

## DETAILED UPGRADE RECOMMENDATIONS REPORT

This is a printable report of the upgrades selected for the home. These upgrades have the potential to save \$649 each year on the utility bill.

### Upgrade Package Summary:

Estimate Yearly Bill Savings:	\$649	?
Estimated Lifetime Energy Savings:	\$9,735	?
Estimated Added Cost:	\$337	?
Maximum Price for 10 Year Payback:	\$20,190	?
Return on Investment:	16%	?
Upgrade Pays for Itself in:	6 years	?

### You selected the following upgrades:

- [Replace high use incandescent lamps with compact fluorescent lamps](#)
- [When replacing your gas water heater, choose an energy efficient model](#)
- [When re-roofing, choose an ENERGY STAR-labeled roofing material with high solar reflectance cool roof](#)
- [Insulate ducts in unconditioned spaces to at least R-6](#)
- [Install a programmable thermostat](#)
- [When replacing your heat pump, choose an ENERGY STAR-labeled model](#)
- [When replacing your windows, choose a double-pane solar-control low-E argon gas wood frame window](#)
- [When replacing your electric clothes dryer, switch to natural gas model](#)
- [When replacing your clothes washer, choose an ENERGY STAR-labeled model](#)
- [When replacing your dishwasher, choose an ENERGY STAR-labeled model](#)

Note: The economic benefits for each of the upgrades below are evaluated in isolation from the other upgrades. If the efficiency level is changed for one upgrade, its potential impact on other upgrades will not be counted in the individual upgrade estimates. However, these kinds of interactions are included in the "package" totals associated with the whole-house totals and chart at the top of the page (above). For example, if the furnace efficiency is increased, the energy savings from wall insulation will not change in the table below, but the incremental savings from including insulation in the package will be less due to the more efficient furnace's impact on reducing the energy required to make up heat losses through the wall (there is less energy being used, so less to save).

## Replace high use incandescent lamps with compact fluorescent lamps

### Economic Benefits:

Estimate Yearly Bill Savings:	\$101
Estimated Lifetime Energy Savings:	\$1,515
Estimated Added Cost:	\$124
Maximum Price for 10 Year Payback:	\$1,010
Return on Investment:	77%
Upgrade Pays for Itself in:	1 year

### Additional Benefits:

Fluorescent lamps last several times longer than ordinary incandescent bulbs, which saves you the time and expense of replacing bulbs when they burn out.

### Upgrade Description:

Replace high-use incandescent lamps with compact fluorescent lamps. These units can save up to 75% of the energy used by an ordinary incandescent bulb.

### Purchasing Tips:

- Compare the light output in Lumens of the bulb you are replacing to ensure you are using the appropriate CFL. Most CFLs list their light output and equivalent incandescent wattage on their package.
- CFLs are available in many shapes and sizes, which will allow replacing nearly any incandescent bulb.
- When buying new light fixtures, look for ENERGY STAR qualified models.
- CFLs are a good investment for lights that are used 2-3 hours per day on average or more.

### More Information:

- [ENERGY STAR qualifying lighting product list](#)
- [General information about lighting from DOE](#)

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When replacing your gas water heater, choose an energy efficient model

### Economic Benefits:

Estimate Yearly Bill Savings:	<b>\$70</b>
Estimated Lifetime Energy Savings:	<b>\$1,050</b>
Estimated Added Cost:	<b>\$170</b>
Maximum Price for 10 Year Payback:	<b>\$700</b>
Return on Investment:	<b>41%</b>
Upgrade Pays for Itself in:	<b>2 years</b>

### Additional Benefits:

Efficient gas-fired water heaters may hold their temperature longer following power interruptions and operate more safely.

### Upgrade Description:

When replacing your gas water heater, choose an energy-efficient model with an Energy Factor of 0.62 or higher.

Note: Our calculations bill savings, typical upgrade costs, and cost-effectiveness assume the efficient water heater has an energy factor of 0.62 and recovery efficiency of 0.76. Higher efficiency units are available, and would provide additional energy savings.

### Purchasing Tips:

- The most important measure of efficiency for water heaters is the Energy Factor EF. The higher the EF, the more efficient the water heater.
- Purchase a water heater whose tank is internally insulated with at least R-16. [5](#)
- A water heater that is too large for your home not only has a higher purchase cost but will increase your energy costs due to excessive cycling and standby losses. The resources below provide good, simple guidance on proper sizing of water heaters. The size, or "capacity", of a fuel-fired water heater should be judged by its first hour rating FHR, not its tank size. Due to larger burners, some gas water heaters with smaller tanks actually have higher capacities FHRs than models with larger tanks.
- Many types of water heaters are now available, such as "demand" tankless, "indirect" or "integrated", and solar-assisted water heaters. [More Information](#)
- New and/or efficient gas water heaters may have different venting and flue requirements. When replacing your water heater make sure your contractor assesses your existing flue, follows new code requirements for venting water heaters, and obtains necessary permits and inspections. [3](#)

### More Information:

- [General Information from DOE](#)
- [DOE Water Heating fact sheet](#)
- [Top-Rated Energy-Efficient Water Heaters from ACEEE](#)
- [GAMA consumer's directory click on "Consumers"](#)
- [How to prevent health and safety problems with combustion equipment](#)

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## When re-roofing, choose an ENERGY STAR-labeled roofing material with high solar reflectance cool roof

### Economic Benefits:

Estimate Yearly Bill Savings:	<b>\$58</b>
Estimated Lifetime Energy Savings:	<b>\$870</b>
Estimated Added Cost:	<b>\$193</b>
Maximum Price for 10 Year Payback:	<b>\$580</b>
Return on Investment:	<b>30%</b>
Upgrade Pays for Itself in:	<b>3 years</b>

### Additional Benefits:

Cool reflective roofs reduce solar gains, keeping your home cooler and more comfortable. High temperatures are one of the factors that shorten the lifespan of roofing materials, so cool roofs may last longer than conventional roofs. Cool roofs also help lower the air temperature surrounding your house, which helps fight the urban heat island effect.

### Upgrade Description:

When replacing your roof, choose a "cool" roofing material that qualifies for the ENERGY STAR label. These roofing materials reflect more of the sun's energy, staying cooler than typical materials and reducing your air conditioning bill. Our calculations bill savings, typical upgrade costs, and cost-effectiveness are for a low-slope roofing material with the minimum reflectance levels that qualify for the ENERGY STAR label 0.60 reflectance after some weathering. To qualify for the ENERGY STAR label, steep-slope roofs must have an initial solar reflectance of greater than 0.25.

### Purchasing Tips:

- The ENERGY STAR criteria differ for low-slope less than 2:12 inches and high-slope roofs. The reflectance requirements are lower for high-slope roofs because in the past it has been difficult to make shingles and tiles highly reflective these materials are typically used for a high-slope roofs. High-reflectance products for high-slope roofs are now becoming more common in the market, so look for the highest reflectance materials you can for your roof type.

### More Information:

- target="footnote"HRFF="http://www.energystar.gov/index.cfm?c=roof\_prods.pr\_roof\_products">ENERGY STAR qualifying roofing product list
- [Cool Roof Rating Council](#)
- [California Energy Commission](#)
- [Background about urban heat islands](#)

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## Insulate ducts in unconditioned spaces to at least R-6

### Economic Benefits:

Estimate Yearly Bill Savings:	<b>\$202</b>
Estimated Lifetime Energy Savings:	<b>\$3,030</b>
Estimated Added Cost:	<b>\$910</b>
Maximum Price for 10 Year Payback:	<b>\$2,020</b>
Return on Investment:	<b>21%</b>
Upgrade Pays for Itself in:	<b>5 years</b>

### Additional Benefits:

Well-insulated ducts can help avoid rooftop ice-dam formation during the winter

### Upgrade Description:

Insulate all exposed ducts in unconditioned spaces to R-6, unless those ducts are already insulated to at least R-4. The average forced-air duct system loses about 30% of the energy produced by the furnace or air conditioner in the course of distributing air to the rooms. This energy loss can be reduced by sealing duct joints with mastic or high-quality duct tape, and insulating ducts in unconditioned spaces. Note: The annual bill savings and cost-effectiveness assume that you insulate your ducts to R-6.

### Purchasing Tips:

When *replacing* your duct insulation, choose R-8 or follow your state or local code.

- Be sure a well-sealed vapor barrier exists on the outside of the insulation on cooling ducts to prevent moisture buildup. [8](#)
- Remember that insulating ducts in the basement will make the basement colder. If both the ducts and the basement walls are uninsulated, consider insulating both. [8](#)

### More Information:

- [General Information from DOE](#)
- [EPA's brochure "Should You Have the Air Ducts in Your Home Cleaned?"](#)
- [An Introduction to Residential \[Duct\] Systems](#)

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## Install a programmable thermostat

### Economic Benefits:

Estimate Yearly Bill Savings:	<b>\$65</b>
Estimated Lifetime Energy Savings:	<b>\$975</b>
Estimated Added Cost:	<b>\$320</b>
Maximum Price for 10 Year Payback:	<b>\$650</b>
Return on Investment:	<b>19%</b>
Upgrade Pays for Itself in:	<b>5 years</b>

### Additional Benefits:

Programmable thermostats can help keep your home more comfortable.

### Upgrade Description:

Install an ENERGY STAR labeled programmable thermostat, and program it to change the temperature settings when you are away from home and at night. EPA estimates that ENERGY STAR-labeled programmable thermostats can save consumers 10-15% on heating and cooling bills when used properly. Note: Our calculations bill savings and cost-effectiveness assume that the heating-season set-point is decreased 4 degrees F during the day 9 am to 5 pm and at night 11 am to 7 pm, while the cooling-season set-point is increased 3 degrees F during those same periods. Larger set-point adjustments can provide additional bill savings.

### Purchasing Tips:

- Some programmable thermostats have a "smart" feature designed to maximize energy savings. These thermostats continually monitor usage patterns in order to determine the best time to turn the system on in order to reach the desired temperature setting, while minimizing energy use.

### More Information:

- [ENERGY STAR thermostat product list](#)
- [General Information](#)

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## When replacing your heat pump, choose an ENERGY STAR-labeled model

### Economic Benefits:

Estimate Yearly Bill Savings:	<b>\$48</b>
Estimated Lifetime Energy Savings:	<b>\$720</b>
Estimated Added Cost:	<b>\$240</b>
Maximum Price for 10 Year Payback:	<b>\$480</b>
Return on Investment:	<b>17%</b>
Upgrade Pays for Itself in:	<b>5 years</b>

### Additional Benefits:

ENERGY STAR® heat pumps may operate more quietly, be more visually appealing, have better temperature and/or moisture control, and be easier to maintain than minimum efficiency heat pumps.

### Upgrade Description:

When replacing your heat pump, choose an ENERGY STAR-labeled model. ENERGY STAR-labeled air source heat pumps must exceed the federal energy efficiency standards by at least 10%.

Note: Our calculations bill savings, typical upgrade costs, and cost-effectiveness are for a model with the lowest efficiency that qualifies for the ENERGY STAR label 14 SEER for cooling and 8.2 HSPF for heating. Higher efficiency models are available, which can provide additional bill savings.

### Purchasing Tips:

- Every new heat pump is labeled with its heating and cooling efficiency. The cooling efficiency is the Seasonal Energy Efficiency Ratio SEER, and the heating efficiency is the Heating Seasonal Performance Factor HSPF. Use these ratings to compare different models. The higher the SEER and HSPF, the more efficient the unit. For maximum efficiency, make sure the efficiency ratings for the indoor and outdoor coils match. [4](#)
- Don't buy an oversized unit. A unit that's too big for your needs will waste energy, have less ability to control humidity, and have a shorter life due to excessive on-off cycling. Ask your contractor for an exact heat-gain calculation following ACCA Manual J procedures to determine the proper size unit for your house. Make sure the contractor sizes the unit based on the latent cooling load as well as the sensible cooling load. Do not rely on rule-of-thumb estimates as they tend to be inaccurate. If you've improved your home's efficiency since the last time you purchased a heat pump, you may be able to purchase a smaller unit. [4,5](#)
- Consider buying a two-speed heat pump, which can run very efficiently at its lower speed during most of the season, while using its higher speed only during the hottest or coldest hours.
- Locate the outside unit properly. Install it in a cool, shaded spot about two feet from the north or east side of your home. Avoid direct sunlight, which makes the unit work harder, and keep the unit away from other objects. Don't enclose the unit with a deck or shrubbery - it needs room to breathe. [4](#)
- Don't buy a heat pump as a stand-alone heating system if you live in a cold climate. Heat pumps operate very inefficiently at sub-freezing temperatures.
- If your duct system has leaks or disconnected portions, you will not reap the full energy savings you could get from a high efficiency heat pump. Consider having your contractor check the entire length of your ductwork for leaks and seal any leaks with mastic-type sealant, not duct tape. It's now possible for a contractor to perform verified duct sealing by using a special fan to test duct system leakage before and after sealing. Also have the contractor check for and repair disconnected ducts - a common problem. Insulate any ducts in unheated spaces to at least R-6.
- If you don't already have one, consider purchasing a programmable thermostat and having your contractor install it along with your new heat pump.

### More Information:

- [ENERGY STAR air source heat pump product list](#)
- [ENERGY STAR geothermal heat pump product list](#)
- [Consortium for Energy Efficiency heat pump product list](#)
- [Top-Rated Energy-Efficient Heat Pumps from ACEEE](#)
- [General Information from DOE](#)
- [Sizing Heating and Cooling Equipment](#)

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## When replacing your windows, choose a double-pane solar-control low-E argon gas wood frame window

### Economic Benefits:

Estimate Yearly Bill Savings:	<b>\$113</b>
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Estimated Lifetime Energy Savings:	<b>\$1,695</b>
Estimated Added Cost:	<b>\$708</b>
Maximum Price for 10 Year Payback:	<b>\$1,130</b>
Return on Investment:	<b>16%</b>
Upgrade Pays for Itself in:	<b>6 years</b>

#### Additional Benefits:

Energy-efficient windows can make your home more comfortable year-round, reduce condensation, block outside noise, improve fire safety, and cut back on ultraviolet radiation that can fade your carpets and furniture.

#### Upgrade Description:

When replacing windows, choose a double-pane, solar-control low-E, argon gas-filled, wood or vinyl frame window.

Note: The annual bill savings and cost-effectiveness assume that you replace all of your windows with windows that have U-factor=0.36 and SHGC=0.31 see the links in More Information for an explanation of these units. Bill savings will be less if you do not replace all of your windows, but the cost-effectiveness of replacing less than all of your windows should be approximately the same as shown above. Windows with even better performance are available, and could provide additional energy savings.

#### Purchasing Tips:

- Choose a window that is appropriate for your climate. ENERGY STAR window labels have a Climate Region Map that indicates which of four broad climate regions Northern, North/Central, South/Central, or Southern the window qualifies for. Make sure the window you choose is appropriate for the region you live in.
- Consider different types of glazing for windows on different sides of your house to benefit from passive solar energy and maximize energy benefits. Install the lowest U-value windows you can afford on north-facing windows. Select windows with appropriate low-e coatings for your location on the east, west, and south sides of your house. <sup>6</sup>
- To maximize energy performance, choose windows with larger unbroken glazing areas instead of multi-pane or true-divided-light windows. Applied grills that simulate true- divided-light windows, however, do not reduce energy efficiency. <sup>6</sup>
- Choose windows with good warranties against the loss of the air seal. If the glazing seal is lost, not only will fogging occur, but also any low-conductivity gas between the layers of glass will immediately be lost. <sup>6</sup>
- If summer heat gain is a problem in your house, look for windows with low-e coatings, especially spectrally selective low-e coatings, which significantly reduce solar heat gain and improve insulation without affecting visible light or color. Tinted windows also reduce solar heat gain, but they transmit less visible light.
- Look for the National Fenestration Rating Council NFRC label to help you compare performance and other features."
- Select windows with low air leakage ratings - between 0.01 and 0.06 cfm/ft. <sup>6</sup>

#### More Information:

- [ENERGY STAR Windows](#)
- [Tips about efficient windows from DOE](#)
- [General Information from the Efficient Windows Collaborative](#)
- [ACEEE Consumer Guide to Windows](#)
- [California Energy Commission](#)

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### When replacing your electric clothes dryer, switch to natural gas model

#### Economic Benefits:

Estimate Yearly Bill Savings:	<b>\$22</b>
Estimated Lifetime Energy Savings:	<b>\$330</b>
Estimated Added Cost:	<b>\$160</b>
Maximum Price for 10 Year Payback:	<b>\$220</b>
Return on Investment:	<b>10%</b>
Upgrade Pays for Itself in:	<b>7 years</b>

#### Additional Benefits:

Natural gas clothes dryers reduce your home's peak load on the power grid compared to an electric dryer.

#### Upgrade Description:

When replacing your electric clothes dryer, select a natural gas model. In many situations, this will reduce your overall energy bill because natural gas tends to cost less than electricity, for the same heating value.

Note: Our calculations bill savings, typical upgrade costs, and cost-effectiveness are for a minimum-efficiency natural gas dryer model. The default upgrade cost provided here assumes that a natural gas connection is available at your clothes dryer. If this is not the case, be sure to include the cost of extending

#### Purchasing Tips:

- To use a gas dryer, your laundry room must have a gas hookup, with proper connections and safe venting of the gas's exhaust, in addition to an electrical outlet
- Look for a dryer with a moisture sensor, and use the dryness settings rather than timed drying.

- When replacing your clothes washer, choose a model with high-speed spin cycles. This feature removes more water from clothes, which reduces the energy and time required for drying.

**More Information:**

- [General Information from DOE](#)
- [Laundry tips from ACEEE](#)
- [Information from the California Energy Commission](#)

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**When replacing your clothes washer, choose an ENERGY STAR-labeled model**

**Economic Benefits:**

Estimate Yearly Bill Savings:	<b>\$24</b>
Estimated Lifetime Energy Savings:	<b>\$360</b>
Estimated Added Cost:	<b>\$180</b>
Maximum Price for 10 Year Payback:	<b>\$240</b>
Return on Investment:	<b>9%</b>
Upgrade Pays for Itself in:	<b>8 years</b>

**Additional Benefits:**

ENERGY STAR® clothes washers can reduce water use significantly, leave the clothes drier thus reducing drying time and energy consumption, and reduce wear and tear on clothes.

**Upgrade Description:**

When replacing your clothes washer, choose an ENERGY STAR-labeled model. ENERGY STAR clothes washers can reduce energy consumption by up to 70% and are available in top-loading and front-loading designs. Some ENERGY STAR models use up to 50% less water in addition to saving energy.

Note: Our calculations bill savings, typical upgrade costs, and cost-effectiveness are for a model with the lowest efficiency that qualifies for the ENERGY STAR label.

**Purchasing Tips:**

- Choose a clothes washer with high-speed spin cycles. This feature removes more water from clothes, which reduces the energy and time required for drying.
- Select a low water-use, high efficiency washer. Front-loading tumble-action washers can cut energy use by up to 70 percent, reduce water consumption significantly, and may actually get clothes cleaner. [1](#)
- Look for pre-soaking and/or "suds saver" options which conserve energy.
- Clothes washers come with [EnergyGuide](#) yellow and black labels. Use these labels to select the most efficient model for the capacity you have chosen.

**More Information:**

- [ENERGY STAR clothes washer product list](#)
- [General Information from DOE](#)
- [Top-Rated Energy-Efficient Clothes Washers from ACEEE](#)

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**When replacing your dishwasher, choose an ENERGY STAR-labeled model**

**Economic Benefits:**

Estimate Yearly Bill Savings:	<b>\$35</b>
Estimated Lifetime Energy Savings:	<b>\$525</b>
Estimated Added Cost:	<b>\$360</b>
Maximum Price for 10 Year Payback:	<b>\$350</b>
Return on Investment:	<b>5%</b>
Upgrade Pays for Itself in:	<b>10 years</b>

**Additional Benefits:**

Some ENERGY STAR dishwashers reduce water use and/or have shorter run times.

**Upgrade Description:**

When replacing your dishwasher, choose an ENERGY STAR- labeled model. ENERGY STAR dishwashers must be at least 15% more efficient than federal efficiency standards. Models are available that are over twice as efficient as a standard new dishwasher. Many ENERGY STAR models reduce water consumption in addition to saving energy. Note: Our calculations bill savings, typical upgrade costs,

and cost-effectiveness are for a model with the lowest efficiency that qualifies for the ENERGY STAR label.

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### Purchasing Tips:

- Choose a dishwasher that allows you the option of air drying rather than heat drying. Air drying uses much less energy than heat drying. [1](#)
- Look for models with internal "booster heaters" which permit lower water heater temperature settings.
- Choose a dishwasher that provides several wash cycle options, such as "energy-saving" or "short wash" cycles. These features reduce energy and water consumption.
- Select a dishwasher with the appropriate capacity for your needs. Dishwashers are classified as either compact or standard capacity. Compact models use less energy but also hold fewer dishes. If you have to run the compact dishwasher more often, you could actually use more energy than with a standard capacity dishwasher. [1](#)
- Dishwashers come with [EnergyGuide](#) yellow and black labels. Use these labels to select the most efficient model for the capacity you have chosen.

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### More Information:

- [ENERGY STAR dishwasher product list](#)
- [Top-Rated Energy-Efficient Dishwashers from ACEEE](#)
- [Tips for Lowering Your Dishwasher Energy Usage from DOE](#)

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