

In response to the ENERGY STAR Challenge in 2007, architecture firms submitted 32 projects to EPA that achieved “Designed to Earn the ENERGY STAR.” This distinction means that the intended energy use for each project rated 75 or higher on a scale of 1 to 100, using EPA’s energy performance rating system (Target Finder). In addition, 11 of the 32 projects were designed to meet the goal of the American Institute of Architects to reduce energy consumption by 50 percent or more (based on an average building).

Below are the energy-efficient design strategies used by the architecture and engineering firms that met the 2007 ENERGY STAR Challenge while achieving 50 percent better than average ratings on their commercial building projects.

Siting
Strategic solar orientation
Tree conservation: shading; reduce heat island effect

Lighting
Daylight harvesting with clerestory windows and operable skylights
Daylight sensors – dimming and switching artificial lighting
Recessed windows
High-performance glazing
Light shelves, roof monitors, and Solotubes for daylighting
Stepped light fixture controls with occupancy sensors
Photocells for control of outdoor lighting
Operable skylights
ENERGY STAR qualified windows
Shading and overhang
T-5 light fixtures
Indirect lay-in light fixtures
Electrochromic glass
Dimmable ballasts

HVAC Systems
Geothermal heating and cooling
Geothermal down-draft heat pumps (SEER 27 ratings)
Raised floor HVAC distribution system
Four-pipe fan coil system with high-efficiency boilers, chillers, and VSD pumps
HVAC system with direct digital control
Passive cooling
Passive solar heating
High-efficiency air-cooled chiller, air handling units, pumps, and fans
Dedicated outdoor air system
Radiant floor heating system
CO ₂ sensors to control heating and cooling based on occupancy
Variable speed cooling tower fans
Indirect evaporative cooling
Hot water heated by building waste heat
Modular heat recovery chillers

Roof
ENERGY STAR qualified metal roofing
Green roof
White roof to reduce cooling loads

Renewables
PV array
Passive solar domestic hot water
Wind turbine

Ventilation
Natural ventilation creating stacking effect through exterior corridor roofs
Operable windows
Indicator advising occupants to open windows
Occupant controlled ceiling fans
ENERGY STAR qualified equipment

Insulation/Massing
Spray-foam insulation in wall cavities
Heat gain control through high mass exterior precast concrete cladding
Super insulated building envelope

Space Types Represented in the 2007 ENERGY STAR Challenge and Achieving 50 % Better than Average Ratings
Office
Residence Hall/Dormitory

Space Types Available in EPA's Target Finder
Office
K-12 School
Hospital (Acute Care or Children's)
Hotel (Economy and Budget)
Hotel (Midscale with or without Food and Beverage)
Hotel (Upscale or Upper Upscale)
Medical Office
Residence Hall/Dormitory
Supermarket/Grocery
Warehouse (Refrigerated or Unrefrigerated)
Courthouse
Bank/Financial Institution
Retail
Water Treatment and Distribution Utility
Computer Data Center
Parking
Swimming Pool
Other