

# THE GreenGUIDE

environmental change begins at home.

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[http://www.thegreenguide.com/products/Appliances/Air\\_Conditioners\\_\(Central\)](http://www.thegreenguide.com/products/Appliances/Air_Conditioners_(Central))

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## Air Conditioners (Central)

### What To Look For

If your current air conditioner is more than eight years old, it's time for a new one. Over the life of the product, the amount you'll save in energy bills will more than likely exceed the cost of the new unit. An added bonus: for every kilowatt hour (kWh) of electricity you save, you prevent the release of 1.34 lbs. of carbon dioxide (CO<sub>2</sub>) from your power plant. Over a summer season, this could result in a CO<sub>2</sub> reduction of several hundred pounds and energy savings of about \$65, when compared to an older model.

The following are basic criteria to use when choosing a new unit:

### BTUs

The cooling capacity of an air conditioner is measured in British thermal units per hour (Btu/hr). To find the best BTUs needed to cool your home, multiply the square footage of the space by 10 and then add 4,000. A room that is 500 sq. ft. would require at least 9,000 BTUs/hr:  $(500 \times 10) + 4,000 = 9,000$ . Make sure you get the right size model for your needs. Choosing an air conditioner that is either too large or too small creates an unnecessary energy drain.

When determining your BTU needs, consider your local climate (both heat *and* humidity), window placement and the average heat level of the space directly above the room you want to cool, whether it's your roof or a neighbor's apartment. For a more accurate assessment, use the free sizing worksheet on the Association of Home Appliance Manufacturers' web site, [www.cooloff.org/sub\\_cool.html](http://www.cooloff.org/sub_cool.html), where you can input various factors to calculate your BTU needs. Or see the BTU equivalency chart at [www.energystar.gov](http://www.energystar.gov).

### SEER (Maximum)

Central air conditioner efficiency is rated by its Seasonal Energy-Efficiency Ratio (SEER). The federal SEER requirement is 13 or above, and Energy Star requires SEERs of 14 or above. The units listed in our [Product Comparisons chart](#) are series of appliances, designed to outfit homes of varying sizes. The SEERs listed represent those of the most efficient units in each series.

### Energy Star Rating

The Environmental Protection Agency's "Energy Star" ratings indicate that an appliance is at least 10 percent more energy-efficient than the minimum federal standards.

### **ACEEE Rated**

The nonprofit American Council for an Energy-Efficient Economy (ACEEE) recommends central air conditioners that represent manufacturers' most efficient models. For maximum energy savings, ACEEE recommends purchasing units with a SEER of at least 14.5.

### **Shopping and Usage Tips**

#### ***Before You Shop***

Many government agencies are offering rebates and trade-ins of older models to encourage the purchase of energy-efficient units. Find out if your state energy office or local utility offers any such deals. You could end up saving \$75 or more on your purchase.

Even so, the greenest method of cooling your home involves creative home design rather than an energy-hogging appliance. According to the Rocky Mountain Institute, about 50 percent of all electricity used in the United States during peak summer months is devoted to powering air conditioners. So before you start your search for a new, more efficient unit, consider the following simple home improvements:

- Buy a ceiling fan or window box fan.
- If you live in a dry climate, install a whole-house fan in your attic; it consumes one-tenth as much power as an air conditioner.
- Close your blinds and windows during peak sunlight/heat hours and open your windows at night. Circulate cooler evening air into your house using fans.
- Plant shade trees or trellised vines on the western and eastern sides of your home to reduce heat absorption.
- Use energy-efficient landscaping to help cool your home's exterior. Dense clusters of plants and bushes close to a home's exterior walls have a greater cooling effect.
- Install awnings and roof overhangs.
- Add light-colored, textured or reflective roof and wall materials.
- Choose energy-efficient indoor lighting and appliances to reduce the amount of indoor waste heat produced by these devices.
- Seal and caulk walls and windows to prevent cold-air leaks.
- Add low-emittance (low-E) glazing to windows to prevent heat transfer.

#### ***Shopping Tips***

**Avoid buying a used air conditioner or attempting to fix an older model. Unless it is a fairly new unit, the upfront savings will end up costing you more in higher energy bills, not to mention the negative impact on the planet in the form of increased CO2 emissions.**

**If you live in a very humid climate, look for models that are good at removing moisture. Manufacturers usually report the rate of water removal in pints per hour. Compare the rates of various energy-efficient models to find the best one for your needs (because keeping condenser coils warmer improves efficiency, some high-efficiency models may not dehumidify as well as less efficient models), and consider adding a carbon filter to reduce humidity.**

**At the store, compare the energy consumption and usage costs of one model to another using the yellow "EnergyGuide" label on the product.**

### ***Installation***

**When installing a central-air unit, hire a reliable contractor. Even the most efficient model will perform poorly if not installed correctly. Make sure your contractor calculates your required cooling capacity, and be sure to negotiate a maintenance plan with him/her as part of your contract. Check with your local Better Business Bureau and consumer-affairs office to find out if there have been any major complaints against a particular contractor before you sign, or consult the Air Conditioning Contractors of America ([www.acca.org](http://www.acca.org)) to find a North American Technician Excellence (NATE) and Energy Star-certified contractor.**

### ***Smart Use Tips***

**After you purchase a new unit, improve its efficiency by doing the following:**

- Install a programmable thermostat so you can better control usage.**
- Set the temperature relative to the temperature outside, rather than to a temperature you think feels comfortable.**
- At night, use your air conditioner's fan-only mode**
- Use the recirculate option instead of constantly cooling hot air from outdoors.**
- Turn the air conditioner off when you're out and close vents in unused rooms.**
- Check your filter every month, especially during the summer when usage is high. Clean reusable filters, or replace disposable ones, every three months, or whenever they look dirty.**
- Have the contractor do regular inspections to ensure that there are no refrigerant or duct leaks, and clean the coils and drainage system.**

### ***Disposal***

**If you are replacing an old unit, make sure to safely dispose of the old one to prevent harmful refrigerants from entering landfills. When purchasing a new room air-conditioner, look for manufacturers and dealers that offer a take-back or end-of-life collection program. In general, they will safely dispose of your older model, often regardless of the maker, when you purchase one**

of their new appliances. Otherwise, contact the public works department in your city and ask about home-appliance recycling or refrigerant-recovery programs. Your contractor should be equipped with a refrigerant-recovery system, and a certified mechanic can safely remove refrigerants from the old equipment.

## Product Comparisons

It's ironic that the very machines designed to keep us cool generate excessive amounts of globe-warming greenhouse gases. But you can cut down on your air conditioner's environmental impact with these efficient units (arranged by BTU size in the chart below) and simple home maintenance tips.

Wondering what these table headings mean? They're the criteria we used to choose and evaluate the products in the chart below. Learn more about their importance in "[What To Look For.](#)"

Name	BTUs	SEER (Maximum)	Energy Star Rated	ACEEE Rated	MSRP	Purchasing Information	Reader Ra
Carrier 38TDB Infinity Series	18,000- 60,000	21	yes	yes	*	<a href="http://www.residential.carrier.com">www.residential.carrier.com</a> , 800-CARRIER	Avg. Rating ★
Carrier 38TSA Performance Series	18,000- 60,000	15	yes	yes	*	<a href="http://www.residential.carrier.com">www.residential.carrier.com</a> , 800-CARRIER	Avg. Rating ☆
Lennox 13ACD Merit Series	18,000- 60,000	14	yes	no	*	<a href="http://www.lennox.com">www.lennox.com</a> , 800-953- 6669	Avg. Rating ☆
Amana ASX16 Series	24,000- 60,000	16	yes	no	*	<a href="http://www.amana-hac.com">www.amana-hac.com</a> , 877- 254-4729	Avg. Rating ★
Bryant 187 Evolution Series	24,000- 60,000	17.1	yes	yes	*	<a href="http://www.bryant.com">www.bryant.com</a> , 800-428- 4326	Avg. Rating ☆
Bryant 180 Evolution Series	24,000- 60,000	20	yes	yes	*	<a href="http://www.bryant.com">www.bryant.com</a> , 800-428- 4326	Avg. Rating ☆
Lennox XC21 Dave Lennox Signature Collection	24,000- 60,000	20.5	yes	no	*	<a href="http://www.lennox.com">www.lennox.com</a> , 800-953- 6669	Avg. Rating ★
American Standard Allegiance 18 Series	30,000- 60,000	18.9	yes	yes	*	<a href="http://www.amstd-comfort.com">www.amstd-comfort.com</a>	Avg. Rating ☆
Trane XL19i	30,000- 60,000	19.5	yes	no	*	<a href="http://www.trane.com">www.trane.com</a>	Avg. Rating ★

## Series

Trane XL15i Series	30,000- 60,000	16.25	yes	no	*	<a href="http://www.trane.com">www.trane.com</a>	Avg. Rating ☆
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\*Prices for central air conditioning units are not included as they can vary widely depending on your con with the installer.

## The Backstory

### Environmental Issues

#### *Energy Use*

**Though air-conditioning increases comfort and can prevent death from heat stroke during intense heat, the electricity generated to power these and other appliances carries both global and personal health consequences. In burning fossil fuels such as coal to supply electricity to homes and workplaces, power plants discharge clouds of soot and other pollutants into the atmosphere. Among these are mercury—a brain-damaging metal that can cause learning disabilities—and carbon dioxide (CO<sub>2</sub>), a greenhouse gas that is a primary culprit in global climate change. For every kilowatt-hour of electricity used in a home or elsewhere, power plants release an average of 1.34 pounds of CO<sub>2</sub> into the environment! Air conditioner use in the U.S. results in about 100 million tons of carbon dioxide (CO<sub>2</sub>) emissions from power plants every year. Electricity generation from nuclear power plants poses a health risk to surrounding communities and generates radioactive waste. In addition to environmental costs, more than two-thirds of all U.S. households have air conditioners, which cost homeowners more than \$10 billion each year in combined energy bills, according to ACEEE.**

#### *HCFCs*

**Formerly used as cooling agents, ozone-depleting chlorofluorocarbons (CFCs) have been replaced by hydrochlorofluorocarbons (HCFCs), which deplete 95 percent less ozone. However, booming demand for air conditioners in hot climates such as India and China has upped the chemical's output in developing countries 20 to 35 percent each year, causing damage at an alarming rate and possibly setting back ozone recovery by 25 years. In industrial countries, HCFCs are being replaced with ozone-safe cooling agents and will be banned in the U.S. by 2010. But HCFCs will be allowed in developing countries through 2040, and because they're still cheaper to install than ozone-safe chemicals, production in developing countries is expected to increase fivefold by 2010.**

#### *Disposal*

**Federal law requires that HCFCs be recovered from air conditioners and other appliances before they are dismantled for recycling or tossed in landfills, and the EPA is authorized to impose fines of up to \$25,000 for failure to comply with regulations. Before discarding your old unit, search for a company that is EPA-certified to recover HCFCs. [www.sharetheair.com](http://www.sharetheair.com) has certified companies listed by region.**

### Personal Health

**In the midst of sweltering heat waves, air conditioning can be a lifesaver, protecting against heat stroke and hyperthermia. But, without proper maintenance, air conditioners can also be a health**

**hazard. Dirty filters can allow allergens, pesticides and other particulate matter to enter your home from the outside, posing threats to indoor air quality. Exposure to those pollutants can trigger a host of health problems, including allergies and asthma and eye, nose and throat irritation.**

**In offices and schools, those symptoms signify "sick building syndrome," caused by improperly ventilated air conditioning systems, and health problems don't always disappear after an extended period away from the building. Repeated bouts of air conditioner fever, a particularly nasty form of sick building syndrome, can result in pulmonary fibrosis, cough, fatigue and weight loss and sometimes require hospitalization.**

**Ozone depletion caused by HCFCs in the atmosphere also poses health risks. The UN Environment Programme estimates that exposure to the additional UV-B radiation resulting from 10 percent loss of global ozone could lead to 300,000 additional cases of squamous cell cancer and basal cell cancer and 4,500-9,000 additional cases of potentially fatal melanoma worldwide each year. Increased exposure to UV-B rays also poses a significant threat to animal and plant life and consequently many of the earth's food chains.**

### **Related Articles**

**From the *Green Guide*:**

**"Keep Your Cool With Less AC," [www.thegreenguide.com/doc/121/cool](http://www.thegreenguide.com/doc/121/cool)**

**"Ventilating, Vacuuming and Filtering Out Allergens," [www.thegreenguide.com/doc/114/ventilating](http://www.thegreenguide.com/doc/114/ventilating)**

**From Outside Sources:**

**Air Conditioning Contractors of America:[www.acca.org](http://www.acca.org)**

**American Council for an Energy-Efficient Economy: [www.aceee.org](http://www.aceee.org), 202-429-8873**

**Energy Star: [www.energystar.gov](http://www.energystar.gov), 888-STAR-YES**

**Rocky Mountain Institute: [www.rmi.org](http://www.rmi.org), 970-927-3851**

### **References**

**A Guide to Energy Efficient Heating and Cooling. Energy Star. May 2005.**

**Choose Green Report: Room Air Conditioning. Green Seal. Summer 1999.**

**"Home Energy Brief - #3 Space Cooling." Rocky Mountain Institute, [www.rmi.org/sitepages/pid119.php](http://www.rmi.org/sitepages/pid119.php)**

***The Most Energy-Efficient Appliances 2005.* American Council for an Energy-Efficient Economy.**

**"Residential Central Air Conditioners and Air-Source Heat Pumps Qualified Product List." Energy Star, February 2006, [www.energystar.gov/ia/products/prod\\_lists/cac\\_prod\\_list.pdf](http://www.energystar.gov/ia/products/prod_lists/cac_prod_list.pdf)**

**Wilson, A. et al. *Consumer Guide to Home Energy Savings*. American Council for an Energy-Efficient Economy, 2003.**

**--By Solvie Karlstrom, June 2007**

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