

AUSTIN'S CLIMATE

A Factsheet from Austin Energy's Green Building Program

Information on Austin's climate and tips to work with, instead of against, our climate when designing a home in order to lower your air conditioning and heating costs.

Austin's Global Location

- ❖ Latitude: 30.3 degrees North
- ❖ Longitude: 97.7 degrees West
- ❖ Altitude: 615 feet above sea level

Austin's Climate

- ❖ HDD (Degree Days Heating - Base 65): 1737*
Areas <2000 Heating Degree Days per year are characterized as having mild winters.
- ❖ CDD (Degree Days Cooling - Base 65): 2907** (1.7 to 1 in favor of cooling)
Areas >1500 Cooling Degree Days per year are characterized by long hot summers with substantial cooling requirements.
- ❖ Seasonal Average Relative Humidity (between 30% and 60% is considered comfortable).
The following are approximate values for our region of the country.

Winter: 74 %	Summer: 78 %
Spring: 77 %	Fall: 79 %
- ❖ Average Diurnal Swing is less than 25 degrees. Less than 25 degree diurnal swing indicates high humidity which reduces the effect of thermal mass. Humid air retains atmospheric heat preventing low nighttime temperatures, which makes thermal mass effective.
- ❖ Prevailing Breeze: Prevailing breeze may vary on a specific site due to certain conditions.

January: S 10 mph	July: S 8 mph
April: SSE 11 mph	October: S 8 mph
- ❖ Total Average Annual Rainfall: 32 inches

Winter: 5.76 inches	Summer: 7.81 inches
Spring: 9.21 inches	Fall: 9.10 inches

Climatic Design Priorities (in descending order of importance)

Adapted from Lechner, Norbert, *Heating Cooling Lighting Design Methods for Architects*.

1. Protect from the summer sun.
2. Keep hot temperatures out during the summer with tight construction.
3. Allow natural / cross ventilation to both cool and remove excess moisture in the summer if outdoor humidity is lower than indoor humidity.
4. Avoid creating additional humidity during the summer by using exhaust fans at point sources of indoor humidity (bathrooms, laundry, kitchen, etc.).
5. Let the winter sun in.
6. Keep the heat in and the cool temperatures out during the winter with tight construction.

Percentage of Year When Passive Strategies Will Work

Adapted from *Texas Renewable Energy Resource Assessment*

- ❖ Comfort: 37 percent of the year, although high humidity makes some of this time marginal.
- ❖ Solar: Let the sun in to use its heat in winter (passive heating), 39 percent of the year.
- ❖ Shade: Long overhangs, porches, and covered outdoor spaces next to buildings to keep the sun off (passive cooling), 62 percent of the year.
- ❖ Ventilation: Windows across from each other for cross ventilation when outdoor humidity is lower than indoor humidity (passive cooling), 13 percent of the year.
- ❖ Thermal Mass: A massive masonry wall or floor to store the sun's heat for later (passive heating), 19 percent of the year.

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- ❖ Night Ventilation: Open the windows at night to allow the cooler air to come in when outdoor humidity is lower than indoor humidity (passive cooling), then close up before the next day's heat, 22 percent of the time.
- ❖ Evaporation: This strategy won't work here in Austin because of high humidity, except under extremely specialized conditions, 0 percent of the year.

Passive Solar Design Criteria

Adapted from *Passive Solar Energy Rules of Thumb for the Austin Area*, Stewardship, Inc., 06/22/95.

- ❖ In order to make use of passive solar heat gain, "A basic rule of thumb is that the {south} wall must receive direct sunlight from 9am to 3pm in the winter." (*Texas Energy*, Jan-Mar 1995, p. 1)
- ❖ In Austin, magnetic north as indicated on the compass is 8 degrees EAST of true North.
- ❖ Ideal orientation is to be within 5 percent of true South. Within 15 percent of true South will perform almost as well. Within 30 percent will still provide a substantial level of solar contribution.

Use south facing glass for:

- ❖ 7 percent of house total floor area if no mass
- ❖ 12 percent of total floor area with mass
- ❖ 20 for all passive systems (direct & sunspace)

Solar Angles for Austin (approximate values)

- ❖ Altitude (ALT) is the angle in degrees above the horizon (how high).
- ❖ Azimuth (AZI) is the angle in degrees from due south (how far west/east).

	8 AM		Solar Noon		4 PM	
Dec 21	ALT: 12	AZI: 54	ALT: 37	AZI: 0	ALT: 12	AZI: 54
Mar 21/Sep 21	ALT: 26	AZI: 74	ALT: 60	AZI: 0	ALT: 26	AZI: 74
June 21	ALT: 37	AZI: 99	ALT: 83	AZI: 0	ALT: 37	AZI: 99

- ❖ Probability of sunshine in Austin - heating months (Nov-Mar): 49-55 percent
cooling months (June-Sep): 67-76 percent

Bear in mind that for all passive strategies to work a building must be properly oriented, avoidance of long east and west walls is a must, and overhangs on the south side of a building will control the sun high in the summer sky.