



# Build It Back Green

## *HVAC Systems*



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### **BENEFITS**

According to the United States Environmental Protection Agency, heating and cooling accounts for as much as half of a home's energy use. With energy efficient systems, and proper sizing, installation, and maintenance you can save up to 20 % annually on your total energy costs.

### **DESCRIPTION & CHARACTERISTICS**

If your HVAC system is more than twelve years old it may be time to replace it.

- A forced air system is the most common. It uses a fan to push air through a duct system where it is conditioned, distributed to individual areas of the house and then returned to the unit.
- A heat pump removes heat from one area and discharges it to another. Air source heat pumps remove heat from the interior and discharge it outside or vice versa. This system loses efficiency in extreme cold. Ground source or "geothermal" heat pumps are the most resource efficient type of HVAC unit. While there is a high initial cost, it has a substantially lower life cycle cost. Ground source units use water to interact with the ground temperature, which acts as heat sink, removing heat from the water.
- A zoned, or mini-split, system pumps Freon to individual rooms/zones rather than pumping cold air throughout the house in ductwork.

### **PERFORMANCE IMPROVEMENT & INSTALLATION TIPS**

Once you have chosen a new HVAC unit there are some things to keep in mind that will greatly impact your comfort and savings.

- Consider Energy Star HVAC units that can save up to 200 dollars a year over non-certified units.
- Raise your outdoor condenser unit up to avoid flooding. Place it on a wooden platform built to at least your area's base level elevation.
- In hot and humid climates a high Seasonal Energy Efficiency Rating (SEER) air conditioner is important. SEER reflects the energy-efficiency over the normal cooling season. SEER 13 is the minimum SEER allowed, but the higher the better.
- Insist that your HVAC contractor uses Air Conditioning Contractors of America's (ACCA) Manual J to size your unit. When contractors use rule of thumb the unit is often too big, which means greater upfront costs, higher energy bills and reduced comfort. An oversized unit will cycle on and off too quickly which does not adequately remove moisture from the air leading to mold and mildew. Manual J takes a myriad of factors into account rather than just square footage. Ask your contractor to show you the Manual J calculations for your home.

- Try to locate ductwork in conditioned spaces to reduce conditioned air losses. Look for R-8 insulation for your ducts. Design your ductwork system with one or more long supply trunks with multiple take-offs rather than with all ducts originating at the air handler (called octopus style). If using flexible ductwork make sure it is installed correctly- fully extended, sealed with mastic and properly secured. To secure properly use duct saddles rather than hanging straps that cause kinks and reduced airflow. Seal around every register where they penetrate the ceiling with canned foam (do this on attic side). Use of ACCA's Manual D for ductwork design can ensure an efficient system of ducts, registers and returns.
- Properly design and maintain your duct system to insure balanced pressure. A positive or negative pressure can damage equipment, cause moisture problems in the home, and intensify infiltration by pulling air in from the wrong areas. Duct leakage causes pressure imbalances. Closing a door and separating more than one single supply register from the return register will also cause an imbalance. If interior doors that separate multiple supplies from the return register will be closed often have jumper returns installed.

If you are not in the market for a new HVAC system there are some simple things you can do to improve the efficiency of your current system.

- Clean or replace your air filter regularly (every 1-2 months).
- Schedule annual maintenance checkups with your heating and cooling contractor. Dirt and neglect are the number one cause of HVAC system failures. Proper maintenance will prolong the life span of your system, maintain optimum efficiency, and ensure your safety and health. For example, have your contractor check the refrigerant charge. Improper levels of refrigerant can decrease efficiency and shorten the lifespan. For a complete contractor maintenance checklist visit the heating and cooling section of [energystar.gov](http://energystar.gov).
- Properly seal and insulate your ductwork. A fifteen percent duct leakage can cut the Seasonal Energy Efficiency Ratio (SEER) of your HVAC unit in half. For more information on sealing your ductwork see Build It Back Green's Seal Leaks in Ductwork Products and Practices Sheet.
- Install a programmable thermostat. This allows a user to preset different temperatures for certain times of the day, and the thermostat automatically adjusts the temperature according to this schedule. If used correctly it can save up to 180 dollars a year.

## ***PRODUCT TYPES & PRICES***

- There are a myriad of factors involved in estimating the cost of an installed HVAC unit, including size, SEER ratings, house layout, etc. For reference a ground source heat pumps will likely be the most expensive option. Mini-split systems are around 1,500–\$2,000 per ton, which is about 30% higher than a forced air system (before the price of the ductwork). For a full price estimate contact your preferred HVAC systems provider.
- HVAC suppliers are identified on our **Vendors List** available on our website at [www.globalgreen.org/bibg](http://www.globalgreen.org/bibg) and in the **New Orleans Green Building Resource Center** at 841 Carondelet.