



Housing Development Consortium of Seattle-King County
Exemplary Buildings Program
Glossary of Terms

Table of Contents

Advanced Framing 2

Air Source Heat Pump 2

Building Envelope 2

Cellulose Insulation 2

Energy Efficient Appliances 2

Energy Modeling 2

Energy Monitoring 2

Energy Recovery Ventilator (ERV) 2

Energy Use Intensity (EUI) 2

Greywater System 3

Heat Pump Water Heater 3

Heat Recovery Ventilation (HRV) 3

Hot Water Circulation Loop 3

Insulated Concrete Forms (ICF) 3

Indoor Air Quality (IAQ) 3

Induction Stove Top 3

Inverter 4

Living Building Challenge 4

Low Flow Toilet 4

Low Flow Fixture 4

Mini-Split Heat Pump 4

Net Metering 4

Passive House Standard 4

Photovoltaic (PV) 5

Radiant Barrier 5

R-Value 5

Sealed Ducting 5

SEER Rating 5

Structured Insulated Panels (SIP) 5

Thermal Barrier 5

Triple Pane Windows 5

U-Value 5

Zero Energy Home 5

Advanced Framing

A construction method (also known as “Optimum Value Engineering” or “OVE”) that uses less material in the framing of a home and can reduce labor and material costs, improve structural integrity, and improve energy efficiency.

Air Source Heat Pump

A home comfort system using refrigeration technology to either heat or cool a building. An outdoor unit exchanges heat with the outdoor air while an indoor unit delivers conditioned air to the occupied space. Air source heat pumps can deliver between two and four units of heat for every unit of electricity used, making them far more energy efficient than other mechanical comfort systems.

Building Envelope

The building envelope is like a six-sided box that separates the interior and exterior environment of a building. The six sides consist of a floor or basement, a ceiling or roof, and four walls including windows and doors. The goal is to keep that box as airtight and insulated as feasible.

Cellulose Insulation

Plant fiber insulation that is used in wall and roof cavities to separate the inside and outside of the building thermally and acoustically. Typically, cellulose insulation is made by recycling old newspapers and telephone directories. Borates and ammonium sulfate are included to retard fire and pests.

Energy Efficient Appliances

Products that use less energy than conventional models. The ENERGY STAR® label is a credible third-party certification of a product’s energy efficiency. Consumers can also refer to the FTC’s Energy Guide label, a yellow label affixed to most appliances today.

Energy Modeling

The use of a computer program to project how much energy a home will use. Modeling shows energy use by building component, such as walls, and by end use, such as space heating. This allows designers and builders to focus efficiency efforts in the most cost effective areas. Energy modeling estimates for zero energy homes should come very close to zero.

Energy Monitoring

Each major electric circuit of the home is monitored to determine the energy use of appliances, heating and cooling system, lights and electronics. Based on this information, homeowners can determine how best to conserve energy and identify malfunctioning equipment.

Energy Recovery Ventilator (ERV)

A type of ventilation system in which the heated (or cooled) air being vented out of the home is used to heat (or cool) the supply air being pulled in from outdoors. The approach decreases the amount of energy needed to heat or cool the supply air and provides fresh filtered air. They are needed in very air-tight homes, such as zero energy homes, to provide fresh air. Unlike heat recovery ventilators, ERVs recover water vapor as well as sensible heat. This is useful in warm humid climates where air conditioning is common and in very dry, desert climates where the outside air has very low humidity.

Energy Use Intensity (EUI)

A common metric to measure energy consumption is the Energy Use Intensity (EUI) metric, which is measured in kBtu/square foot/year.

Greywater System

A system to reuse wastewater from bathtubs, shower drains and sinks. Greywater systems require separate wastewater collection pipes, storage tanks, filters and other equipment. Reusing greywater reduces the use of potable water for purposes that don't require treated drinking water, such as irrigation, toilets, and exterior washing.

Heat Pump Water Heater

A very energy efficient water heater that uses refrigeration technology to extract heat from the surrounding air to heat water for household use.

Heat Recovery Ventilation (HRV)

A type of ventilation system in which the heated (or cooled) air being vented out of the home is used to heat (or cool) the supply air being pulled in from outdoors. The approach decreases the amount of energy needed to heat or cool the supply air and provides fresh filtered air. They are needed in very air-tight homes, such as zero energy homes, to provide fresh air. Unlike an energy recovery ventilator, HRVs transfer only sensible heat and not moisture.

Hot Water Circulation Loop

A water conservation device that rapidly moves water from a water heater to fixtures. This is desirable when one or more fixtures is a long distance from the water heater. Instead of turning on the hot water tap and running clean water down the drain until hot water arrives, a circulation loop rushes hot water to the fixture. Typically the circulation loop operates continuously or during certain periods of the day controlled by a timer. These typical systems waste energy with unnecessary pump operation and heat loss from the hot water as it circulates around the loop.

An on-demand system uses less energy than continuous or timed pump operation. Hot water recirculation systems can be activated by a push button, or motion sensor. When activated the pump pushes water that has been sitting in the hot water line back to the water heater through the cold water line, while quickly bringing in hot water to the fixture.

Insulated Concrete Forms (ICF)

Rigid plastic foam forms that hold concrete in place during curing and remain in place afterwards to serve as thermal insulation for concrete walls. The foam sections are lightweight and result in energy-efficient, durable construction. The approach decreases the number of breaks in the thermal barrier of the building envelope. It also can save on construction costs because it is fast, especially compared with "stick built" homes.

Indoor Air Quality (IAQ)

A measurement of the overall cleanliness of the air within a building or home. Indoor air may contain a number of contaminants, including carbon monoxide, formaldehyde, mold, lead, volatile organic compounds, and many others. Even water vapor can be considered undesirable when it reaches high levels that support mold and decay. The EPA has a builder program called Indoor airPLUS.

Induction Stove Top

A highly energy efficient electric stove top that heats more quickly and with more precise settings than a gas stove. It uses an electromagnetic field to heat the metal pan directly, so the stove top stays relatively cool, making it easy to clean up spills and less likely to burn skin.

Inverter

Used with solar PV systems, inverters are necessary to change the direct current (DC) produced by the solar panels into alternating current (AC) that can be used in the home and sent to the grid. Grid-tied inverters also include safety measures to protect the grid during power outages. Stand-alone inverters work with off-grid homes.

Living Building Challenge

The International Living Future Institute has created the most rigorous performance standards for homes and buildings, called Living Building Challenge. Their standards call for the construction of buildings that operate as cleanly, beautifully, and efficiently as nature's architecture. To be certified under the Challenge, buildings must meet a series of stringent performance requirements, such as zero net energy and zero off-site water use. Monitoring is required over a minimum of 12 months of continuous occupancy.

Low Flow Toilet

A toilet that combines efficiency and high performance. The toilet must average no more than 1.28 gallons per flush. Design advances enable these toilets to save water with no trade-off in flushing effectiveness. Such toilets often have the EPA's WaterSense label.

Low Flow Fixture

A faucet with aerator installed to reduce the flow of water but not reduce water pressure. A low-flow showerhead uses 2.0 gallons per minute (GPM) or less. A faucet uses 1.5 GPM or less. However, some products have lower flow rates.

Mini-Split Heat Pump

A type of air source heat pump with an outdoor unit to exchange heat and indoor unit to deliver conditioned air to the living space. Refrigerant moves through tubes between the units. In smaller systems, one outdoor unit drives a single indoor unit. In other cases, one outdoor unit can drive two to four indoor units. They are very quiet and provide very even heating.

Mini-splits are distinguished from central split-system heat pumps in several ways. First, capacity is smaller, ranging from 8,000 BTUs per hour to 24,000 BTUs per hour. Second, each indoor unit serves a small area, so multiple indoor units may be needed for larger homes. Third, duct work is generally not used, although sometimes short ducts may be installed inside the conditioned space of the building. Fourth, current models use an inverter-drive compressor that provides variable speed operation to match output to the need of the conditioned space. Fifth, the most energy efficient mini-splits can be up to 400% efficient, exceeding the most efficient central heat pumps. Sixth, mini-splits operate efficiently at very low outdoor temperatures. Sometimes they are called ductless heat pumps.

Net Metering

A method for giving credit for excess electricity produced by a consumer's home, often by means of solar panels. In most zero energy homes, the excess energy produced in the summer goes to the utility grid and credit is given, via net metering, for the energy supplied. Then in the winter, the home can use the credit to power the home without an energy bill. Net metering arrangements vary widely between locations and must be thoroughly researched before undertaking a zero energy home project.

Passive House Standard

A voluntary international building standard developed by the [Passive House Institute \(PHI\)](#). The Passive House Standard is composed of several strict performance requirements for new building construction, including a roughly 90% reduction in heating and cooling energy usage in new construction, and up to a 75% reduction in primary energy usage from existing building stock. These strict standards must be met using passive design measures before any renewable energy, such as photovoltaic panels, are added.

Photovoltaic (PV)

This system captures light from the sun and converts it into electricity through solar panels usually installed on roofs.

Radiant Barrier

A barrier, installed on the underside of roof sheathing in warm or hot climates to reflect some of the sun's radiant heat energy so it does not enter the attic. Radiant barriers can also help prevent winter heat loss from the home. Radiant barriers are most useful in cooling-dominated climates where summer heat gain is a greater concern than winter heat loss.

R-Value

R-value indicates an insulation material's resistance to heat flow. The higher the R-value, the greater the insulating effectiveness. This is the inverse of U-value, which is used for rating windows.

Sealed Ducting

A way to save energy, improve indoor air quality and avoid moisture damage by sealing all the seams in newly installed ductwork or by sealing improperly installed existing ducts. Duct mastic is a paste-like sealant that is applied with a brush or a gloved hand for sealing ducts.

SEER Rating

Seasonal Energy Efficiency Ratio (SEER) is a rating system used to measure the efficiency of central air conditioners and air source heat pumps. The higher the rating, the more energy efficient it is. For reference, air conditioners that are 14 or higher SEER meet ENERGY STAR criteria.

Structured Insulated Panels (SIP)

Panels made from a thick layer of foam (polystyrene or polyurethane) sandwiched between two layers of oriented strand board (OSB), plywood or fiber-cement. SIPs are often used in panelized construction and timber-frame buildings. The result is an engineered panel that provides structural framing, insulation, and exterior sheathing in a single, solid component.

Thermal Barrier

When the building envelope is insulated and air-sealed it acts as a thermal barrier – keeping cold air out and warm air inside in winter.

Triple Pane Windows

Triple pane glass windows often contain argon, krypton, or other gases between 3 panes to reduce heat flow and improve insulation. The middle pane may be glass or a plastic film.

U-Value

Also called U-factor, this is the rate of heat flow expressed as a decimal number. Higher numbers mean greater heat loss. U-value is used to express the energy performance of windows. Zero energy homes often have windows with U-values between 0.15 and 0.24. U-value is the reciprocal of R-value.

Zero Energy Home

A home that uses as much energy as it produces. The home is made as air-tight and well-insulated as possible and uses highly energy efficient heating and cooling systems, hot water system and appliances. After all the energy saving measures have been taken, sufficient solar electric panels are added to balance the amount of energy produced with the amount of energy used over the course of a year.
