something in the air

We all want warmer, drier, healthier air in our homes, so what's the difference between HRVs, heat pumps and air conditioners?

With huge emphasis now being placed on making our homes healthier, warmer and drier places to live, we are confronted by a plethora of new products to help us out. With so many systems available, there's a lot of confusion about which ones do what.

Heat pumps

Heat pumps are a very energy-efficient form of space heating and cooling. Air-to-air heat pumps, the most common type here, take low-grade heat from the air outside then upgrade it to warm the air inside, using a process that's a bit like a refrigerator working in reverse. Heat pumps can do this even when it's cold outside, although their performance deteriorates as the outdoor temperature drops, which is why sizing a heat pump correctly is so important.

The electricity supply to a heat pump is only used to move the heat around, not to create it. The heat itself is a renewable passive energy source, so you can make significant savings. In practice, many people who install heat pumps keep their homes significantly warmer than before – so they get increased comfort rather than lower bills.

Heat pumps are generally controlled by a return air thermostat, to keep your home within a set temperature range.

All heat pumps incorporate air filters to remove dust and pollen, which can be helpful for people with asthma and allergies. Heat pumps can also cool your home in summer.

Differences in running costs and performance vary greatly between models. Energy Star qualified heat pumps are on average 15 percent more efficient than non-qualified models.

Air conditioners

Air conditioners remove heat from the room when the outdoor temperature is high. All the components present in air conditioners are also present in heat pumps, the primary difference being that heat pumps can both cool and heat.

Air conditioners work by removing heat from the indoor air and transferring it across a cold refrigerant coil to the outdoors. The cooling cycle continues until the indoor temperature reaches the controller setting.

Air conditioners also control humidity. Excess moisture condenses on the indoor unit coil in cooling or dry mode and is piped away. Dry mode is used primarily in high humidity conditions where people are trying to sleep.

Heat/energy recovery ventilation systems

Heat energy and recovery ventilation systems remove stale and/or moist indoor air and replace it with fresh outdoor air that has been warmed from heat recovered from the stale exhaust air. These systems incorporate a heat exchanger between the stale air being extracted and incoming fresh air flow.

They are ventilation systems, not heating systems. Internal humidity may be controlled with heat recovery ventilation (HRV) systems as moist indoor air is replaced with warmed, drier outdoor air. The ability to raise or lower the temperature of the incoming air is only a secondary benefit. They can be combined with ducted heating systems as well as room-by-room heating systems.

Because they recover heat/energy from the exhaust air, less heat is required to maintain a comfortable indoor environment. The amount of heat/energy recovered depends on the indoor air temperature, air flow rates and moisture content at the time of recovery. Both indoor moisture levels and humidity are effectively reduced. Indoor air may be cooled when the outdoor air is drawn from a cooler location.

words Vicki Holder

If a ventilation system does not have a heat exchanger and does not supply outdoor air to the interior, it is not a heat recovery system.

Before installing a heat recovery or energy recovery system, the house should be insulated and draught-proofed. A large heat loss, due to inadequate insulation or large amounts of infiltration will effectively negate any benefits gained.

Forced air (roof space) ventilation systems

Forced ventilation systems take filtered air from a roof space and blow it (using a fan) into the rooms of a home. This air is usually drier and easier to heat, although because it takes air from inside, it's not considered a true fresh air ventilation system.

Though ventilation systems are sometimes marketed as alternative forms of heating, they are really for ventilation only. During sunny days, the systems draw air from warm roof spaces and distribute it throughout a house via ventilation ducts. However, at night there is no 'free heating' and all the outside ventilation air that is introduced inside must be additionally heated.

Most forced-air systems automatically slow or even stop the airflow when the roof space temperature falls below certain levels.

Composite systems

There are also systems available such as roof space air intake systems where the air is passed through a heat exchange before being ducted into the building. Electronic controllers are used to extract stale air to be recirculated or removed by natural air leakage depending on temperatures within the building and the roof space.

Solar powered ventilation systems

These use the sun to heat up panels, which are mounted on the roof or an outside wall. These panels then warm the incoming air, with solar cells being used to power the fan. There are no running costs with solar-powered ventilation, and you get fresh outside air that's nicely warmed up. There's also an optional cooling kit for summer.

These systems depend on getting adequate sun, and won't suit some locations. You'll need extra heating in the house at night and on very cold wet days. Models suitable for a typical-sized house can be quite expensive.

Dehumidifers

Cold air can't hold as much water as warm air. A dehumidifier works by passing warm moist room air over a cold surface. Some of the water in the air will condense and collect in a tank. The air exiting the dehumidifier is a few degrees warmer, so you get a small amount of heating as well as drying.

Certainly, whether you are trying to warm, ventilate or improve the quality of air in your home, there is plenty of help out there. Just make sure you compare apples with apples, and identify which function is a priority. H

- Heat pumps are an extremely energy-efficient form of space heating and cooling.
- Heat pumps can both warm and cool. Air conditioners can only cool.
- HRV systems are for ventilation, not heating. The ability to raise or lower the temperature of the incoming air is only a secondary benefit.
- Forced ventilation systems take filtered air from a roof space, which may be warm, however these are primarily a ventilation not heating system.
- Dehumidifiers remove moisture from the air, and work best when the air is warm.

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