LANDSCAPING FOR ENERGY SAVINGS

1

Conserving Energy

- Cost to produce/purchase energy
- Driving cause of climate change

Correctly placed shade trees, windbreaks and foundation plantings can reduce heating and cooling costs by an estimated 25-30%!! But, it's hard to measure directly.

Return on investment by energy savings in about 8 years.

2

Landscaping for Energy Savings

In Wisconsin and other northern states, people typically spend about 10 times more for heating than for cooling, but energy savings in all seasons should be considered.

3

Landscaping for Energy Savings

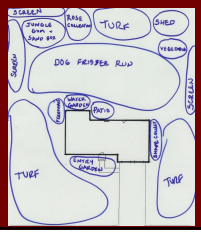
You might have your own microclimate to consider.

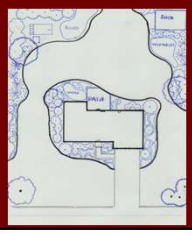
- Wind determined by hills, buildings, etc.
- Heat bowl/valley
- Sunny slope
- Water body nearby

4

Planning for Energy Savings

Energy-wise landscaping should be incorporated with all the other goals and benefits of landscaping.





5

Cool Climate Landscaping to Reduce Energy

Heat exchange in a home occurs through three major processes:

- air infiltration
- heat conduction
- transmission of radiant energy through windows

6

Landscaping for Energy Savings

Solar energy can make up 5-20% of the total energy needed to heat a home.

Escaping warm air, along with cold wind entering a house, can account for 25-40% of the heating requirements.

The stronger the wind, and the colder the outside temperatures, the greater the effect.

7

Air Infiltration

- Outside air is forced through openings by pressure differences caused by wind on the outside of the home.
- Air pressure on surfaces that face the wind are subject to increased air pressure as wind velocity increases.
- This forces an equal amount of interior air out of the home through openings that face away from the wind

8

Landscaping for Energy Savings

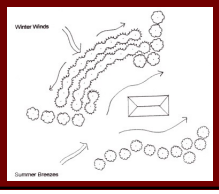
Windbreaks reduce "wind chill" and disruption of heat bubble around the building.

Know your prevailing winds! Usually, winter and summer winds come from a different direction. Block winter winds, and direct summer breezes.

9

Landscaping for Energy Savings

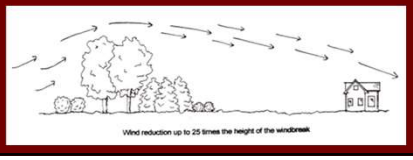
To be effective, windbreaks should consist of trees and shrubs that are tall enough, dense enough, and in a long enough line to protect the house.



10

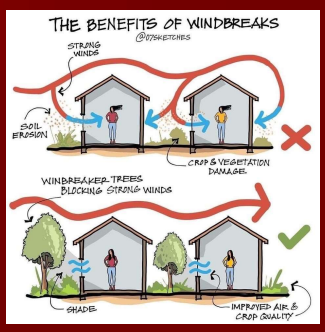
Landscaping for Energy Savings

- Windbreaks reduce wind speed up to 25 times the height, but maximum effectiveness is at 2-5 times the height
- The most effective windbreaks will consist of:
  - At least one row of dense evergreens with branches to ground level



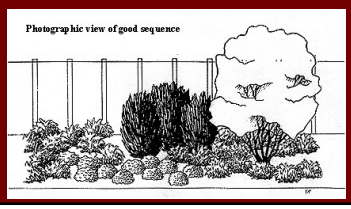
11

- Windbreaks lift the wind and send it OVER the area to be protected.



12

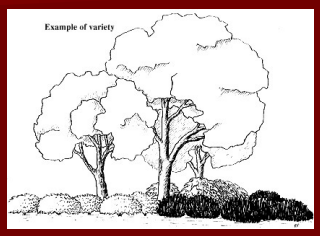
Solid barriers, such fences and buildngs, are NOT as effective as plants which will allow 40-50% of the wind to penetrate



13

Landscaping for Energy Savings

Small residential lots may not accommodate a row of evergreens, but deciduous trees and shrubs also reduce a significant amount of wind.

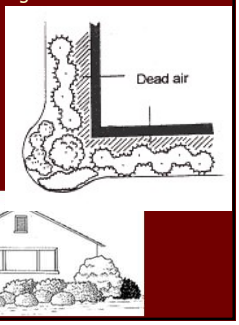


14

Landscaping for Energy Savings

Shrubs can also help!

Foundation plantings create an area of "dead air" along foundations, reducing heat loss.



15

Landscaping for Energy Savings

Plant shrubs so that when mature, there will be approximately 1 foot of space between the plants and the building wall.

Vines growing on a wall, or a trellis attached to a wall, will absorb the summer sun's heat and reduce the amount of winter wind hitting the house walls.

16

Plants for Windbreaks

- Choose plants for the windbreak that have multiple uses:
  - Food for wildlife, pollinators
  - Shelter for wildlife
  - Screening/privacy
  - Noise control
  - Seasonal interest

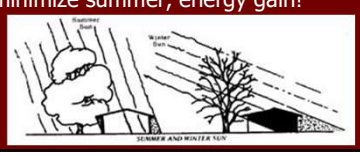
Windbreaks do NOT have to be straight lines, and should be incorporated into your overall landscape design!

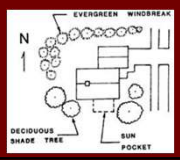
17

Conduction and Radiant Energy

In winter, sun warming house walls or shining in through windows can reduce energy needs.

Position trees/plants properly to maximize winter, but minimize summer, energy gain!





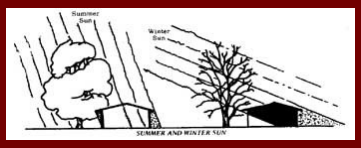
18

- Deciduous shade trees should be planted to the east-southeast and west-southwest of windows.
- Avoid evergreens that block light in winter, requiring more electricity use.

19

Landscaping for Energy Savings

In summer, very little solar energy enters homes through the roof and walls because of insulation.



Most summer heat enters from west and east windows, not south windows, because of the angle of the sun in the sky.

20

The Value of Trees

- Because of shade and evapotranspiration, trees reduce surrounding temperatures around 6 degrees
- Because cooler air settles under trees, temp can be 25 degrees less than above sunny blacktop.
- Temperatures are 3-6 degrees cooler in neighborhoods with trees.

21

Conduction and Radiant Energy

- Shade walls in summer that can absorb heat and conduct it indoors, requiring more air conditioner use.
- Shade outdoor living spaces in summer, making it more pleasant to use.
- Shade windows where cool summer breezes can enter.

22

Cover Heat-absorbing Walls

If there isn't room for trees or shrubs:

- Vines on walls can prevent heat gain and buildup.
- They can also create dead air space to reduce heat loss.
- Use proper vines that won't damage wall.
- Use trellis in front of wall.

23

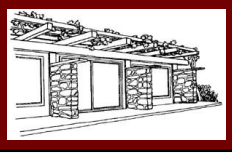
Landscaping for Energy Savings

- Shading your air conditioner with tree canopies will help it run more efficiently.
- Shading cars and driveways will reduce heat buildup in cars and reduce gasoline use for cooling the car.

24

Landscaping for Energy Savings

- Mature deciduous trees in summer block 60-90% of the sun, depending on the density of the foliage.
- In winter, branches and twigs will block 30-50% of the sun.
- Pergolas can block summer sun but allow in winter sun.



25

Shade Windows and Walls

- Choose trees for canopy size and shape.
- To shade windows, choose a tree that grows 10 feet above the window, and plant it about 20 feet out.

26

Be sure trees are planted to be effective, but aren't a safety hazard.

27

Landscaping for Energy Savings

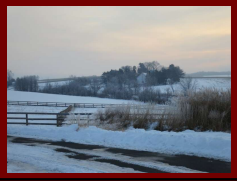
- The bigger the tree, the bigger the effect
- Plant trees as big as space permits, but remember the need for root space and don't let the trees get so big as to collide with buildings!

28

Landscaping for Energy Savings

<u>Controlling snow</u>

Trees and shrubs can act as living snow fences to control the location of snow drifts.

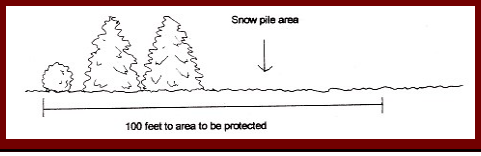


29

Landscaping for Energy Savings

Living snowfences should be a mixture of plants.

Lower shrubs on the windward side will trap snow before it blows next to buildings or driveways



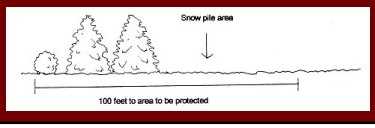
30

Landscaping for Energy Savings

Snow will settle on the downwind side of a windbreak because of reduced wind velocity.

Winds will funnel around the ends of the snowfence, so be sure it is long enough.

The windward row of plants should be 100 feet from the building to be protected.



31

Investigate Your Yard

- Notice where snow piles/drifts in winter.
- Where is wind coming from?
- Landscape plants may need to be planted on far side of the house!

32

Other Energy Use Related to Landscaping

- Maintenance
  - Reduce mowing!
  - Use no-mow grass in outer areas
- Reduce/eliminate string trimming/weed whacking
  - Design/adjust bedlines and eliminate grass along vertical surfaces
- Use energy efficient equipment

33

Your beautiful, peaceful, functional landscape can also save you money!

34

35