

# How to Provide Makeup Air for Range Hoods

If your kitchen has a powerful exhaust fan, it may be making your indoor air worse

BY MARTIN HOLLADAY

**W**hen Cheryl Morris moved into her new home, she realized that the kitchen exhaust fan was probably too powerful. Whenever she turned on the 1200-cfm fan, strange things happened. “It pulled the ashes out of the fireplace, halfway across the room, right up to my husband’s chair,” she says. Those dancing ashes demonstrate an important principle: Large exhaust fans need makeup air.

#### The air that fans remove has to come from somewhere

Most homes have several exhaust appliances. They can include a bathroom fan (40 cfm to 200 cfm), a clothes dryer (100 cfm to 225 cfm), a power-vented water heater (50 cfm), a woodstove (30 cfm to

50 cfm), and a central vacuum-cleaning system (100 cfm to 200 cfm). The most powerful exhaust appliance in most homes, however, is the kitchen range-hood fan (160 cfm to 1200 cfm).

Although tightening up homes is a good way to make them more energy efficient, builders need to remember that plugging air leaks makes it harder for air to enter a house. Every time an exhaust fan removes air from your house, an equal volume of air must enter. If a house doesn’t have enough random air leaks around windows, doors, and mudsills, makeup air can be pulled through water-heater flues or down wood-burning chimneys, a phenomenon called backdrafting. Because the flue gases of combustion appliances can include carbon monoxide, backdrafting can be dangerous.

# Tight-house solution: A recirculating hood and an HRV

Code requirements for kitchen ventilation vary widely from jurisdiction to jurisdiction. If your local building official is willing to accept the installation of a recirculating range hood that doesn't exhaust any air to the exterior, you can sidestep the makeup-air dilemma entirely. This approach has been

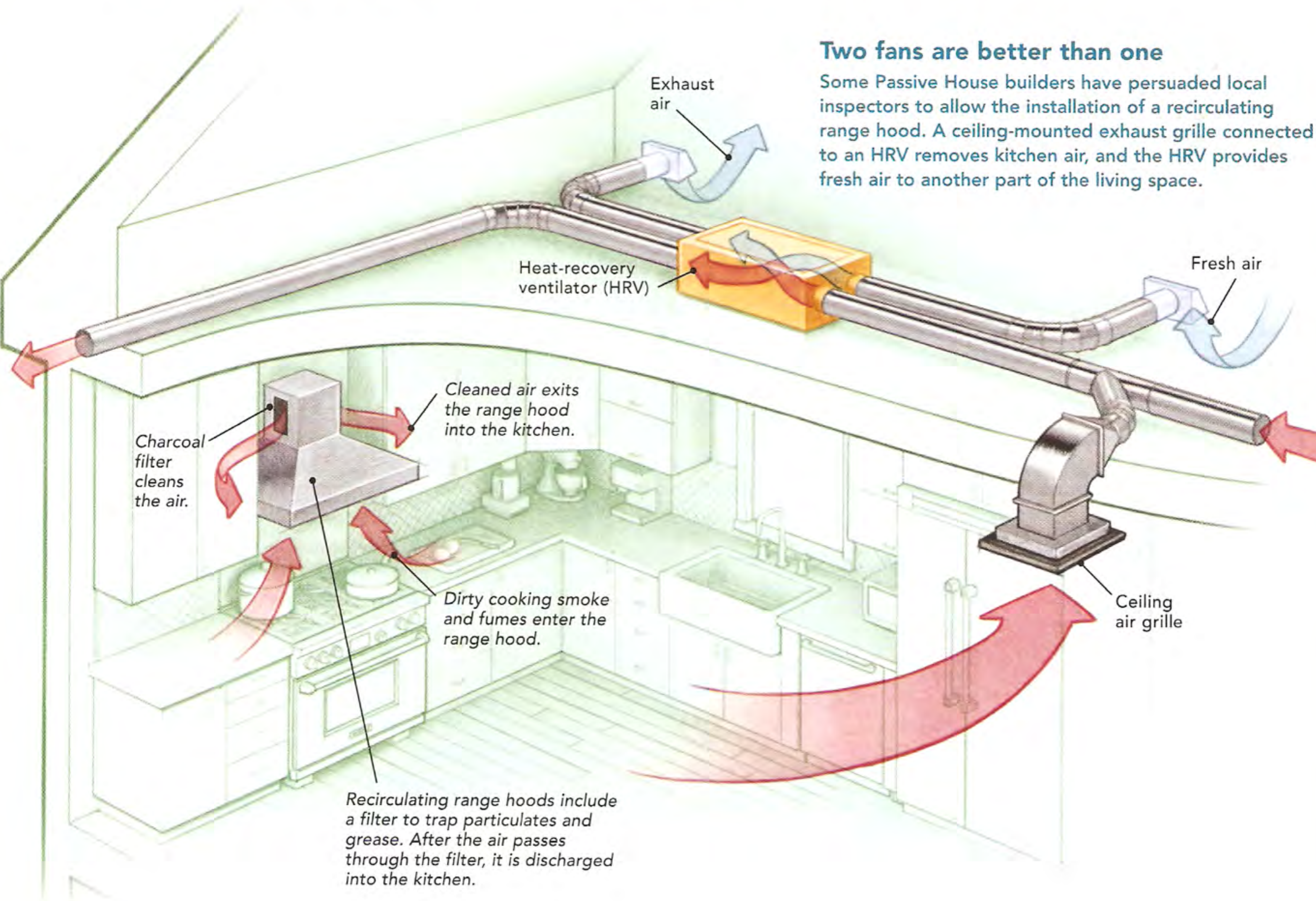
pioneered by Passive House builders, who usually try to avoid unnecessary exhaust fans or makeup-air supply ducts when they are building.

Passive House designers often specify a recirculating range hood connected to a replaceable charcoal filter. They also install

an exhaust grille on the kitchen ceiling as far away from the stove as possible. The grille is connected to the exhaust duct of a heat-recovery ventilation (HRV) system. The exhaust grille is located away from the stove to limit the amount of filter-clogging grease reaching the HRV.

## Two fans are better than one

Some Passive House builders have persuaded local inspectors to allow the installation of a recirculating range hood. A ceiling-mounted exhaust grille connected to an HRV removes kitchen air, and the HRV provides fresh air to another part of the living space.



If your fan is larger than 400 cfm, however, you'll need a makeup-air system with a motorized damper and interlock controls. The code states, "Exhaust hood systems capable of exhausting in excess of 400 cfm shall be provided with makeup air at a rate approximately equal to the exhaust-air rate. Such makeup-air systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system."

If you are building a superinsulated house and, therefore, want to limit the number of penetrations in your building envelope, consider using a recirculating range hood rather than an exhaust fan.

Combined with a ventilation appliance such as an HRV, this solution works well for some families. Those who do a lot of roasting and frying, however, may not find it satisfactory.

The bottom line is that powerful range hoods are great for getting rid of smoke from blackened redfish, but they are difficult to integrate into a tight house. It is best to avoid exhaust fans altogether, but if you can't live without one, be sure to provide plenty of makeup air. Backdrafting from combustion appliances can be deadly. □

Martin Holladay is a senior editor.