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We inspire people to plant, nurture, and celebrate trees.



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# How to Plant Trees to Conserve Energy

## Summer Shade

Planting the right trees in the right places conserves energy and reduces your energy bills, while helping to fight global warming. See how properly placed trees save energy by providing summer shade, [winter warmth](#), and [winter windbreaks](#).

Large deciduous trees planted on the east, west, and northwest sides of your home create soothing shade from the hot summer sun and reduce summer air conditioning costs by up to 35%

you use less energy

the utility company uses less energy

less fossil fuel is consumed by the utility to create the energy

less fossil fuel consumption means less carbon dioxide emissions



Shaded air conditioners run more efficiently.

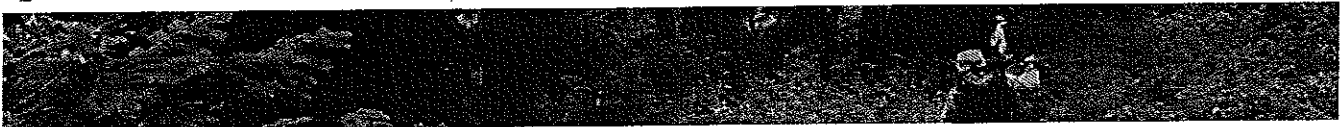
Plant trees to **shade your air conditioner** to help keep it cooler and running more efficiently.

And trees that **shade patios, sidewalks, and driveways**, cool the concrete, the entire yard, and even the neighborhood.

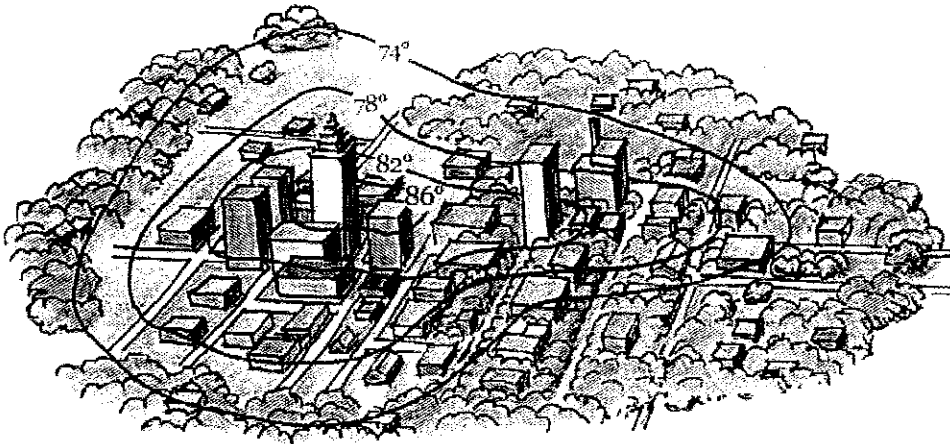
## More:

- [Winter Warmth](#)
- [Winter Windbreak](#)
- [How Trees Fight Global Warming](#)
- [The Urban Heat-Island Effect](#)

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## The Urban Heat-Island Effect

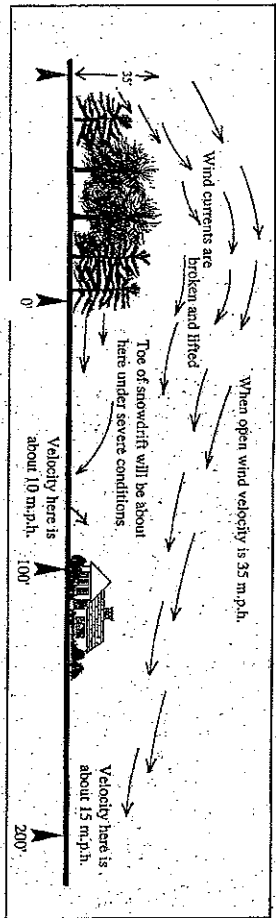


Planting trees in your city's urban areas is a winning investment for the city, its citizens, and the environment. Urban areas without trees can become "heat islands," with significantly higher temperatures than other commercial and residential areas with trees. Adding more trees to your city streets, parks, schools, and downtown areas will help keep communities cooler, reducing energy needs.

*Urban areas without trees can be "heat islands," with significantly higher temperatures.*

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Typical windbreak effects

evergreen shrubs are good choices for wind protection.

Trees for winter wind protection should be planted upwind of the area to be protected. This will often mean planting on the west, northwest, and north sides of a building. However, local conditions like mountain ranges may cause prevailing winter winds to be from other directions.

Windbreak trees can be planted in straight or curved rows or in linear groupings. They should be close enough together so their crown edges meet within a few years without overcrowding. Small or narrow-crowned trees can be as close as six to eight feet while larger trees can be as far as fifteen feet apart. Shrubs can be planted as close as two to four feet apart.

Windbreaks can consist of one or two dense rows or several less-dense rows. Wind protection extends downwind ten to twenty times the windbreak height, so the trees need not be planted close to dwellings to be effective. Keep in mind that snow drifting will be the worst at two to three times the windbreak height downwind.

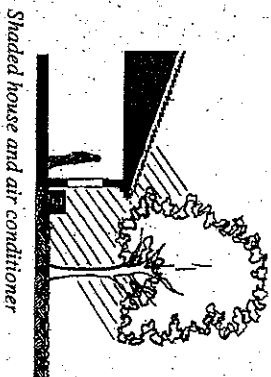
### Planting Precautions

Avoid future problems when planning trees. Remember that a four foot tall, two foot wide tree might end up being 60 feet tall and 30 feet across. Learn mature size and crown characteristics of any tree you buy and plant accordingly.

Plant trees far enough from sidewalks, driveways, and buildings so the crown can grow. Trees that naturally keep branches all the way to the ground should be planted at least one-half of their mature crown width from obstructions. Trees that can readily be pruned as they grow, like most deciduous trees, can be planted closer and allowed to overhang low obstructions.

Consider power line location when planting. Trees that grow into power lines cause electrical outages and increased line maintenance costs. They also can end up in poor health because of the severe pruning that is sometimes necessary.

Wildfire hazard also should be considered when planning your landscape. In areas where grass, brush, or forest fires are likely, planting trees and shrubs near your home may not be appropriate. Contact your local fire department for more information on landscaping in fire-prone areas.



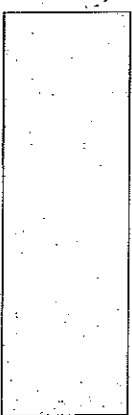
Shaded house and air conditioner

### For Assistance....

For additional information on tree selection, planting, and care contact your County Extension office, District Forester, or local nursery. For more information about trees and power lines contact Utah Power or your local power provider.

If you are planning to plant trees in an area with buried power lines or other buried utilities, call Blue Stakes at 1-800-662-4111 (532-5000 in the Salt Lake City dialing area) to have these utilities located and marked.

Credits: Text by Mike Kuhns, Extension Forestry Specialist, Utah State University. Tree drawing used with permission from *Native Trees for Urban and Rural America* by Gary L. Hightshoe.

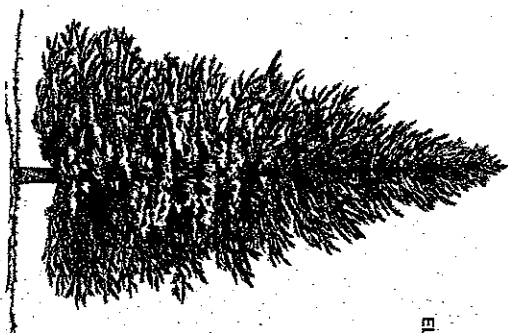


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# Planting Trees For Energy Conservation

EL 272



### The Right Tree In the Right Place

- A joint production of:
- Utah State University Cooperative Extension
  - Utah Division of State Lands and Forestry
  - Utah Community Forest Council
  - Utah Power

Homeowners go to great lengths to conserve energy in this era of tight budgets and environmental awareness. However, many do not realize that the simple act of planting a tree can result in energy savings.

Planting the right tree in the right place is the key to saving energy with trees. The right tree in the right place provides wind protection, shade, and cool air, while adding beauty, privacy, and wildlife habitat to the landscape.

The right tree in the right place also means tree selection and placement to minimize conflicts with power lines and other obstructions. Many residential power outages are caused by trees interfering with power lines.

### The Right Tree

Deciduous trees (trees that lose all of their leaves each fall) save energy in summer by shading houses, paved areas, and air conditioners. Small deciduous trees and shrubs, and especially those with low, dense branches, also can serve as effective wind barriers.

Large and small evergreen trees and shrubs save energy by slowing cold winds in the winter. They also provide shade, but since they often have branches near the ground, their shade is most effective when the sun is not directly overhead.

Both deciduous and evergreen trees save energy in summer by directly cooling the air. This cooling happens as water evaporates from the leaf surfaces, much as our skin is cooled when we perspire.

### The Right Place.... ....for Shade

Shade from trees reduces air conditioning needs and makes non-air conditioned homes more comfortable. Plant deciduous trees so they will shade east-facing walls and windows from 7 to 11 a.m. and west-facing surfaces from 3 to 7 p.m. during June, July, and August. Trees with mature heights of at least 25 feet should be planted 10 to 20 feet east and west of the house.

Plant smaller deciduous or evergreen trees with lower limbs northwest and northeast of the building to provide late afternoon and early morning shade.

Trees planted to the southeast, south, or southwest of a building for summer shade can provide significant cooling and energy savings if properly chosen and located. Such trees must be close enough for some branches to extend out over the roof. Trees must be chosen that will develop single trunks with fairly high, wide

crowns and strong branches, such as many oaks, hackberry, and Norway maple.

Trees with low dense crowns, such as flowering pears, crabapples, some lindens, and many others, will cast significant shade even in the winter after their leaves have dropped. To avoid winter shading, locate such trees no closer than 2-1/2 times their mature height to the south of a building. Such trees planted to the southeast or southwest should be about four times their mature height from the building.

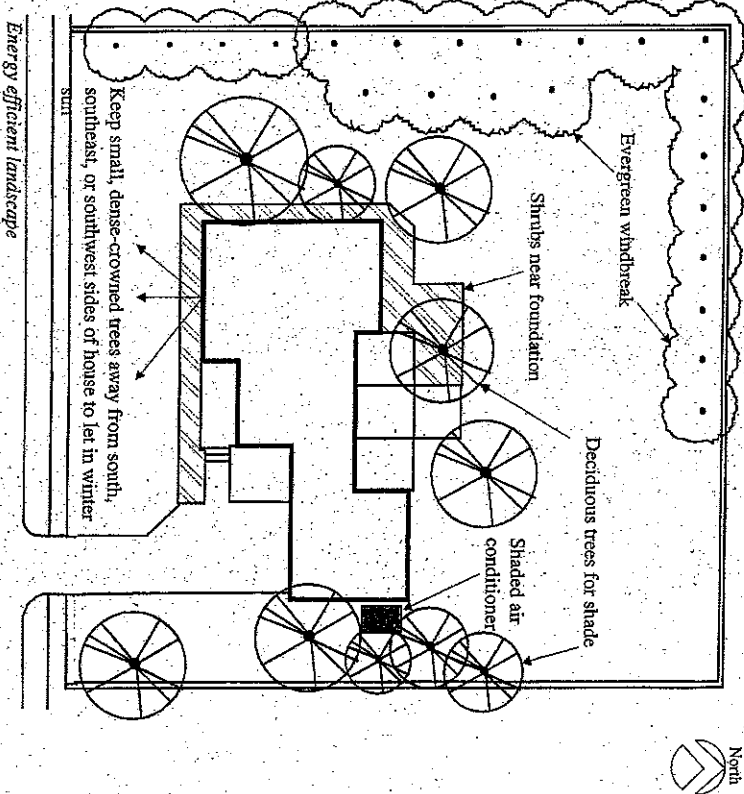
Trees should also be planted to shade paved areas. Light energy striking dark pavement like asphalt is absorbed, causing the air above to be heated. Light colored pavement absorbs less energy, but can reflect it toward a building. Tree leaves reduce heat and reflection as they absorb light energy and use it to evaporate water.

Air conditioners also should be shaded from mid-morning through evening. Prune branches to allow at least several feet clearance around the air conditioning equipment to encourage air flow. Shrubs should not be planted near the air conditioner or they will reduce air flow and cooling efficiency.

### The Right Place.... ....for Wind Protection

Trees can reduce energy use for heating by blocking cold winter winds. These winds enter homes through small openings and also carry heat away from the building's outer surfaces.

Effective windbreak trees have crowns that extend to the ground and branches that keep their foliage in winter (evergreens), Junipers, spruces, firs, Douglas-fir, and



Energy efficient landscape

## SHADE GARDENING & TREES FOR HEATING & COOLING REDUCTION

### \*Cooling a house with plantings

- Plant deciduous trees on the west, south, & east sides to block summer sun
- Plant trees around a/c units to shade them from the sun-makes them work more efficiently
- Plants create a cool microclimate that can reduce the temp. in areas as much as 9 degrees – During photosynthesis large amounts of water vapor escape through there leaves cooling the passing air.
- Provide excellent protection from the summer sun by shading roof, walls, & windows
- For western exposures wide spreading trees are best
- Deciduous vines such as grapes provide summer shade & winter sun – create dead air space that insulates home and cool it all year
- Shrubbery planted a few feet away from the house will provide extra shade without obstructing cool air currents
- Shrubbery also reduces soil and wall temps
- Avoid large paved areas and gravel beds. They will store heat
- Lawns are 10 degrees cooler than bare ground so surround your patio with grass and ground covers
- Trees with high canopies shade roofs & large portions of the building structure
- Shrubs are appropriate for windbreaks and for localized shade for windows
- Wall vines are suitable to reduce summer heat and radiation
- Vines on pergolas are excellent for home cooling and shading

### \*Heating a home by planting

- Evergreen trees planted in a row on the north side can offer protection from the winter winds before it hits your home-serve as a wind break
- Helps cut heating bills
- Don't plant vegetation too close to your house or it will trap summer heat and make the air around your house even warmer
- Trees may direct winds to the side or over the house, lowering the wind chill
- Because deciduous trees lose their leaves in the fall, they permit winter sunlight to reach the house helping to heat home with solar energy

### \*Benefits

- A healthy tree is equivalent to 10 room-size air conditioners operating 20 hrs a day

- Landscaping can reduce air conditioning by up to 50% by shading windows and walls of home
- If you plant a tree today on the west side of your house, in 5 yrs your energy bills should be 3% less. In 15 yrs 12% less
- Trees properly planted can reduce a/c needs by 30% and can save 20-50 % in energy for heating

\*Other benefits of trees

- Landscaping can increase property value by 20%
- One acre of forest absorbs 6 tons of carbon dioxide and puts out 4 tons of oxygen. This is enough to meet the annual needs of 18 people
- Planting of trees means improved water quality, resulting in less run off and erosion. This allows more recharging of ground water supply
- Visual exposure to settings with trees has produced significant recovery from stress within 5 minutes, as indicated by changes in blood pressure and muscle tension

## **Tree Choices**

- 1. Patmore Ash**
- 2. London Plane Tree**
- 3. Red Maple**
- 4. Pin Oak**
- 5. Honeylocust**
- 6. Redbud**
- 7. River Birch**
- 8. Sugarmaple**
- 9. White Pine**
- 10. Blue Spruce**