Landscaping to Conserve Energy

By planting trees, shrubs and vines in your garden, you can change the temperature in and around your house. Colorado State University says landscaping changes can reduce heating bills by as much as 25 per cent and cooling bills by 50 per cent or more.

Energy savings are not just good for the wallet; they also reduce a household's contribution to smog and climate change. In 2005, Oakville residents saved over $800,000 in household heating and cooling costs due to shading, windbreak and local climate effects (evapo-transpiration) provided by trees. As a result of this reduced energy demand, 1,200 tonnes of carbon emissions were avoided by power generating facilities.

Summer shading

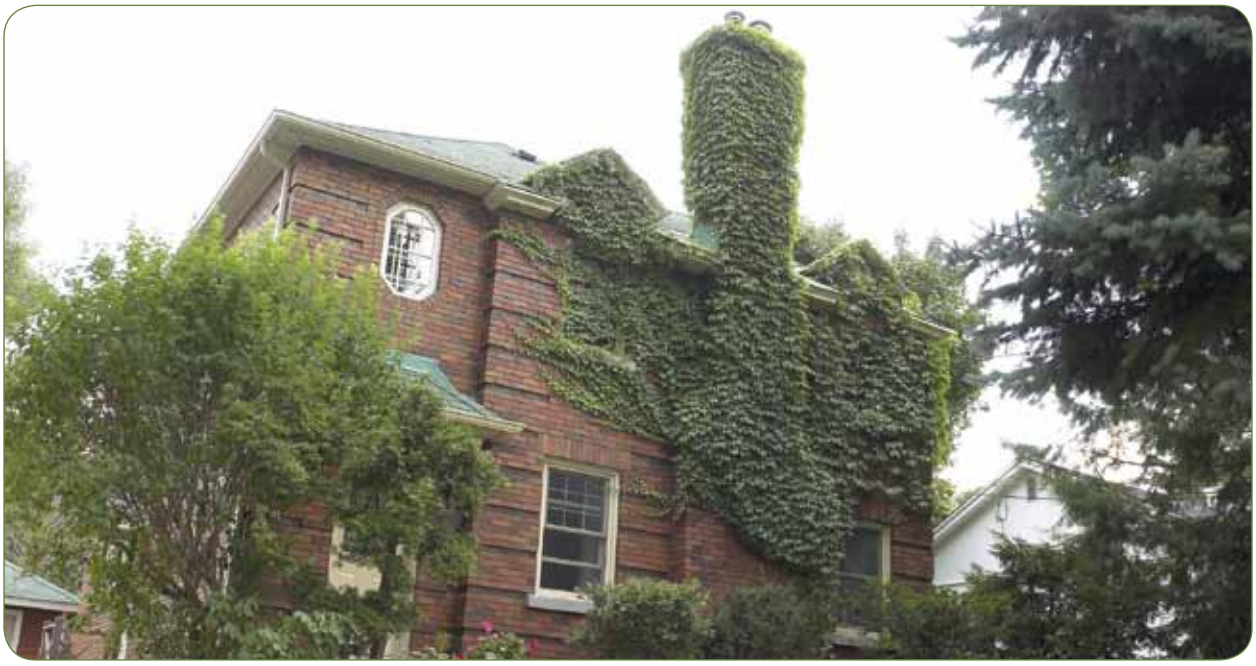
Deciduous trees planted on the south and west sides of a house reduce or eliminate the need for air conditioning. Large trees that shade the roof of a house from the afternoon sun can reduce indoor temperatures by as much as four to five degrees Celsius. A Friends of the Earth study concluded that three well placed and cared for trees can reduce cooling costs by up to 40 per cent. And, in the Town of Ajax, the urban forest saved residents over $70,000 on summer cooling costs in 2008, subsequently reducing the town's carbon emissions by 118 tonnes.

Small trees and shrubs can be placed near air conditioning units for added energy savings. These plants should be placed so they do not block air flow or access for maintenance. Shading is especially important for units on south or west sides of houses. Units in shaded areas use less energy to reach the desired temperature indoors because they are taking in cooler air.

Winter windbreaks

Tall evergreen trees planted in a row on the northwest side of a house act as a natural windbreak. These trees block or reduce the speed of cold winter winds. Less cold air enters the house, saving energy and reducing heating bills.

A row of smaller evergreens can also be planted three to four feet away from a house's northern wall to act as a layer of insulation. Approximately 60 percent of Ajax's annual residental energy savings provided by trees was attributed to winter windbreaks.



Insulating vines

Vines help to insulate exterior walls from summer's heat and winter's cold. They should only be trained up undamaged walls, away from wooden sills, shutters and doors, to prevent moisture damage. If there is any sign of mortar disintegration, or if there is wood detail on the exterior wall, vines should be trained to grow on trellises.

Plant selection and placement

There is no single formula for energy conservation landscaping. Every property is unique. Property size, soil type, sun and wind exposure, and location of above and below-ground utilities are factors to consider when choosing a species and location.

Many shade trees grow to great heights and their canopies to great widths. The larger the tree, the more shade and/or windbreak value and associated energy savings. However it is important to choose species that fit the space available. Attempts to limit the size of large trees by pruning will only result in poor structure and health.

Below-ground space for root growth is also very important. Most roots are found in the top 30-40 centimetres of soil and can spread out two times the width of the canapy. If their growth is impaired by structures, the entire tree will suffer. See the plant list for suggested planting distances from buildings.

Plant list

This plant list features native species because of the added benefits associated with such plants, including the protection of native biodiversity, the creation of wildlife habitat, and the reduction of long-term maintenance (e.g., pest control and watering).

Native plants are indigenous to a specific location, whether that location is a county, country or continent. Some species have large ranges, others small. Plants that are native to the Greater Toronto Area evolved over thousands of years together with many other native species.

The vegetation that truly belongs on this land is absent from most gardens and nurseries. However, a growing number of land managers and owners are discovering the benefits of native plant gardening and adopting the principles on their land. See the *Naturescaping* fact sheet in this series for more information on native plants and where to find them.

Plant list

Large trees to provide wide-reaching shade

Basswood (*Tilia americana*)
Bur Oak (*Quercus macrocarpa*)
Common Hackberry (*Celtis occidentalis*)
Green Ash (*Fraxinus pennsylvanica*)
Red Oak (*Quercus rubra*)
White Ash (*Fraxinus americana*)

- Plant at least seven metres from buildings and paved surfaces.

Medium-large trees to shade roofs and windows

Black Cherry (*Prunus serotina*)
Paper Birch (*Betula papyrifera*)
Red Maple (*Acer rubrum*)

- Plant at least four metres from buildings and paved surfaces.

Small trees and shrubs to shade air conditioners and windows

Chokecherry (*Prunus virginiana*)
Downy Serviceberry (*Amelanchier arborea*)
Eastern Redbud (*Cercis canadensis*)
Gray Dogwood (*Cornus racemosa*)
Nannyberry (*Viburnum lentago*)
Pagoda Dogwood (*Cornus alternifolia*)

- Plant at least two metres from buildings and paved surfaces.

Evergreen trees for windbreaks

White Pine (*Pinus strobus*) — Plant at least five metres from buildings and paved surfaces.

White Spruce (*Picea glauca*) — Plant at least three metres from buildings and paved surfaces.

Eastern White Cedar (*Thuja occidentalis*) — Plant at least one metre from buildings and paved surfaces.

Vines for shading walls

Virgin's Bower (*Clematis virginiana*)
Virginia Creeper (*Parthenocissus quinquefolia*)
Moonseed (*Menispermum canadense*)

Tree health

A healthy tree can defend itself against most pests, eliminating the need for expensive treatments. The first step to maximizing health and vigour is to plant the right tree in the right place. As mentioned earlier, ensure that adequate above and below-ground space is available for trees, and that the species selected suits the existing soil and light conditions.

The second most important factor in tree health is water. Trees need water for all of their biological functions, just as humans do. When dehydrated, they become vulnerable to pest infestations and disease. Urban trees suffer from drought more then their rural counterparts because much of the rain that falls in the city runs off of paved surfaces and compacted soil into storm sewers. It is not absorbed into the soil.

For the first two years after planting, water twice a week for 20 minutes, with the hose at the base of the tree on a trickle. This light flow will allow water to soak deep into soil rather than run off the surface. Apply a two to three-inch layer of mulch around the base of trees and shrubs to increase the permeability of soil and prevent evaporation. A large doughnut-shaped circle of mulch will also prevent lawn mower and weed-whacker damage, which can be fatal to trees. A mixture of leaves, wood chips and compost makes an ideal mulch.

Tree health (continued)

Keep in mind that mature trees need water too. After the first two years, watering trees once a week for about an hour will greatly improve their overall health.

For more information on choosing the right species and location, and proper planting and maintenance techniques, refer to the resources listed at the end of this fact sheet.

Invasive insects pose another threat to trees in the Greater Toronto Area. The City of Toronto has experienced Gypsy Moth and Asian Long-Horned Beetle (ALHB) infestations, and the presence of Emerald Ash Borer (EAB) is now confirmed in a number of towns and cities in southern Ontario.

The general public is encouraged to familiarize itself with the signs and symptoms of these insects, and to report suspected cases to municipal forestry departments. Suspected ALHB and EAB cases should also be reported to the Canadian Food Inspection Agency (CFIA). Visit the CFIA website (www. inspection.gc.ca) for more information.

Additional resources

- Evergreen's Native Plant Database **www.evergreen.ca/nativeplants**
- Local Enhancement and Appreciation of Forests (LEAF) **www.leaftoronto.org**
- Ontario Urban Forest Council **www.oufc.org**
- Tree Canada Foundation **www.treecanada.ca**

For more information, please contact Toronto and Region Conservation
5 Shoreham Drive, Downsview, Ontario M3N 1S4 Tel: 416-661-6600 Fax 416-661-6898 www.trca.on.ca/yards

Toronto and Region Conservation for The Living City