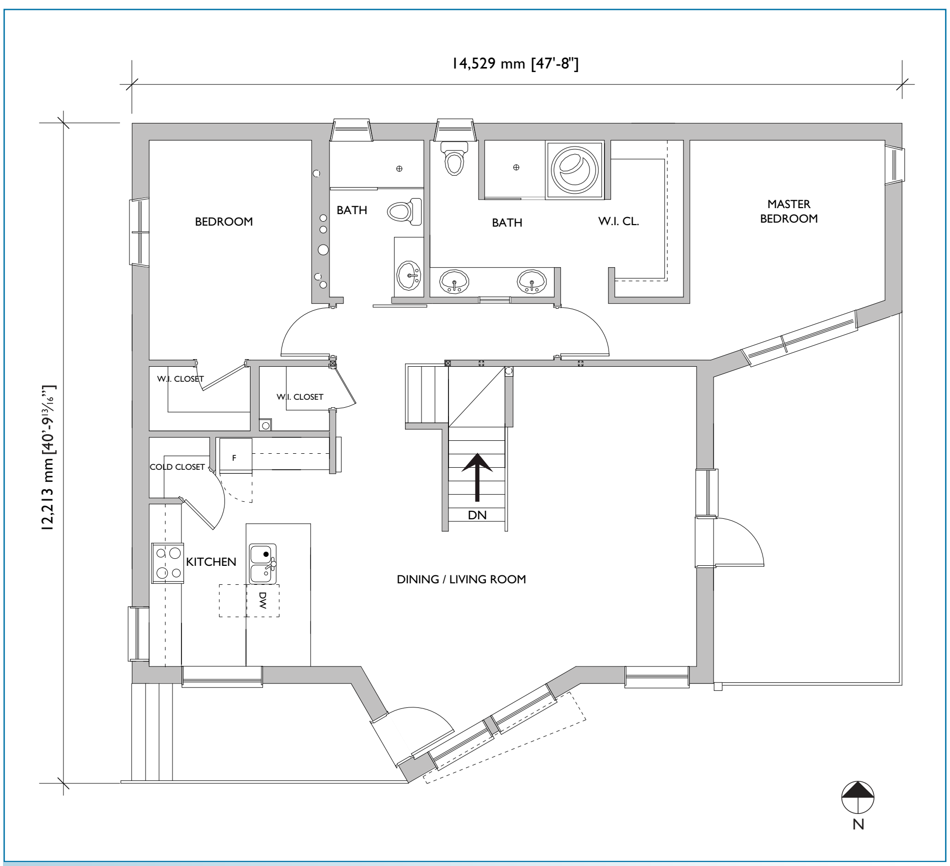


Figure 3—Main floor plan of the EchoHaven EQuilibrium™ Project

Energy Efficiency

EchoHaven employed a two-stage strategy to achieve a predicted near net-zero annual energy consumption. The first strategy was to design and construct a home that is very energy efficient. This involved the design and optimization of solar orientation, building envelope features such as increased insulation and airtightness, energy efficient windows and doors, and energy efficient mechanical systems, appliances and lighting.

Optimal solar potential was achieved by orienting the building to face due south with the west and north portion of the lower floor foundation partially buried in the hillside. The use of large south facing windows contribute to passive solar heating, and the 16 mm (5/8”) drywall on interior walls, and the concrete floors, help to absorb and retain daytime heat gains which are released as the inside temperature cools in the evening.

The building envelope was highly insulated and well-sealed. The basement concrete floor slab rests on 19 cm (7.5”) of compacted gravel over 20 cm (8”) of extruded polystyrene (EPS) Type II rigid insulation, yielding an RSI value of 5.6 (R-32). The lower floor exterior walls are pressure treated wood frame on a wood footing. The walls have 10 cm (4”) of EPS insulation on the outside of the sheathing and 15 cm (6”) of closed-cell (2 lb/ft^3) polyurethane spray foam between the studs. This assembly yields an RSI value of 9.5 (R-54). In order to provide protection for the footings from potential freezing and thawing of adjacent soil, a 'skirt' of EPS rigid foam insulation extends 1.2 m (4 ft.) out from the foundation wall in locations where the height from the footing to the finish grade is 1.8 m (72") or less. Where grade is between 1.2 m to 1.8 m (4 ft. to 6 ft.) above the footings, a skirt of 50 mm (2") EPS (RSI 1.4, R-8) is installed; where grade is less than 1.2 m (4 ft) above the footings, 100 mm (4") (RSI 2.8, R-16) is installed. The main floor exterior walls were fabricated off-site in a controlled indoor environment. A double wall system was built, with 38 x 89 mm (2"x 4") interior bearing members and 38 X 63 mm (2"x 3") exterior members 'hung' from the bearing members with plywood gussets, resulting in a 30 cm (12") deep wall assembly. After assembly on-site, the walls were insulated with 90 mm (3½") of 2 lb polyurethane foam insulation as well as 215 mm (8½") of blown-in cellulose, yielding an overall RSI value of 10.2 (R-59). The roof trusses contain 90 cm (30") blown-in cellulose, yielding RSI 19.2 (R-108).

High-performance fibreglass frame, argon filled, low-emissivity triple glazed windows were sized and placed to ensure abundant daylighting in the living spaces, as well as solar gain in the colder seasons, while minimizing evening heat loss. To further enhance solar gains, the north, east and west facing windows contain one pane of low iron glass and the south facing windows include two panes of low iron glass. Polyurethane insulated fibreglass exterior doors also contribute to the energy-efficient building envelope.

Special attention to air sealing of building envelope penetrations (e.g. window and door openings, vent and pipe penetrations), as well as roof-wall and wall-floor intersections provided superior airtightness. An air-leakage rate of 1.04 air-changes per hour at 50 Pa was achieved during the final blower door test.

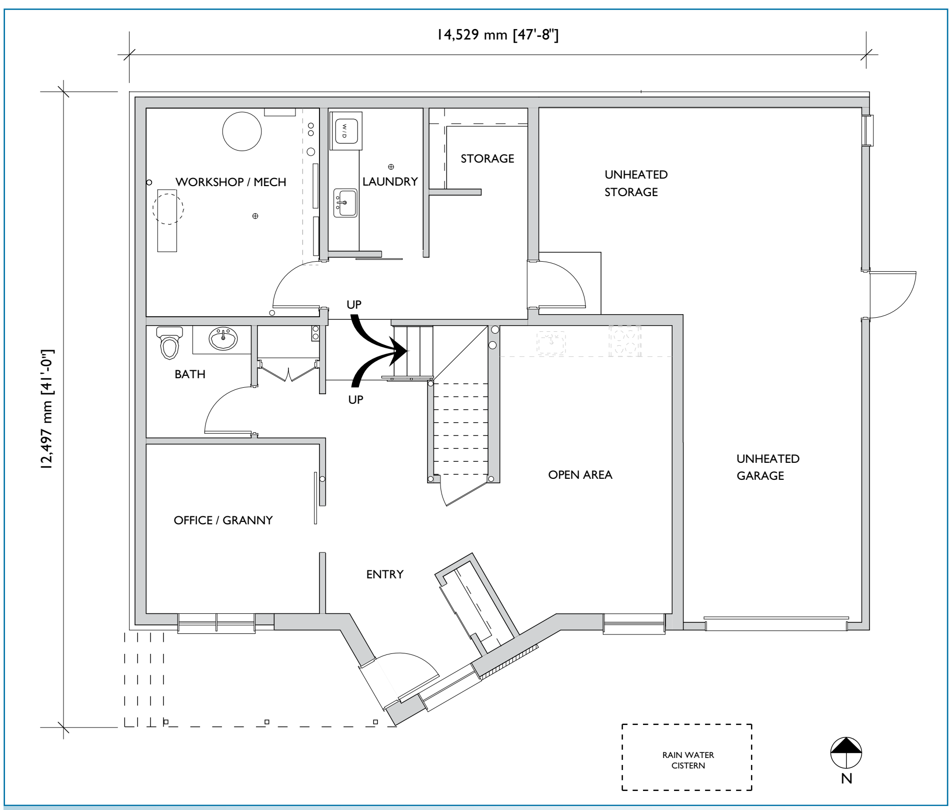


Figure 4—Lower floor plan of the EchoHaven EQuilibrium™ Project

Energy-efficiency considerations also played a key role in the selection of mechanical systems, appliances and lighting fixtures. The HRV contains energy-efficient electronically commutated (brushless DC) motors. Energy efficient appliances were selected using the NRCan EnerGuide Appliance Directory 2010[3] and lighting energy requirements will be substantially reduced with the use of compact fluorescent, T5 fluorescent and LED lighting.

A cold storage closet adjacent to the kitchen provides supplemental food storage. The well insulated closet (complete with well-insulated, weathertight door) is actively ventilated by a thermostatically controlled 6 volt fan that draws outdoor air into the closet via a 40 m (131 ft.) duct buried in the ground outside the home.

[3] For further information, and to order copies of the directory, see www.oee.nrcan.gc.ca and search under "EnerGuide Appliance Directory 2010."

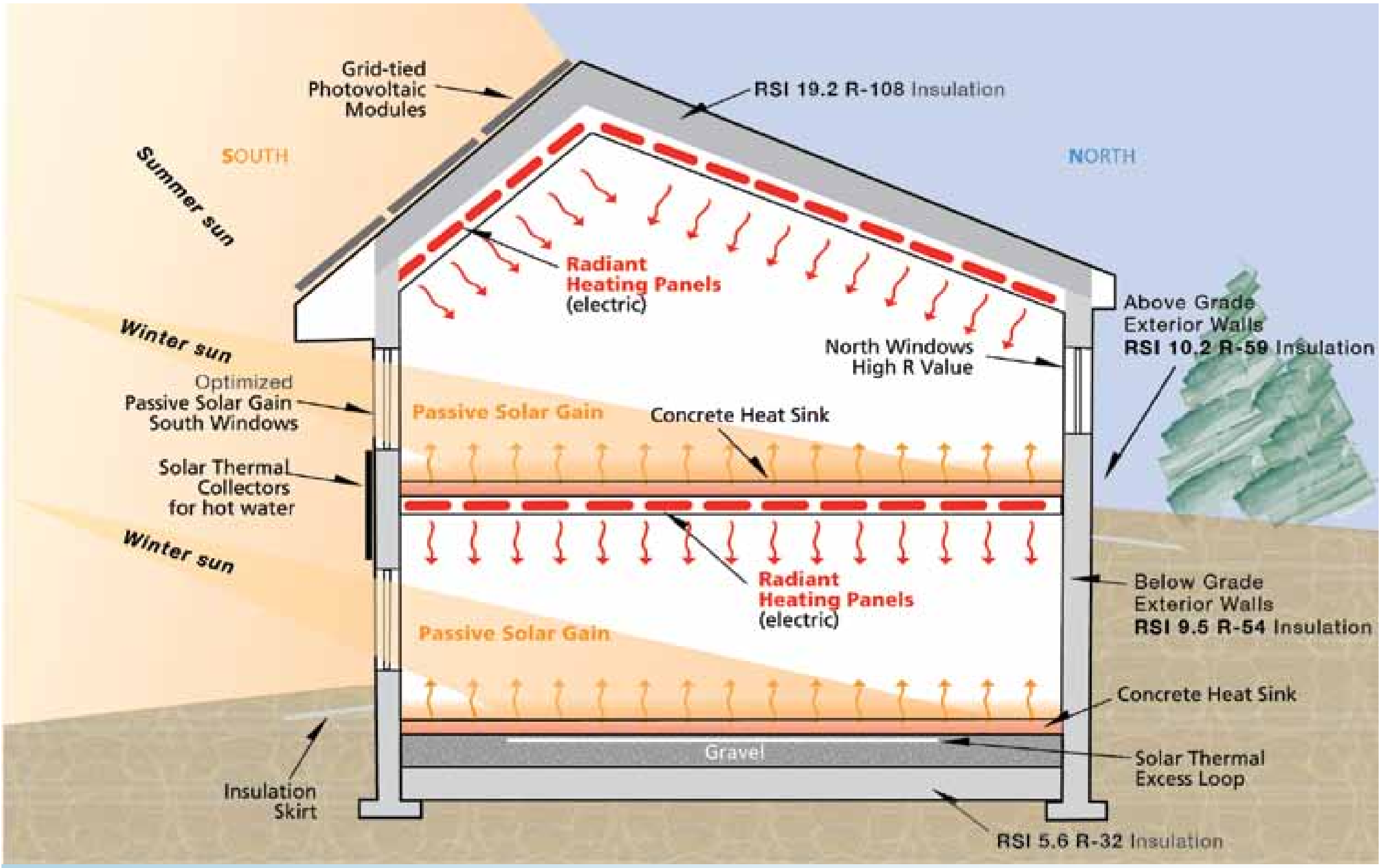


Figure 5—Cross-section of EchoHaven showing insulation and space heating sources

The buried duct is intended to maintain a consistent cool temperature in the closet year round.

The induction cooktop and convection oven are intended to reduce the energy required for cooking. The electric clothes dryer is a self-contained condensing unit that does not require venting outdoors. This eliminates both the heat losses associated with conventional clothes dryers that vent heated air outdoors and the need for a building envelope penetration that can increase unwanted air leakage.

Electrical radiant heating panels are located behind the ceiling drywall and heat most of the living space. These heaters provide a quiet and unobstructed method of zoned radiant heating. Digital programmable thermostats control the nine zones of heating in the home maintaining comfort while permitting energy saving setback temperatures on a zone by zone basis.

A ‘kill switch’ turns off non-essential appliances and lighting when activated. The switch is located beside the garage door so that non-essential house circuits can be shut down when the residents leave for the day to reduce the small, but not insignificant, continuous electricity draw associated with many appliances and home electronics. Exterior lighting is minimal and located at the exterior doors only.

Energy recovery is also part of the first strategy. The HRV recovers heat from outgoing exhaust air to preheat incoming fresh air. Additionally, a drain water heat recovery (DWHR) device transfers heat (estimated at 1,100 kWh/yr) from drain water that would otherwise be lost to the sewer system to the incoming cold potable water destined for the domestic hot water storage tank.

Renewable Energy Production

The second strategy was to install renewable energy systems, i.e. the electricity generating photovoltaic panels and the solar hot water heating system. These systems are predicted to have sufficient combined capacity to nearly meet the home's reduced energy requirements on an annual basis.

A grid-connected 5.46 kW PV array of 26,210 watt, modules is mounted on the south face of the standing seam metal roof and is expected to generate 6,900 kWh/yr. The system uses micro-inverters, also mounted on the roof. PV electrical energy is first used by any demands in the house; any excess is fed to the grid. A planned grid-connected community array will also contribute to meeting the electrical needs of the EchoHaven home and Echo-Logic community.

Two flat-plate solar thermal collectors are integrated into the vertical siding on a southeast facing wall. The position of the collectors will enable easy cleaning if required and the vertical mounting will help improve their solar gains in winter. The custom made collectors, which total 5.2 m^2 (56 sq. ft.) of collection area, are predicted to produce approximately 1,900 kWh/yr of heat energy, providing about 59% of the domestic hot water energy needs of the home. They are connected to a 341 litre (75 imp. gal.) hot water storage tank that provides domestic hot water. When the water temperature in the tank is higher than required for domestic use, excess heat is directed to a 'heat dump loop' imbedded in the gravel under the concrete slab.[4] When the water temperature is insufficient to meet domestic needs, a separate "on-demand" (or instantaneous) backup electric water heater ensures proper hot water temperature.

Resource Conservation

The EchoHaven design incorporates features that help conserve resources. These features include the relatively modest building footprint and floor area, durable building components, efficient use of materials, water conservation, and design for adaptability and flexibility as occupants' needs change.

Both the relatively modest house size (255.3 m^2 [2,749 sq. ft.]), and the small (157.6 m^2 [1696 sq. ft.]) footprint is in keeping with the Echo-Logic Lands community vision of reduced ecological impact on the surrounding site. The exterior stucco finish, installed over a drainage 'wrap', and the roof overhang, will help protect the building envelope from the elements. Low maintenance exterior and recyclable finishes such as metal and hardwood were used, as were pre-fabricated exterior walls, roof trusses, and I-joists, all of which can help reduce material requirements and waste. Fly ash, a 'waste' product from coal-fired generating stations, was used to reduce the amount of cement in the concrete slab thereby reducing the greenhouse gases associated with the production of cement powder.

Water conservation is required by the Echo-Logic Lands subdivision condominium association. The use of low flow fixtures, dual flush toilets, and water efficient appliances (dishwasher and clothes washer) will decrease the use of potable water.

The community bylaws also require the houses in the development to capture rainwater and treat and store it for site irrigation, toilet flushing and clothes washing. Rainwater from roof run-off is collected in a 6,000 litre (1,321 imp. gal.) cistern buried under the driveway. The cistern is constructed from tank modules which are manufactured using recycled plastic. The rainwater collected at EchoHaven is pumped from the cistern into the workshop/mechanical room, where it is directed through a 5 micron particulate filter and an ultraviolet filter. When the cistern is empty (e.g. at times during the winter or extended dry periods), the water supply for the toilet, clothes washer and (if required) irrigation automatically switches over to city potable water. Alternately, if more rainwater is collected than the cistern can hold, the overflow is directed to a natural pond near the house rather than into storm sewers.

[4] While excess heat will be transferred to the gravel at all times of the year, the vertical orientation of the solar panels will result in less heat generation (and transfer) during the cooling season (e.g. summer, when the sun is high) than would be the case with panels mounted on a south facing roof.

All the homes will have, and all the lots are serviced with, both blackwater and greywater[5] wastewater lines; the community intends to eventually collect and treat the greywater from the homes and use this water for plant and tree irrigation.

In terms of flexibility and adaptability, EchoHaven has been designed drawing on CMHC FlexHousing™ concepts[6]. All rooms on the lower floor are wheelchair accessible, and the lower floor could be converted into a secondary suite with separate entrance; plumbing and electrical requirements have been 'roughed-in' for a kitchen area, for example. In addition, there is provision in the structural design for a future elevator to the main floor, if required.

Reduced Environmental Impact

In addition to the features outlined above, other development philosophies as well as design and construction technologies and techniques are expected to reduce the environmental impact of the EchoHaven project and the Echo-Logic community.

A comprehensive construction waste management strategy, including manual daily separation and recycling for wood, gypsum (drywall), and metal waste, was in place during construction. The site did not have utility electrical service during much of the construction. This necessitated on-site electrical generation, an estimated 80% of which was from photovoltaic generation. To reduce waste during operation, the home includes recycling and garden composting bins.

The site landscaping incorporates a combination of low maintenance drought resistant and native plantings which require little irrigation. Site landscaping includes low grasses, deer resistant indigenous perennials, aspen, shrubs and spruce trees. The latter, located to the north of EchoHaven, help shelter the north side of the house from the prevailing winter winds.

The reductions in greenhouse gas (GHG) emissions due to the use of energy conservation and renewable energy features, the reductions in indoor pollutant emissions with the use of natural and low VOC building materials and the absence of combustion appliances (e.g. gas appliances or wood fireplaces) in the home will further reduce local air pollution emissions.

The incorporation of sustainable features such as those found in EchoHaven into future Echo-Logic homes, and the sharing of amenities, will help reduce the environmental impact of the community. The planned community building will provide two guest suites for temporary lodging, decreasing the need for guest bedrooms in the homes. It will also function as a permanent demonstration centre for visitors. There will be opportunities for shared transportation and community-based employment. The planned community PV system will be designed to help with energy security, and the greenhouse (to be built on an existing concrete foundation) will help bring food production closer to home.

Affordability

As a result of the energy-efficient and renewable energy technologies and practices included in this new house, the annual net energy consumption is predicted to be near net-zero, with utility costs therefore less than would otherwise be the case.

In addition, the design elements which contribute to durability are expected to result in reduced maintenance costs. The many FlexHousing™ features will help to accommodate the changing needs of the occupants, over time reducing the disruption and costs associated with renovations or a move to a new home. Finally, energy efficiency, and occupant health and comfort, both of which have been integrated into the design of the home, are features sought by more and more prospective homeowners; this may help protect the resale value of the home over time.

---

[5] In general, greywater is the term given to untreated wastewater from bathtubs, showers, sinks, clothes washers, and laundry tubs that has not come into contact with kitchen waste or waste from toilets, urinals, bidets, etc. Toilets are typically the source of blackwater. However, consideration can also be given to removing kitchen wastewater and highly soiled laundry wastewater from the greywater stream.

[6] For further information, see www.cmhc.gc.ca and search under FlexHousing™

Technical Summary: EchoHaven, Calgary, Alberta

Building Description

Type: New, One-storey with walk-out lower floor, 3 bedroom single detached residence

Floor space (including attached garage)	255.4 m²	2,749 ft²
Solar orientation	due south	
Building footprint including garage	157.6 m²	1,696 ft²
Heated volume	656.3 m³	23,177 ft³
Heated floor area	225.3 m²	2,425 ft²
Ceiling area	144.7 m²	1,558 ft²
External wall area	174.8 m²	1,881 ft²
Total window area	28.32 m²	304.9 ft²
South	8.05 m²	86.7 ft²
Southeast	9.91 m²	106.7 ft²
North	1.49 m²	16.0 ft²
West	2.15 m²	23.1 ft²
East	4.71 m²	50.7 ft²
Southwest	2.01 m²	21.7 ft²
Ratio of south/SE/SW glazing area to floor area		8.8%
Ratio of south glazing area to floor area:		3.6%

Thermal Characteristics

Roof	RSI 19.2	R-108
Walls: main floor	RSI 10.2	R-59
lower floor	RSI 9.5	R-54
Windows (average values)	RSI 0.9	R-5.13
Basement floor	RSI 5.64	R-32
Measured Airtightness Level[1]	1.04 ACH @ 50 Pa	

Site Characteristics

Location	Calgary, Alberta	
Site type	Suburban, new development	
Site area	315 m²	3,391 ft²
Elevation	1,276 m	4,186 ft.
Latitude	51°06' N	
Longitude	114°01' W	

Climate

Average daily horizontal solar irradiation		3.8 kWh/m²
Average daily vertical solar irradiation		3.8 kWh/m²
Average annual precipitation	413 mm	16 in.
Average annual wind speed	14.0 km/h	8.7 mph
Average outdoor temperatures: January	-8.9 °C	16.0 °F
April	4.6 °C	40.3 °F
July	16.2 °C	61.2 °F
October	5.4 °C	41.7 °F
Building design temperatures[4]: January	-31 °C	-23.8 °F
July	29 °C	84.2 °F
Heating Degree Days (base 18°C [64°F])	5,345	[9,621]
Cooling Degree Days (base 18°C [64°F])	40	[72]

Predicted Annual Energy Consumption

Space heating	21.71 kWh/m²
Domestic water heating	9.40 kWh/m²
Appliances/lighting	13.50 kWh/m²
Mechanical ventilation	1.32 kWh/m²
Space cooling	0.00 kWh/m²
Total predicted consumption	**45.93 kWh/m²**

Note: All above values are based on heated floor area. The value given for space heating is for energy consumption associated with mechanical and / or electrical heating systems; it does not include the heat energy from passive solar gains and internal gains. (see Space Heating Information, below)

Predicted Annual On-site Renewable Energy Production

Solar (photovoltaic) electricity	32.51 kWh/m²
Active solar domestic water heating	8.30 kWh/m²
Total predicted production	**40.87 kWh/m²**

Note: All values are based on heated floor area.

Predicted Annual Energy Balance **-5.07 kWh/m²**

EnerGuide for Houses[2] (EGH*) Rating **99.2**

Space Heating Information

The space heating requirements (the load) for EchoHaven will be met as follows (predicted values):

Passive solar gain	60%
Internal gains[3]	22%
Electric radiant ceiling panels	18%
Total Load	100%

Domestic Hot Water Information

The domestic hot water requirements (the load) for EchoHaven will be met as follows (predicted values):

Active solar thermal heating system	72%
Electric back-up element	10%
Drainwater heat recovery	18%
Total Load	100%

Ventilation

Heat recovery ventilator (HRV) with electronically commutated motors (ECMs) and timer activated booster fans for bath and kitchen exhaust. Sensible efficiency 77% @ -25 C. Ventilation rate 62 L/s, 0.35 air changes per hour.

Water Consumption (estimated 2 adult & 2 children consumption)

Potable water use	600 L/day	132 U.K. gal/day
	219,000 L/yr	48,206 U.K. gal/yr
Rainwater use	95 L/day	20.9 U.K. gal/day
	34,675 L/yr	7,632 U.K. gal/yr
Potential greywater reuse	670 L/day	147 U.K. gal/day
	244,550 L/yr	53,830 U.K. gal/yr

1 The value presented above measures ACH with the HRV ductwork shut.

2 Natural Resources Canada's EnerGuide For Houses (EGH) Rating is a standard measure of a home's energy performance, and can range from 0 to 100. The rating is based, in part, on the assumed energy consumption of appliances, assumed hot water draws, and other electricity usages in conventional homes. The EGH* Rating allows reductions in electricity and hot water loads in EQuilibrium™ homes, thereby more accurately reflecting the home's potential energy performance.

3 Internal gains include heat from occupants, lights, appliances, mechanical systems, and consumer electronic items.

4 Building design temperatures are based on historic temperature data for a particular area and are used when designing a building and its heating and cooling systems for that area.

Project Team

Primary contact: Kim Walton,
Design and Construction Liaison
Bow Crow Design / Sunergy
Systems Ltd.
crow@telusplanet.net

Developer: Echo-Logic Land
Corporation
dave.spencer@stantec.ca

For more information about this and other EQuilibrium™ homes, visit the CMHC website at www.cmhc.ca or www.equilibriumhousing.ca.

EQuilibrium™ Sustainable Housing Demonstration Initiative

What is EQuilibrium™ Housing?

EQuilibrium™ is a national sustainable housing demonstration initiative, created and led by Canada Mortgage and Housing Corporation (CMHC), that brings the private and public sectors together to develop homes and communities that address occupant health and comfort, energy efficiency, renewable energy production, resource conservation, reduced environmental impact and affordability.

CMHC's EQuilibrium™ Housing initiative offers builders and developers across the country a powerful new approach to establish a reputation for building premium quality sustainable homes that will meet the needs of Canadians now and well into the future.

EQuilibrium™ Housing combines a wide range of technologies, strategies, products and techniques designed to reduce a home's environmental impact to an absolute minimum. At the same time, EQuilibrium™ Housing also features commercially available, on-site renewable energy systems to provide clean energy to help reduce annual consumption and costs.

The ultimate goal is a highly energy-efficient, low-environmental-impact house that provides healthy indoor living for its occupants and produces as much energy as it consumes on a yearly basis. As part of the initiative, all EQuilibrium™ Housing projects will be open to the public for a minimum time period of six months and then monitored for performance with occupants for at least one year.

For more information on this project and on the CMHC EQuilibrium™ Sustainable Housing Demonstration Initiative, visit www.equilibriumhousing.ca.

67570

Printed in Canada
Produced by CMHC 31-07-12
Revised: 2012