

## Equilibrium™

HEALTHY HOUSING  
FOR A HEALTHY ENVIRONMENT

Equilibrium™ is a national sustainable housing demonstration initiative, created and led by Canada Mortgage and Housing Corporation (CMHC), that strives to balance our housing needs with those of our natural environment. The Equilibrium™ initiative brings the private and public sectors together to build and showcase the next generation of sustainable housing in Canada. Through a national design competition, CMHC has engaged leading builder-led teams to design, construct and demonstrate some of the most sustainable market housing ever seen in Canada. Once built, all Equilibrium™ homes will be open to the public for a minimum of six months and, when sold and occupied, the homes will be monitored for performance.

Canadians across the country are beginning to change the way they think about their homes. The combination of volatile energy costs, a greater concern for the environment and a heightened awareness of indoor and outdoor environmental health concerns is expected to increase interest in homes that are healthy, comfortable and energy-efficient.

CMHC's Equilibrium™ initiative is a powerful new direction in sustainable housing. It can help homeowners reduce their energy bills, protect their families' health and reduce greenhouse gas emissions and environmental impact. Equilibrium™ is about achieving balance in the quality of our lives, our homes and the environment.

### THE BENEFITS OF AN EQUILIBRIUM™ HOME

An Equilibrium™ home is designed to be healthier and more energy- and resource-efficient than traditional housing. It can be a new or renovated house, a single-detached house or multi-unit housing, and built according to any style or taste. While there is no one fixed model, Equilibrium™ homes embody sustainable development practices that address occupant health and comfort, energy efficiency, renewable energy production, resource conservation, reduced environmental impact and affordability, under five core principles:

1. Occupant health
2. Energy efficiency
3. Resource conservation
4. Low environmental impact
5. Affordability

By focusing on these five core principles, an Equilibrium™ home is designed to offer a wide range of positive benefits and advantages, including the following:

- **Low monthly utility bills**—save money on energy costs all year round and protect your family from future energy price increases.
- **Healthier, more comfortable living space**—enjoy better indoor air quality, comfortable temperatures, more natural light and healthier building materials in your home.
- **A greener choice for the environment**—conserve resources, lower your family's greenhouse gas emissions, reduce pollution and minimize your household's environmental footprint.
- **A better future**—help make sure that future generations of Canadians have clean air to breathe, clean water to drink and a healthy environment to live in.

## HOW DOES AN EQUILIBRIUM™ HOME WORK?

While the initiative is relatively new, the ideas behind EQUilibrium™ are based on many years of research and practice, and many of the technologies involved have already been proven both in Canada and around the world.

An EQUilibrium™ home brings together a well-planned, passive solar home design combined with a wide range of state-of-the-art construction techniques, products and systems to significantly reduce the home's energy consumption. Clean, environmentally friendly

renewable energy technologies are then integrated into the design to help meet household needs for electricity, space heating and hot water.

The result is a highly energy- and resource-efficient home with low environmental impact that aims to produce as much energy each year as it consumes. Among other features, EQUilibrium™ homes can include:

- healthy building materials and finishes;
- climate- and site-specific design;
- passive solar heating and cooling;
- energy- and resource-efficient construction;

- energy-efficient appliances and lighting;
- integrated renewable energy systems such as photovoltaics, solar thermal and ground-source heat;
- natural daylighting; and
- water conservation, rainwater harvesting and water reuse strategies.

It is not just individual homes that benefit from the EQUilibrium™ approach. Through innovative planning approaches, EQUilibrium™ communities can increase the scale of achievable benefits to include the conservation of water, land

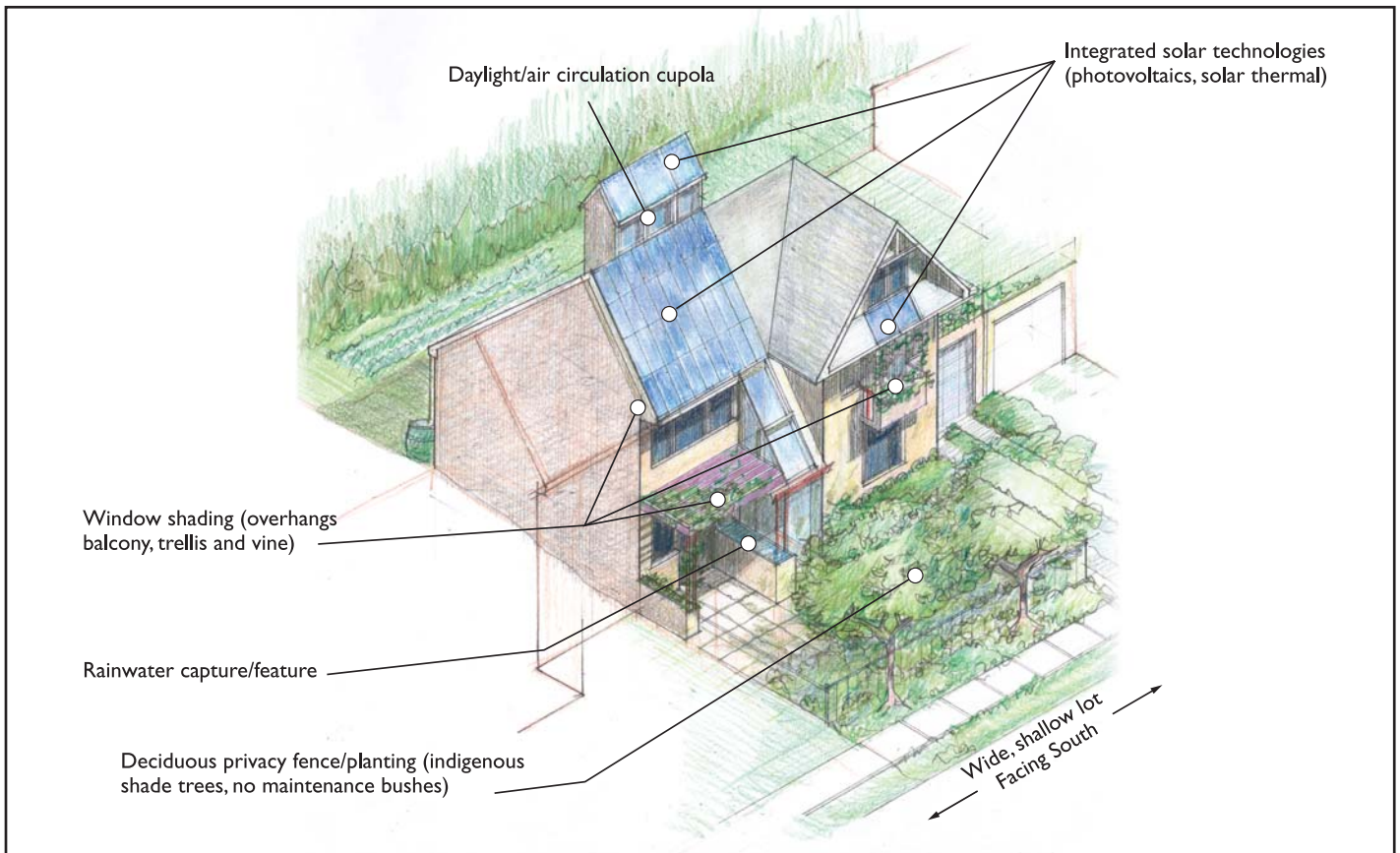


Figure 1 Conceptual design of an EQUilibrium™ home

and natural habitats, the reduction of infrastructure needs and the protection of existing local ecosystems while reducing costs, and creating healthy, vibrant and livable communities.

Many of the EQuilibrium™ design elements and construction techniques have already proven effective on their own. The difference is that EQuilibrium™ is the first sustainable housing initiative in Canada to combine and integrate these practices to achieve practical market housing solutions.

## STAYING CONNECTED: EQUILIBRIUM™ AND UTILITY POWER

EQuilibrium™ homes are grid-interconnected and have the capacity to buy and sometimes sell electricity to the local utility. On days when the home's renewable energy systems don't produce enough electricity or heat, the home's energy needs can be easily and seamlessly met with electricity from the grid. When the home's photovoltaic panels produce excess electricity, the excess can be delivered back into the grid. This reduces the home's net annual electricity consumption. The surplus electricity produced can reduce electricity bills and produce a net income for the homeowner in areas where utilities offer purchase agreements.

## HOW MUCH DOES AN EQUILIBRIUM™ HOME COST?

As EQuilibrium™ homes are carefully planned and designed, and include many innovative features to improve their performance, their purchase price may be higher than conventional housing. However, lower energy and operating costs are expected to counterbalance the upfront costs over the home's lifetime.

In addition, the healthier indoor environment, lower energy bills and other environmental features could increase a home's resale value. As more and more EQuilibrium™ homes are built across the country, experience and demand are expected to increase, and the cost of construction will decrease, making them less expensive to deliver over time.

## DEMONSTRATION

To increase public awareness and professional education of, and industry capacity for sustainable housing solutions, CMHC is working with the selected builder-developer teams to design, build, demonstrate and monitor EQuilibrium™ homes across Canada (see Table 1). Each of the EQuilibrium™ homes will be open for public and industry tours once construction is completed, as part of a minimum six-month demonstration period. Details and tour information can be found on the CMHC website at [www.cmhc.ca](http://www.cmhc.ca).

## PERFORMANCE MONITORING

Following the demonstration period, the EQuilibrium™ homes will be sold and a year-long performance monitoring period will commence once the homes are occupied. The monitoring, supported by CMHC, is designed to establish how well each project performs with respect to EQuilibrium™ criteria, and whether the home meets its net-zero energy consumption target. Key performance criteria being monitored include the following:

- Indoor environment conditions, including air change rates, CO<sub>2</sub>, temperature and relative humidity levels.
- Overall household electrical consumption and a profile of energy usage by appliances.
- Natural gas consumption (if used). Any other combustible fuel consumption will also be recorded and used to calculate energy usage.
- Household hot and cold water consumption.
- Energy contribution from renewable energy systems (for example, photovoltaic system and solar water heating).

## About Your House

Equilibrium™: Healthy Housing for a Healthy Environment

Table 1 | Equilibrium™ demonstration homes across Canada

Project Name	Team Name	Location
Abondance le Soleil	Équipe EcoCité-Sodero	Montréal (Verdun), QC
Alstonvale Net Zero House	Sevag Pogharian Design	Hudson, QC
Avalon Discovery 3	Avalon Master Builder	Red Deer, AB
Echo Haven	Echo-Logic Land Corporation	Calgary, AB
ÉcoTerra™	Les Maisons Alouette Homes	Eastman, QC
The Green Dream Home	Canadian Home Builders' Association Central Interior and Thompson Rivers University	Kamloops, BC
Harmony House	Habitat Design + Consulting Ltd. and Insightful Healthy Homes Inc.	Burnaby, BC
Inspiration – the Minto ecohome	Minto Developments Inc.	Ottawa (Manotick), ON
The Laebon CHESS Project	Laebon Developments Ltd.	Red Deer, AB
The Moncton VISION Home	AlternaHome Solutions Inc. and VISION Land Development Ltd.	Moncton, NB
Now House™	The Now House™ Project Inc.	Toronto, ON
Riverdale NetZero Project	Habitat Studio and Workshop Ltd.	Edmonton, AB
Top of the Annex TownHomes	Sustainable Urbanism Initiative (SUI)	Toronto, ON
Urban Ecology	Winnipeg Housing Rehabilitation Corporation (WHRC)	Winnipeg, MB
YIPI! Net Zero Footprint Housing	Nexus Solar; and Spruce Home RTM Builders Ltd.	Regina Beach, SK

## WORKING TOGETHER TOWARDS A BRIGHTER FUTURE

The ultimate vision for the Equilibrium™ housing initiative is to create the next generation of sustainable housing in Canada. The approach to achieve this vision is through an active partnership between all levels of government and industry. The CMHC Equilibrium™ Sustainable Housing Demonstration Initiative is supported by developers, homebuilders, utility companies, manufacturers, architects, engineers, academics, integrated design experts and researchers. Natural Resources Canada has contributed its expertise to the development of the energy-related technical guidelines and supplied funding for performance

monitoring and testing. Environment Canada and Industry Canada, the Canadian Home Builders' Association (CHBA), the Canadian Solar Industries Association (CanSIA) and the Net-Zero Energy Home (NZEH) Coalition are also strong supporters of this initiative and have provided key input.

The vision of CMHC, the talent of the Equilibrium™ teams and the support of stakeholders are working together to create a whole new direction for housing—a blueprint for healthy and sustainable communities—and a cleaner, brighter energy future for all Canadians.

To find out more about the Equilibrium™ Sustainable Housing Demonstration Initiative, visit our website at [www.cmhc.ca](http://www.cmhc.ca) and keyword search “Equilibrium.”

### Equilibrium™ Project Profiles

Detailed Project Profiles of completed Equilibrium™ sustainable housing demonstration homes are available at [www.cmhc.ca](http://www.cmhc.ca)—keyword search “Equilibrium project profile.” Each Profile includes photographs, floor plans, a technical summary of the project and links to the project teams.

**To find more About Your House fact sheets plus a wide variety of information products, visit our website at [www.cmhc.ca](http://www.cmhc.ca). You can also reach us by telephone at 1-800-668-2642 or by fax at 1-800-245-9274.**

**Priced Publications**

<i>Healthy Housing™ Renovation Planner</i>	Order No. 60957
<i>Household Guide to Water Efficiency</i>	Order No. 61924
<i>Tap the Sun</i>	Order No. 60940

**Free Publications**

<i>EQilibrium™: New Housing for a Changing World</i>	Order No. 65019
<i>EQilibrium™ Project Profiles</i>	Visit our website
<i>Renovating for Energy Savings series</i>	Visit our website
<i>Ten Steps to a Cooler Planet</i>	Order No. 62659

**About Your House fact sheets**

<i>The ABC's of Windows</i>	Order No. 63683
<i>Assessing the Comfort and Safety of Your Home's Mechanical Systems</i>	Order No. 62266
<i>Before You Start an Energy-Efficient Retrofit—Mechanical Systems</i>	Order No. 62262
<i>Before You Start Window and Door Renovations</i>	Order No. 62256
<i>Insulating Your House</i>	Order No. 62039
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<i>Replacing Your Furnace</i>	Order No. 63227
<i>Understanding Window Terminology</i>	Order No. 62031
<i>Water-Saving Tips for Your Lawn and Garden</i>	Order No. 62042

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