

Energy Efficiency Measures

DOORS and WINDOWS: Doors and windows energy conservation measures affect the exterior or "envelope" of a building. Examples of doors and windows Energy Conservation Measures (ECMs) include replacement windows, storm doors, storm windows, and window film.	
ENERGY STAR qualified Replacement Windows	ENERGY STAR qualified windows meet energy efficiency specification set by the Department of Energy (DOE) and have been tested and certified by the National Fenestration Rating Council (NFRC). Windows should be as specified by ENERGY STAR: http://www.energystar.gov/index.cfm?c=windows_doors.pr_crit_windows
ENERGY STAR qualified Replacement Exterior Doors	ENERGY STAR qualified doors meet energy efficiency specification set by DOE and have been tested and certified by the National Fenestration Rating Council (NFRC). Windows should be as specified by ENERGY STAR: http://www.energystar.gov/index.cfm?c=windows_doors.pr_crit_windows
Energy Efficient Storm Doors	A storm door that, in combination with the exterior door over which it is installed-- (a) Has a U-factor and SHGC of 0.30 or below; and (b) Meets the prescriptive criteria for such component established by the 2006 IECC.
Energy Efficient Storm Windows	A storm window that, in combination with the exterior window over which it is installed- (a) Has a U-factor and SHGC of 0.30 or below; and (b) Meets the prescriptive criteria for such component established by the 2006 IECC.
Energy Efficient Window Film	Energy efficient window films are those that meet the requirements of a "qualifying insulation system." The window film manufacturer must certify that the film meets the requirements. Make sure you get a "Manufacturer Certification Statement" that certifies the product meets the requirements.
INSULATION and AIR SEALING: Insulation and air sealing energy conservation measures affect the exterior or "envelope" of a building. Examples of insulation and air sealing Energy Conservation Measures include adding attic insulation, adding wall insulation, and air sealing.	
Attic or Roof Insulation installations	Install additional attic insulation to meet or exceeds current building code requirements. Install additional roof insulation to meet or exceeds current building code requirements only if the attic is tightly sealed, i.e. isolated from the outside and any roof or soffit vents.
units receiving professional Air Sealing	Air sealing (caulking and/or weatherstripping, or foam insulation) in single family detached and semi-detached properties should be verified by blower door testing, and follow up Indoor Airquality/IAQ (carbon monoxide) testing, if appropriate. If accessible, seal air leaks using materials (low VOC if available) that meet local fire code requirements, including at a minimum: § to attic spaces or into basements; include sill and top plates; § along the top, bottom, or inside party walls; § around windows and doors; § around access to common stair wells around plumbing, electrical, or ventilation shafts; § around any vents, flues, chimneys that penetrate the roof or side walls; around decks, balconies, or cantilevers.
HEATING and COOLING: Heating/Cooling ECMs are measures that save energy by directly affecting heating or cooling equipment. These include: (1) measures that involve changes directly to the equipment, such as vent or flue dampers; electronic ignition; controls; replacement of inefficient heating or cooling equipment; combined heat and power; (2) measures that regulate the temperature in the dwelling units, such as setback thermostats, radiator controls or Energy management Systems; and (3) measures that improve the distribution system, such as insulating hot water or steam pipes; converting steam distribution system to hot water; and sealing and insulating ducts.	
Furnaces/boilers receiving Flue/Vent Dampers	A flue/vent damper is a device installed in the vent of a furnace or boiler that automatically closes the vent when the burner goes off to reduce the loss of warm air up the chimney.
Constant Air Regulating Dampers installations	In multifamily buildings Constant Air Regulators (CARs) optimize ventilation and control in-unit pressure and "stack effect."
Furnaces/boiler conversions to Electronic Ignition	Electronic ignition is used to replace the constant-burning pilot lights on gas-fired heating systems.

Energy Efficiency Measures

Inefficient Heating Plants replaced with high efficiency/ENERGY STAR qualified heating plants	92 AFUE gas furnace, ENERGY STAR qualified; OR 85 AFUE boiler, ENERGY STAR qualified; OR 85 AFUE oil furnace, ENERGY STAR qualified; OR > 8.2 HSPF / 14.5 SEER / 12 EER ENERGY STAR qualified heat pump; OR ENERGY STAR qualified Geothermal Heat Pump: Open Loop: ≥ 3.6 COP; ≥ 16.2 EER; Closed Loop: ≥ 3.3 COP; ≥ 14.1 EER; Direct Expansion (DX): ≥ 3.5 COP; ≥ 15 EER
Insulation for Hot Water or Steam Pipes	All circulating service hot water piping shall be insulated to at least R-2.
Sealed and Insulated Ducts	Seal all duct joints with air-tight collars, mastic and/or UL-181 tape. Insulate all ductwork located in unconditioned space to at least R-6. Insulate all accessible ductwork located in conditioned space to at least R-4, especially in places where condensation is a problem.
Inefficient A/Cs replaced with efficient/ ENERGY STAR qualified air conditioners	> 14.5 SEER / 12 EER ENERGY STAR qualified AC; OR > 8.2 HSPF / 14.5 SEER / 12 EER ENERGY STAR qualified heat pump; OR ENERGY STAR qualified Geothermal Heat Pump: Open Loop: ≥ 3.6 COP; ≥ 16.2 EER; Closed Loop: ≥ 3.3 COP; ≥ 14.1 EER; Direct Expansion (DX): ≥ 3.5 COP; ≥ 15 EER
HVAC pump motors >1 HP replaced with high efficiency motors	Motors and Pumps 1 hp or greater should be National Electrical Manufacturers Association (NEMA) premium efficiency; Product scope and nominal efficiency levels for the NEMA Premium program. http://www.nema.org/stds/complimentary-docs/upload/MG1premium.pdf
HVAC controls: These energy conservation measures are relatively cheap and easy to install controls for HVAC systems.	
Boiler Temperature Controls/Outdoor Air Reset Installations	Boiler controls save energy by regulating the boiler so that it operates only when necessary. The most basic type of boiler control is an outdoor air reset/cutout control system, which senses outdoor temperature and matches boiler operation to how much heat the residence needs..
Radiator Controls installed	Thermostatic radiator valves regulate the amount of heat a radiator gives off.
Thermostats replaced with Programmable Thermostats	Use ENERGY STAR qualified setback thermostats.
Domestic Hot Water	
Domestic Hot Water Tanks insulated	Ensure total of R-16 insulation. Many older DHW heaters are equipped with R-7 so install a minimum of R-9 rated blanket over water heater or hot water storage tank.
Clothes washing machines were/will be Converted to Cold Rinse	Although warm or hot water is necessary to wash some types of clothing, cold water can be used in the rinse cycle for all applications. Converting laundries to cold-rinse cycle can generate significant energy savings by cutting down on hot water use.
Inefficient Water Heaters replaced with high efficiency/ ENERGY STAR qualified Hot Water Heaters	In unit: Gas (EF) ≥ 0.67 : In-unit gas water heaters need to be sealed combustion. Electric (EF): 52 Gal EF ≥ 0.92 66 Gal ≥ 0.90 80 Gal ≥ 0.89 Heat Pump Water Heaters: EF ≥ 2.0 . Central Water Heaters: DHW equipment shall be specified as indirect fired or standalone tanks only; Only gas water heaters that vent to the outside will be specified; The maximum storage tank capacity shall be specified based on occupancy; The distribution system shall include a DHW loop with a timed or temperature based control on the circulating pump; Electronic mixing valves shall be used to control hot water temperature.
ENERGY STAR qualified Solar Thermal Hot Water System	ENERGY STAR qualified Solar Thermal Hot Water Systems use the sun to heat water. These heating systems typically include storage tanks and solar collectors. There are two types of solar water heating systems: active, which have circulating pumps and controls, and passive, which don't.
Lighting: Lighting ECMs save electricity through the installation of more efficient lighting and/or by controlling the operation of lights. Examples include: replacing incandescent lights with fluorescent lighting in dwelling units and common areas; installing more efficient lamps and ballasts in common areas; installing lighting controls in common areas; improving the efficiency of outdoor lighting; and installing outdoor lighting controls.	
Incandescent light bulbs and conventional indoor light fixtures replaced with ENERGY STAR qualified Compact Fluorescent Lighting and fixtures	ENERGY STAR qualified light fixtures and bulbs use about 75 percent less energy than standard incandescent bulbs, generate 75% less heat, and last up to 10 times longer. All types of fixtures are available. Bulbs are available in different sizes and shapes to fit in almost any fixture. ENERGY STAR qualified fixtures are designed to optimize the performance of the enclosed efficient light source.

Energy Efficiency Measures

Exit signs replaced with ENERGY STAR qualified LED exit signs	ENERGY STAR qualified LED exit signs use very little energy, 5 watts or less, per sign.
Outdoor and common area lighting fixtures replaced with ENERGY STAR qualified fixtures and lamps	ENERGY STAR qualified light fixtures and bulbs use about 75 percent less energy than standard incandescent bulbs, generate 75% less heat, and last up to 10 times longer. All types of fixtures are available. Bulbs are available in different sizes and shapes to fit in almost any fixture. ENERGY STAR qualified fixtures are designed to optimize the performance of the enclosed efficient light source.
Lighting controls in outdoor and common areas installed	There are two main types of lighting controls: occupancy controls and daylighting controls. Occupancy controls turn off or dim all or most of the lights in a space that is unoccupied. Daylighting controls use light sensors that detect natural light and turn off or dim lights appropriately.
Appliances: Appliances include replacing old refrigerators, dishwashers, or clothes washers with energy-efficient models.	
refrigerators replaced with ENERGY STAR qualified Refrigerators	ENERGY STAR qualified refrigerator models use at least 20 percent less energy than required by current federal standards and 40% less energy than the conventional models sold in 2001.
Clothes Washers replaced with ENERGY STAR qualified Clothes Washers	Clothes washers with the ENERGY STAR label can cut clothes washing related energy costs by more than a third and the water costs by more than half.
Window AC units replaced with ENERGY STAR qualified Window AC units	ENERGY STAR qualified room air conditioners use at least 10% less energy than conventional models.
Dishwasher replaced with ENERGY STAR qualified Dishwasher units	ENERGY STAR qualified dishwashers use at least 41 percent less energy and much less water than conventional dishwashers.
Water Conservation: Water conservation measures are green measures focused on water savings and related energy savings from heating domestic hot water.	
Toilets replaced with Water-saving Toilets	Low flow toilets use less than 1.28 gallons per flush. This is 20% less than the current normal toilet that uses 1.6 gallons per flush.
Showerheads and faucet aerators replaced with low-flow showerheads and faucet aerators	Low-flow showerheads use less than 2.2 gallon per minute and low-flow faucets are less than 1.5 gallons per minute
Gray water recycling system	Gray water is wastewater from bathtub, shower drain, sinks, washing machines, and dishwashers. Greywater can be recycled for irrigation, toilets, and exterior washing, resulting in water conservation. Check local codes. Many do not yet allow greywater recycling for indoor use.
Other: These include solar thermal (hot water); photovoltaic panels; geothermal; and other renewable systems.	
Solar Photovoltaic Panels	
Cogeneration/Micro Combined Heat and Power Systems	Multi-family: Cogeneration Systems combine power generation with hot water production. Cogeneration systems are considerably more energy efficient than conventional power plants. Single-family: Micro Combined Heat and Power (CHP) Systems are similar to Cogeneration Systems but are sized for single-family residential applications.
Green Measures: Green measures for new units are those with LEED, ENERGY STAR, or Enterprise Green Communities ratings/labels. Other green measures include environmentally friendly storm water management systems; green roofs; low- or no-VOC paints; resource efficient materials; recycled products; and other indoor air quality (IAQ) measures including mold and moisture control.	

Energy Efficiency Measures

Green Roof	Green roofs are rooftops planted with vegetation. Intensive green roofs have thick layers of soil (6 to 12 inches or more) that can support a broad variety of plant or even tree species. Simpler green roofs (extensive roofs) have a soil layer of 6 inches or less to support turf, grass, or other ground cover. Green roofs provide additional insulation to residence and reduce storm water runoff peak flows
Units painted with Low or No-VOC Paints	Most conventional paints contain VOCs (volatile organic compounds). VOCs diminish air quality, and may be detrimental to occupant health.
Recycled Building Products	Use salvaged products or use products with minimum of 25% postconsumer recycled product.
Spot Ventilation installed	Ensuring adequate ventilation of bathrooms and kitchens can improve the indoor air quality of a unit. When installing ventilation use ENERGY STAR qualified exhaust fans.
Advanced utility metering installed	Master-metered utilities may be converted to individually-metered utilities, whereby tenants pay directly to the energy suppliers; or sub-metered, whereby the project's energy usage costs utilize industry-standard metering and computer billing systems which monitor/measure a tenant's actual energy consumption. Advanced metering may include smart metering. Advanced meters may also provide time of day rates, and provide occupants with better information and improved controls over appliances