A GUIDE TO ENERGY-EFFICIENT COOLING AND HEATING

ENERGY STAR® is a government backed program that helps consumers protect the environment through superior energy efficiency. For more information visit www.energystar.gov or call 1.888.STAR.YES (1.888.782.7937)

CHANGE FOR THE BETTER WITH ENERGY STAR

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ENERGY STAR

IF ONE HOUSEHOLD IN TEN BOUGHT COOLING AND HEATING PRODUCTS THAT HAVE EARNED THE ENERGY STAR®,

THE CHANGE WOULD KEEP 17 BILLION POUNDS OF POLLUTION OUT OF OUR AIR.

Looking for ways to keep your home comfortable year-round and contribute to a cleaner environment?

Use this guide to:

1. Determine when it's time to replace your old cooling and heating equipment with more energy-efficient equipment.

2. Get recommendations on increasing the performance of your new or existing equipment across the seasons to save energy and money while providing a more comfortable, healthy home for you and your family.

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When you see the ENERGY STAR on a product, you know that it meets strict energy efficiency guidelines set by the US Environmental Protection Agency (EPA) and the Department of Energy (DOE).

To help you get the most out of the products you purchase and save more energy, the EPA provides important recommendations for product installation and home improvement.

Since using less energy reduces greenhouse gas emissions and improves air quality, choosing ENERGY STAR is one way you can do your part to protect our planet for future generations.

ENERGY STAR

AS MUCH AS HALF OF THE ENERGY YOU USE GOES TO COOL AND HEAT YOUR HOME

But paying to be comfortable does not have to burn through your bank account. Find out if you should consider a change this season by reviewing the checklist on the next page.

WHEN IS IT TIME FOR A CHANGE?

How do you know if it's time to replace your old cooling and heating equipment or improve the performance of your overall system? It may be time to call a professional contractor to help you make a change if:

> Your heat pump or air conditioner is more than 10 years old. Consider replacing with ENERGY STAR qualified equipment that uses at least 20 percent less energy than new standard models.

> Your furnace or boiler is more than 15 years old. Consider replacing with an ENERGY STAR qualified furnace. It would be 15 percent more efficient than a conventional furnace. Or, if you have a boiler, consider replacing with an ENERGY STAR qualified one.

> Your equipment needs frequent repairs and your energy bills are going up. Your cooling and heating equipment may have become less efficient.

> Some of your rooms are too hot or cold. Improper equipment operation, duct problems or inadequate insulation could be the cause.

> No one is home for long periods of the day and you don't have a programmable thermostat. Install an ENERGY STAR qualified programmable thermostat or have a professional contractor install one and instruct you on its use–to start saving energy and money while you're away or even sleeping.

> Your home has humidity problems. Poor equipment operation, inadequate equipment, and leaky ductwork can cause the air to be too dry in the winter or too humid in the summer.

> Your home has excessive dust. Leaky ducts can pull particles and air in from attics, crawlspaces and basements and distribute them through the house. Having your ducts sealed may be a solution.

> Your cooling system is noisy. You could have an undersized duct system or a problem with the indoor coil of your cooling equipment.

> Your score on the ENERGY STAR Home Energy Yardstick is below five. That means you're using more energy at home than most Americans and probably paying more than you need to on energy bills. Get personalized recommendations to improve your home and/or cooling and heating system. Find the Home Energy Yardstick at www.energystar.gov. Click on Home Improvement.

MAINTENANCE

Maintain your equipment to prevent future problems and unwanted costs. Keep your cooling and heating systems at peak performance by having a contractor do annual pre-season check-ups. Contractors get busy once summer and winter come, so it's best to check the cooling system in the spring and the heating system in the fall. To remember, you might plan the check-ups around the time changes in the spring and fall.

COOLING & HEATING MAINTENANCE CHECKLIST

Your contractor should complete the following each spring and fall:

> Check thermostat settings to ensure the cooling and heating system turns on and off at the right temperatures.

> Tighten all electrical connections and measure voltage and current on motors. Faulty electrical connections can cause unsafe operation of your system and reduce the life of major components.

> Lubricate all moving parts. Parts that lack lubrication cause friction in motors and increase the amount of electricity you use.

> Check and inspect the condensate drain in your central air conditioner, furnace and/or heat pump (when in cooling mode). If plugged, the drain can cause water damage in the house, affect indoor humidity levels, and breed bacteria.

> Check controls of the system to ensure proper and safe operation. Check the starting cycle of the equipment to assure the system starts, operates, and shuts off properly.

> Inspect, clean, or change air filters once a month in your central air conditioner, furnace, and/or heat pump. Your contractor can show you how to do this yourself. Depending on your system, your filter may be found in the duct system versus the cooling and heating equipment itself. A dirty filter causes energy costs to be greater than they should be and can damage your equipment, leading to early failures.

The following checklists outline additional steps your contractor should follow when servicing either your cooling or heating system:

COOLING SPECIFIC CHECKLIST

> Clean evaporator and condenser air conditioning coils before warm weather starts. Dirty coils reduce the system's ability to cool your home and cause the system to run longer, costing you more energy dollars and decreasing the life of the equipment.

> Check your central air conditioner's refrigerant pressures and adjust charge if necessary. Too much or too little refrigerant charge can damage the compressor, reducing the life of your equipment and increasing costs.

> Clean and adjust blower components to provide proper system airflow for greater comfort levels. Proper airflow over the coils will improve equipment efficiency and reliability. Airflow problems can reduce your system's efficiency by up to 15 percent.

HEATING SPECIFIC CHECKLIST

> Check all gas (or oil) connections, gas pressure, burner combustion and heat exchanger. Improperly operating gas (or oil) connections are a fire hazard and can contribute to health problems. A dirty burner or cracked heat exchanger causes improper burner operation. Either can cause the equipment to operate less safely and efficiently.

COOLING & HEATING EQUIPMENT

REPLACE WITH EQUIPMENT THAT HAS EARNED THE ENERGY STAR.

PROGRAMMABLE THERMOSTATS

Using a programmable thermostat to consistently control your home's temperature can save you about $100 every year in energy costs when used properly. Use the four pre-set temperature weekday and weekend settings for your home depending on whether you're at work, at home, or in bed at night.

Programmable thermostats that have earned the ENERGY STAR provide you with more flexibility than standard models and unlike older mechanical thermostats, contain no mercury. Just remember to install your thermostat away from naturally cool or hot spots so it can accurately read the temperature in the house.

BOILERS

A boiler heats your home by burning gas or fuel oil to heat water or steam that circulates through radiators, baseboards, or radiant floor systems. Boilers do not use a duct system. A properly sized and installed ENERGY STAR qualified boiler uses about 6 percent less energy than a standard new boiler. Boilers that have earned the ENERGY STAR have higher AFUE ratings. AFUE, the Annual Fuel Utilization Efficiency, measures the heating efficiency of boilers.

How much energy you save will vary based on your use and climate, with colder regions likely saving more. Features that improve boiler efficiency include electronic ignition, which eliminates the need to have the pilot light burning all the time, and technologies that extract more heat from the same amount of fuel.

FURNACES

Furnaces are the most commonly used residential heating system in the United States, running most often on gas, but sometimes on fuel oil or electricity, and deliver their heat through a duct system. One in four furnaces in US homes today is more than 20 years old. ENERGY STAR qualified furnaces use advanced technology to deliver 15 percent higher efficiency than standard new furnaces available today.

HEAT PUMPS

Electric Air-Source Heat Pumps (ASHPs): Often used in moderate climates, ASHPs use the difference between outdoor and indoor air temperatures to cool and heat your home. ASHPs remove excess heat from indoor air and release it outdoors. ENERGY STAR qualified ASHPs use about 20 percent less energy than conventional models. They also come with higher HSPF ratings. HSPF, the Heating Seasonal Performance Factor, measures the heating efficiency of heat pumps.

Geothermal Heat Pumps (GHPs): By using stable temperature conditions in the ground, GHPs cool and heat your home. In addition to providing much lower energy bills with 30 percent higher efficiency than standard new models, ENERGY STAR qualified GHPs are quieter and include water-heating capabilities. Although initially expensive, they quickly pay back the homeowner with significant cost savings. GHPs are most often installed in new homes and require a duct system. Find out if a GHP might be right for your home.

CENTRAL AIR CONDITIONERS

ENERGY STAR qualified central air conditioners are 25 percent more energy-efficient than today's standard equipment. Central air conditioners that have earned the ENERGY STAR have a higher SEER than standard models. SEER, the Seasonal Energy Efficiency Ratio, measures energy efficiency. The higher the SEER, the greater the level of efficiency. Since sizing and proper installation of a central air conditioning system are critical to energy efficiency and home comfort, it is important to hire a qualified technician.

SIZING & INSTALLATION

When purchasing cooling and heating products, pay close attention to several things: getting the right-sized equipment for your home, getting a quality installation, getting the right professional to work with you, and asking the right questions.

MAKE SURE YOUR UNIT IS PROPERLY SIZED.
WHEN IT COMES TO COOLING AND HEATING EQUIPMENT, BIGGER ISN'T ALWAYS BETTER.

With cooling and heating equipment, a larger-sized product is intended to meet the needs of a larger area. However, if the equipment is too large for your home, you will experience increased costs and less comfort. Over-sized equipment will operate in short run times or cycles, not allowing the unit to reach efficient operation or deliver even temperatures throughout the home.

Don't assume that the size of your new system will be the same as your old equipment. Changes, such as additions or insulation improvements, may have been made to the house since the original equipment was installed; or, the equipment may have been too large from the start. Your contractor can calculate the right size for your cooling and heating equipment by using Manual J or an equivalent calculation tool. Ask about it.

GET A QUALITY INSTALLATION
ENSURE THAT YOUR CONTRACTOR FOLLOWS EACH STEP BELOW WHEN INSTALLING YOUR NEW COOLING AND HEATING EQUIPMENT.

COOLING INSTALLATION CHECKLIST

> Replace the indoor coil of the equipment when replacing the outdoor unit. You should have a matched set. An old coil will not work efficiently with a new outdoor unit.

> Check proper level of refrigerant charge and airflow through the registers that deliver cool air to your rooms. Confirm that the level of refrigerant charge and the airflow across the coils meets the manufacturer's recommendation.

> Place the condenser in an area that can be protected from rain, snow, or vegetation, as recommended by the manufacturer. Use a cover over your outside equipment during the winter to protect it from snow and ice.

> Provide adequate room around the equipment for service and maintenance.

HEATING INSTALLATION CHECKLIST

> Test and verify proper airflow (if a furnace or heat pump).

> Verify your furnace or boiler has been tested for proper burner operation and proper venting of flue gases. The vent piping should be inspected for leaks or deterioration and repaired or replaced as necessary.

> Provide adequate room around the equipment for service and maintenance.

WORKING WITH A CONTRACTOR

TO PURCHASE AND HAVE NEW EQUIPMENT INSTALLED, YOU WILL NEED TO HIRE A CONTRACTOR.

The following sections will help you find the right contractor, get quality and value from the contractor and your new equipment, and get a signed agreement on the work to be done. Many of the following recommendations also apply if you choose to work with a contractor on home improvements such as home sealing or duct work.

1. HOW DO YOU FIND THE RIGHT CONTRACTOR?

A reputable contractor should:

> Perform an on-site inspection of the job you want done and provide a detailed bid in a timely manner.

> Demonstrate to you that they are (A) licensed as a legitimate contractor in your area, recognized by your local municipality; and (B) licensed and insured to repair or install cooling and heating equipment (many states require this).

> Be able to provide their certification for refrigerant handling, required since 1992.

> Have several years in business in your community.

> Provide examples of other quality installation work, with names of customers that you can contact.

> Ask whether a contractor's service technicians are certified by North American Technician Excellence (NATE) to professionally install and service cooling and heating systems. For a list of contractors that employ NATE-certified technicians in your state, visit www.natex.org.

2. GET QUALITY AND VALUE.

Have the contractor :

> Show you a layout of where the equipment is going to be installed.

> Calculate the size of your new equipment using Manual J or an equivalent calculation tool.

> Show calculations of savings for installing high-efficiency, ENERGY STAR qualified equipment.

> Explain the financial benefit of your new equipment.

> Diagnose and repair your duct system, if needed.

> Provide financing for the purchase, if necessary.

> Explain the warranty on equipment and parts and labor.

3. SIGN AN AGREEMENT BEFORE WORK BEGINS.

Both you and your contractor should sign a written proposal before work gets started. The agreement or proposal should:

> List in detail all the work that is being contracted.

> Specify all products by quantity, name, model number, and energy ratings.

> Provide manufacturer's warranty and documents for products and contractor installation warranty information.

> Give the payment schedule.

> State the scheduled start and completion date.

> Describe how disputes will be resolved.

> State the contractor's liability insurance and licenses if required.

> Outline paperwork and permits needed for the project.

ENERGY STAR HOME SEALING

IMPROVEMENTS THAT INCREASE THE ENERGY EFFICIENCY AND COMFORT OF YOUR HOME, INCLUDING SEALING AIR LEAKS, ADDING INSULATION AND REPLACING WINDOWS.

IMPROVING YOUR HOME ENVELOPE

In old homes, and even new homes, it is common to find air leaks and missing or inadequate insulation. The holes, cracks, and gaps in an average home can allow as much air leakage as an open window.

To address this problem, US EPA has developed ENERGY STAR Home Sealing, a recommended approach for improving a home's envelope–the outer walls, ceiling, windows, and floors. Home Sealing can make your home more comfortable and energy-efficient, and lower energy bills. ENERGY STAR Home Sealing will also make your home quieter by reducing outside noise and help prevent pollutants such as pollen, chemical vapors from the garage, and car exhaust from entering your home.

ENERGY STAR HOME SEALING RECOMMENDATIONS

1) **Seal air leaks** to reduce drafts and get the full performance out of insulation. The biggest leaks are usually hidden in the attic and the basement. Caulk and spray foam products can seal many of these holes. Always work to reduce air leaks before installing insulation.

2) **Add insulation** to keep your home comfortable and energy-efficient even during periods of extreme temperatures. The most effective place to add insulation is usually in the attic. The U.S. Department of Energy offers recommended insulation levels for each part of the house in different climates. Visit www.energystar.gov and click on Home Improvement to see home insulating recommendations.

3) **Choose ENERGY STAR qualified windows** when replacing or adding windows to a home. Be sure to select windows that are rated for your climate zone.

Whether you seal your home yourself or have a contractor seal and insulate your home, it is important to have a professional perform a Combustion Safety Test afterward to be sure all your gas or oil burning appliances are working properly.

Learn more about Home Sealing and your home's envelope at www.energystar.gov. Click on Home Improvement.

DON'T FORGET YOUR DUCTS!

Your new or existing cooling and heating equipment is only as good as the system that carries its heated or cooled air. Central air conditioners, heat pumps and forced air furnaces rely on a system of ducts to circulate air throughout your home. To maintain comfort and good indoor air quality, it is important to have the proper balance between the air being supplied to each room and the air returning to your cooling and heating equipment. Leaky ducts can cause an unbalanced system that wastes energy. Sealing your ducts improves your system's ability to consistently cool and heat every room in your home.

DUCT SEALING INCREASES THE EFFICIENCY OF YOUR COOLING AND HEATING SYSTEM, POTENTIALLY SAVING UP TO $140 EVERY YEAR.

Whether you're having new equipment installed or working to improve the performance of your existing cooling and heating system, you should have your duct system checked.

DUCT IMPROVEMENT CHECKLIST

To improve your ducts, make sure to have your contractor:

> Identify any leaks with diagnostic equipment.

> Seal your ducts with mastic, metal-backed tape, or aerosol sealant. Duct tape should not be used; it can not withstand high temperatures and will not last.

> Test airflow after ducts are sealed.

> Insulate your ducts where it counts to keep the air at its desired temperature as it moves through the system. The contractor should use duct insulation material rated at R-6 to insulate ducts located in unconditioned spaces such as the attic.

> Conduct a combustion safety test after ducts are sealed to be sure all gas or oil-burning appliances are working properly.

YOU CAN MAKE A CHANGE FOR THE BETTER

When you choose cooling and heating products that carry the ENERGY STAR, you're creating a better environment both inside and outside your home.

Remember to look for products that have earned the ENERGY STAR, including lighting, appliances, home office equipment, cooling and heating equipment, and consumer electronics. Even new homes and commercial buildings can earn the ENERGY STAR. For more information, visit www.energystar.gov or call 1-888-STAR-YES (1-888-782-7937).