

# What to look for in an Eco-home

*Many factors are involved—there is no simple one-size-fits-all solution.  
Broad vision and long-term thinking are needed.*

**Goal** A home that meets occupant needs for shelter and well-being without compromising the well-being of the planet (present and future generations, human and non-human).

## Objectives for an eco-home design (new or retrofit)

- reduce purchased energy use
- reduce water use / degradation
- reduce damage to ecosystems
- reduce environmental toxic loading
- increase health and well-being.

*Sometimes these objectives conflict!*

## Checklist of eco-home features

No single eco-home on the tour includes everything below, but you will find almost all of the checklist items demonstrated somewhere on the tour. We challenge everyone to pick at least one idea to implement at home.

### REDUCED PURCHASED ENERGY USE

**Location:** Close to community and daily activities, or is a car needed? (Annual transportation energy use may be greater than annual home energy use).

**Design:** Look for simple design, using ‘house as a system’ principles. Complex building forms use more material and are generally more difficult to heat and maintain.

**Size:** Small is beautiful. Try this rule of thumb—600 square feet for one person, plus 400 square feet for the second person and 300 square feet for each additional full-time person.

**Upgraded thermal envelope:** At least R-20 walls, R-40 ceilings, R-20 foundation, high-performance glazing, and reduced air leakage.

**Passive solar:** South-facing glass with overhangs for summer shading, and additional thermal mass. Good day lighting, and perhaps an attached greenhouse or sunspace.

**Efficient mechanical systems:** Low-emissions wood heater, high-efficiency heating and hot water systems, with heat-recovery ventilator (HRV) for optimum efficiency. Good ventilation is an essential component of an energy-efficient home. The better-insulated the house, the smaller and simpler the heating system should be.

**Efficient lighting and appliances:** Compact fluorescent and LED lighting and Energy Star appliances. Look for front-loading clothes washers, and solar dryers (a.k.a. clothes lines).

**Renewable energy systems:** Solar hot water, PV (solar electric), wind, and microhydro are all options, depending on site conditions. Conservation and efficiency measures are pre-requisites.

**Reduced embodied energy:** Embodied energy is the energy used to extract, refine, grow and harvest, process, manufacture, transport and install building materials. Embodied energy is much less than the energy used during occupation. (Embodied energy for a typical house is about seven times its annual energy use.) Local materials, re-used and salvaged materials, recycled materials, materials with recycled content—all reduce embodied energy.

# Checklist of eco-home features (cont.)

## REDUCED WATER IMPACT

Canadians use a lot of water and release it back to the environment in far worse condition than it was in to begin with. We can reverse this situation.

**Supply:** Rainwater catchment can provide most or all of a household's water needs.

**Water-conservation measures:** low-flow toilets, composting toilets, low-flow showerheads, faucet aerators, front-loading clothes washers all reduce water demand.

**Greywater:** with appropriate regulatory approvals, wastewater from sinks and showers can be separated from black water and filtered through reed beds and ponds. Treated greywater can be used for irrigation and toilet flushing.

**Blackwater:** new environmentally friendly alternatives to the conventional septic system are now being approved for use. Composting toilets generally use no water at all.

## NATURAL, LOCAL & MINIMALLY PROCESSED / RECYCLED MATERIALS

Sustainably-harvested local wood, straw and earth, etc. are materials with low embodied energy. Their use can minimize ecosystem damage and reduce environmental toxic loading, (unless the thermal performance of the building is compromised). These materials can be used to create organic forms and satisfying spaces that increase health and well-being for occupants and for those involved in their construction. Because these materials are of local origin and their use often involves more labour than conventional materials, there can also be benefits to the local economy.

## HEALTHY INDOOR ENVIRONMENT

**Interior finishes and furnishings:** Use of low-toxicity and low VOC (volatile organic compounds) materials such as unpainted plaster finishes and ceramic tile with additive-free grout provides better indoor air quality and is essential for anyone with chemical sensitivities. Hard surfaces retain fewer mould spores and animal dander than carpets. Standard foam-filled upholstery and soft furnishings in general contain many toxic products. By refusing to use toxic materials within the home, consumers influence manufacturers to find less toxic alternatives.

**Ventilation:** There are three types of ventilation needed in a home:

1. Ventilation for occupants
2. Ventilation for combustion equipment (e.g. woodstoves)
3. Ventilation of thermal envelope assemblies (e.g. attic ventilation, rainscreen walls)

Note that 'breathing walls' are simply walls without a vapor barrier—molecules of water vapor can migrate through them. 'Breathing walls' do not provide enough ventilation air for occupants and combustion equipment. All exterior walls, floors and ceilings should be free of cracks to prevent moisture damage and drafts. Natural ventilation (open windows) may or may not provide enough fresh air for occupants, depending on design, and wind and temperature conditions.

**Reduced EMFs:** Exposure to electromagnetic radiation within the house can be reduced by good wiring strategies. High mass materials such as tile roofs shield occupants from some exterior radiation.

## IMPROVED LONGEVITY / MAINTENANCE

Features which provide improved longevity and reduced maintenance such as rammed earth, metal roofs, good moisture protection (rainscreen walls, big overhangs, drainage swales, etc.) reduce the long-term environmental burden of a building.

## GREEN SITE DESIGN & LANDSCAPING

Features such as short driveways, porous paving and erosion control reduce impact on site. Preservation and restoration of ecological features—native vegetation, trees, drainage patterns—protect native species and enhance biodiversity. Permaculture design and organic gardens and greenhouses provide healthy food for body and soul.

## COMMUNITY / LIFESTYLE

Ecovillages, co-housing communities, and housing co-ops can provide increased quality of life for residents and involve shared amenities and services which reduce the environmental burden. Modest living can be rich in many ways. Lifestyle habits—good or bad—have a huge impact on the planet; we can all make our own personal footprints smaller.