

Energy-efficient Landscaping



Sustainable energy-efficient landscaping takes into consideration the ways that landscaping can save energy on heating and cooling and also the ways to save energy by choosing lower emission gardening practices. Certain types of landscapes consume larger amounts of energy than are necessary, especially when we are trying to create a different type of habitat than would be there naturally. Faith communities can choose alternative landscapes or retrofit their garden beds to lower the consumption of energy and water on their properties. This has a positive effect not only for their own community, but also the neighbourhood area and even the city.

Landscaping for Energy-efficiency of your building

Larger Scale

Various landscaping greenery can provide great opportunities to lower heating and cooling bills by providing shade in the summer and wind-breaks in the winter.

Large deciduous trees provide shade for your buildings in the summer. If there is space, these can be planted along the south and west sides of the building or one can be added in the southwest corner. With the shade that the leaves provide, temperatures under the tree can lower between 10 – 20°C (ASLA).

Large evergreens can be planted as windbreaks, to help with heating in the winter. These are planted to face prevailing winds (usually from the north/northwest in Canada) and can lower heating costs up to 30 percent. Consider Cedar, Spruce and Juniper as they are fast growing and have dense foliage. But if you have specific conditions (close to roads, height restrictions, poor soils/drainage, shady areas or tight spaces) discuss your best options with your local garden centre (Arbor Day Org).

Green roofs provide cooling and insulation benefits. Installation of this feature can be either on the full roof or part of a roof, especially if there are varying slopes or an extension that provides an optimal location. The cooling and insulation benefits can save up to 15 percent in energy costs and help extend the life of the roof structure (ASLA). Green roofs also provide benefits for the community such as storm water retention, cooler ambient air temperatures, cleaner air, increased habitat and biodiversity and green sight lines for neighbours. (BCIT)

Any consideration of a green roof requires an engineering inspection to determine what weight the roof can support. Different types of planting and soil depth add different weights so a lighter weight (extensive) green roof can be an option if an intensive green roof would be too much. Even buildings with a pitched roof could be a potential site for green roofs.

Note:

When planting larger trees consider the full height to decide on species of tree. Do not plant under overhead wires or where tree would block solar panels. Place at the correct distance from the building considering the full canopy spread so that overhanging branches do not increase the need for maintenance of gutters. Also consider root growth and plant correctly. Many trees will not impact foundations but here are a few that can cause troubles: Willows, Black Alder, Black Locust, American Elm, Norway Maple, Silver Maple or any of the Poplar, Cottonwood, Aspen family.





Landscaping for Energy-efficiency of Your Building (cont.)

Smaller Scale

Vines or climbing perennials on a trellis or arbour are another simpler option to shade buildings and property. Those that shade building walls or patio areas can decrease ambient air temperatures by 5 degrees Celsius (ASLA) and lower cooling costs of shaded building. These vertical plants can also help to clean the air by filtering urban pollutants. They help reduce both nitrogen dioxide (NO₂) and particulate matter. In very dense urban areas, green walls can mitigate urban pollutants at street level better than trees as thick canopy cover can actually prevent these pollutants from dissipating (Pugh et al.,2012).

Decrease summer temperatures in specific rooms with green foliage. Shading west facing windows with smaller trees or a trellis will also help cool the interior of the building. They don't need to block the view but would rather shield rays from above.

Provide a windbreak around the foundation with dense landscaping. Planting small evergreen shrubs around the foundation creates a windbreak which adds an insulating factor to the building making it more efficient to heat. Plant these shrubs approximately half a metre away from building to allow some air circulation.

When choosing small trees and shrubs, consider native plants that will do double duty and also provide habitat and food for wildlife. When the plants are positioned between 9 m and 1 m from windows consider adding some type of bird-safety window deterrent such as decals, films or UV technology that birds can see but is virtually undetectable to humans. See F.L.A.P. website for more information.

Engery-efficient Landscape Maintenance

Maintenance equipment that is gas-powered can have a large impact on the environment if it's a two-stroke engine. For example, a two-stroke lawnmower pollutes as much as driving a new car 550 kilometres (Ontario Government). This doesn't take into account other gas power tools used for lawn and garden maintenance such as leaf blowers, trimmers and such. Choices in regards to

sustainable lawn and garden maintenance extend to the efficiency of the water and fertilizers you use also. The energy used to make water potable in cities is wasted if this water is used for lawn and garden irrigation. This waste of energy is even worse when you take into consideration that up to half of the water used outdoors is not applied in the areas needed or is lost due to evaporation. Similar issues can be found with fertilizer this is used improperly on lawns. First the energy to create it has been wasted if it is washed off and goes into storm sewers. The second impact of excess fertilizer is to our local waterways as this excess fertilizer heightens the nitrogen and phosphorus levels of streams, rivers and lakes.

Find a sustainable landscaping company. New companies are available that use energy-efficient equipment (four-stroke engines or electric or solar-powered) or even use hand-tools. This not only cuts down on air contaminants but also cuts down on noise pollution as well which is good for both the neighborhood and also the landscapers! If your faith community has its own garden equipment, consider investing in new energy-efficient ones.

Opt for more energy-efficient type landscaping. Convert part of your lawn so that it requires less mowing, trimming, fertilizing and watering. Alternative landscapes include xeriscape ground cover, an urban meadow or drought tolerant wooded area. The more you can leave it alone to recycle its own nutrients the better. Also the use of leaf mold, newspapers, branches, hugelkulture can save on water bills. Less water requirements means less water pump use and less use of city-treated water which requires energy to treat. See other fact sheets for further information: Native trees (wooded areas), Urban Meadows, Drought-Tolerant Landscaping, Lawns and ground-cover.

Allow your lawn to go dormant. This not only cuts down on mowing and trimming requirements but also water usage. Grass can survive drought periods and this can be a good choice if converting the lawn is not an option.

Ease up on garden maintenance. Leaving leaves on the ground for the winter or at least leaving leaves on the property either in large compost containers or by raking to the edges of the property



lessens the need for leaf blowers and garden compost collection from the municipality. If this isn't possible for the full property, create a "forest setting" in one part around trees and shrubs or in a large natural garden bed where leaves can be left as ground cover for the winter.

Choose a No-Till option when creating a new garden. Avoid the cost and energy-inefficiency of a garden tiller cultivator. The Lasagna Garden method easily converts lawn into new garden beds with less energy required. It also adds nutrients and mulch so less is required to add afterwards.

Other energy-efficient landscaping options include ordering one large order of soil or other items you may need, rather than a dozen or more bags, buying as locally as possible and choosing recycled material for your garden needs such as green roofs which have many recycled options to choose from.

Other Outdoor Greening Energy Efficient Options

Consider your own energy efficiency and take a page out of permaculture manuals. Identify your Zone "Zero" and keep all your more regular garden activities closer to the building. If possible, locate your altar flower garden bed, composting corner and any other daily or weekly gardening activities in this zone. Also if using a rain barrel, locate flowers that need more watering close to this area. Wilder, more natural areas are located on the outskirts of property as they don't have to be visited often.

Consider solar lighting for your gardens. Solar lights are a great options but they do need to be charged properly at the start and require some care. Charge them for 5 – 10 cycles in full direct sunlight before setting them out, avoid installing them near street lights, keep the solar panels clean and brush off snow in the winter. With cold winters the batteries need to be replaced annually.

Make your own fertilizer from compost and weeds. Scraps from the office kitchen and event hospitality can be collected to make compost. Higher nutrient food waste includes bananas, egg shells, coffee grounds and boiled water from vegetables. Add to a compost heap and include weeds that are high in nitrogen and/or phosphorus such as Chick-

weed, Lamb's Quarters, Curly Dock, Stinging Nettle, Clover, Common Burdock and Field Horsetail. Just make sure they haven't gone to seed.

Extend a community garden's growing season. Locate your gardens against southern facing brick or stone walls. Even better if you can create a teepee or encourage climbing plants to grow on trellises against the wall in this location as the stone soaks up the heat during the day and radiates it back out after the sun sets, creating a micro climate.





Links / Further Info:

Arbour Day – *How to Plant a Windbreak to Conserve Energy:*

www.arborday.org/trees/climatechange/windbreak.cfm

ASLA – *Energy Efficient Landscapes :*

www.asla.org/sustainablelandscapes/Vid_Energy.html

BCIT - Centre for Architecture Ecology – *Why Green Roofs? :*

www.common.s.bcit.ca/greenroof/faq/why-green-roofs-benefits

EPA – *Water Sense :*

www3.epa.gov/watersense/pubs/outdoor.html

Fatal Light Awareness Program Canada (FLAP) – *Protect Birds At Home :*

www.flap.org/residential_new.php

Green Roofs for Healthy Cities (North America) :

www.greenroofs.org/

Ontario Government – *Ontario Government Mows Down Pollution:*

news.ontario.ca/archive/en/2005/04/21/Ontario-Government-Mows-Down-Pollution.html

Solartown – *Outdoor Solar Light Tips :*

www.solartown.com/learning/solar-lights-and-garden/usage-tips-for-outdoor-solar-lights

Tree Canada – *Urban Tree Legends Revealed :*

www.treecanada.ca/en/resources/urban-tree-legends-revealed

Pugh et al. - *Effectiveness of Green Infrastructure for Improvement of Air Quality in Urban Street Canyons, 2012 Study:*

pubs.acs.org/doi/abs/10.1021/es300826w

