GOOD(ISH), BETTER, AND BEST VENTILATION OPTIONS

IN TODAY'S TIGHTER HOMES, BETTER/BEST VENTILATION PRACTICES ARE ESSENTIAL

BY JOHN KOENIG

Ventilation is a key element in modern home construction, and several factors make it more critical now than in the past. But the reasons why ventilation is so important may surprise you.

Primarily, houses a century ago were quite drafty. They relied on natural ventilation—wind and temperature variations—to move air, and outdoor air was able to enter through numerous gaps, cracks, and holes in the home's envelope and fenestration.

Also, the building materials used back then were primarily natural products that didn't emit significant levels of volatile organic compounds (VOCs) commonly found in today's construction materials, furnishings, and personal items.

Driven mostly by building codes that strive for greater energy efficiency and occupant health, today's homes are built much tighter than those of the past, and no longer experience uncontrolled infiltration and exfiltration. But the *people* living in the homes still breathe, cook, and shower, buy new furniture and rugs, and—thanks to the advent of air conditioning—rarely open their windows for cooling or ventilation.

These occupant behaviors, in conjunction with today's modern construction methods, make ventilation essential for maintaining healthy indoor air by exchanging stale, moist, and polluted air for clean, fresh air.

There are several options for ensuring proper ventilation. Some are good(ish), some are better than others, and others are truly best practices.

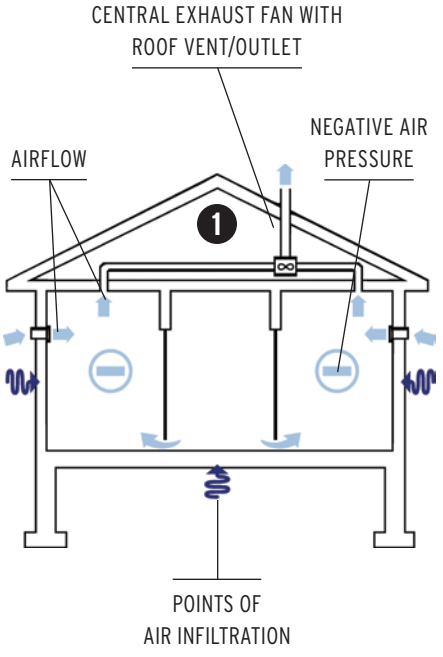

FIG. 1: GOOD(ISH)
EXHAUST-ONLY VENTILATION

Home builders today often rely on an unbalanced, exhaust-only mechanical system to deliver some measure of ventilation for the home. This "good(ish)" solution may feature a central exhaust fan or consist of small exhaust fans in bathrooms or laundry rooms that operate either continuously or intermittently (by manual control) to remove stale air and moisture to the outside.

While cost-effective, this strategy creates a modest negative pressure in the house that pulls air–which can carry pollutants, including radon gas–into the home through incidental gaps in the building envelope.

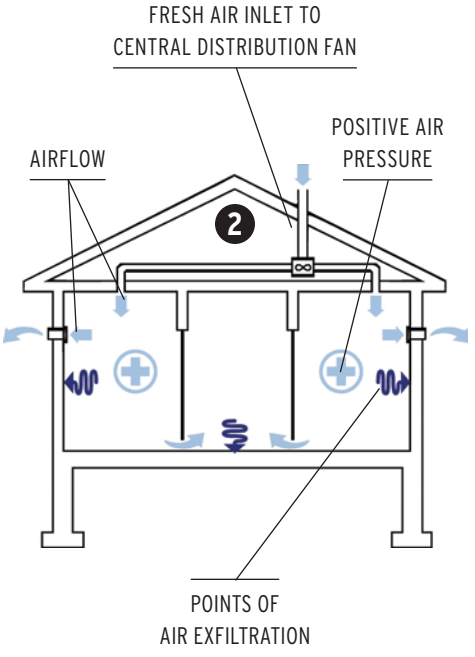

FIG. 2: GOOD(ISH)
SUPPLY-ONLY VENTILATION

Another "good(ish)" approach is a supply-only solution that uses a fan to bring in fresh air. The air supply may be delivered to one location, dispersed through ducts, or integrated into the distribution system of a forced-air system.

The opposite of the exhaust-only approach, this method pressurizes the house, which helps keep contaminants out. But it can also force moisture-laden indoor air into wall and ceiling cavities, leading to condensation and mold issues.

While both methods are better than having no ventilation at all, they're quickly becoming outdated and obsolete ... and that's a good thing.

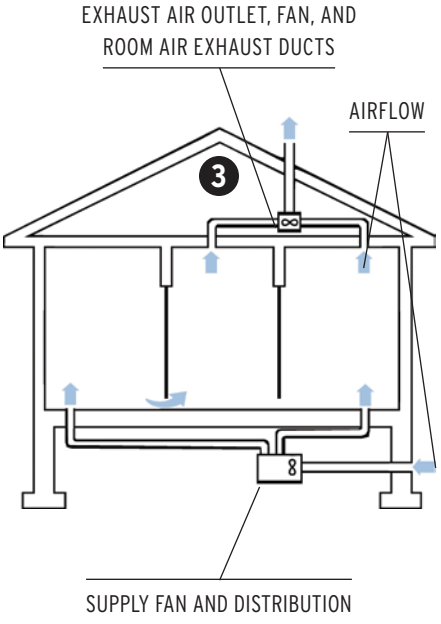

FIG. 3: BETTER
BALANCED VENTILATION

Some builders create balanced systems using both exhaust and supply fans to achieve a healthy equilibrium and avoid swings in pressurization and the problems that can cause.

While this approach certainly can work—and solves issues with unbalanced systems—it requires careful calculations to properly size and locate the fans, as well as some assumptions about occupant behavior. To address the latter, a builder may feel compelled to install an automated monitoring and management system to help ensure a proper exhaust and supply balance—an extra cost that may be a tough sell to a homebuyer.

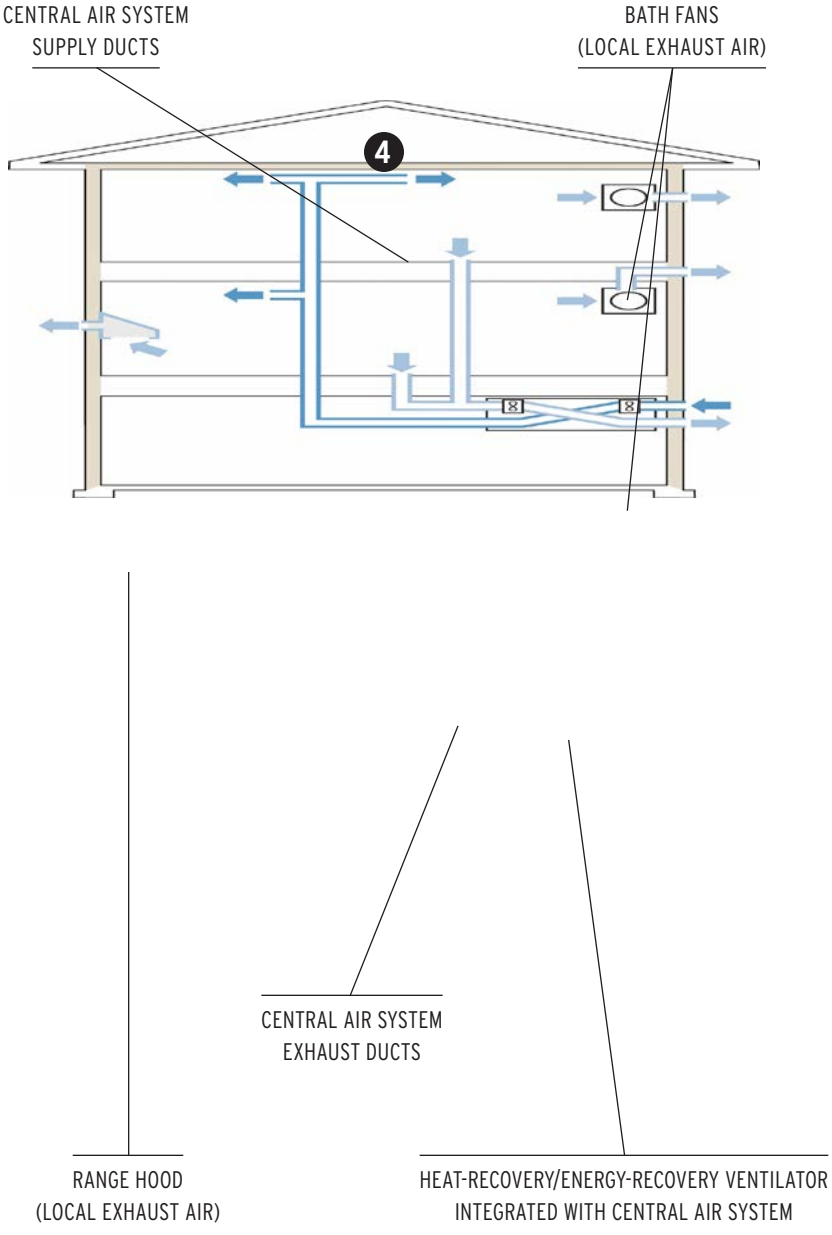

FIG. 4: BEST
BALANCED VENTILATION WITH RECOVERY

A balanced system with a recovery setup is the best option, as it allows the outgoing (exhaust) air from the house to precondition the incoming outdoor air, warming or cooling it as the air is mechanically filtered into the home.

Such devices, known as heat-recovery ventilators or HRVs, are ideal for extremely cold climates, while energy-recovery ventilators (ERVs) are especially good for dry climate conditions. HRVs and ERVs can also exchange moisture in the airflows to help maintain optimal indoor humidity levels. ERVs are the best choice in most cases, as they are beneficial in preventing indoor air from becoming too dry in winter or too humid in summer.

Naturally, the best-practice solution often costs more, and this one is no exception. But for builders that prioritize occupant health and indoor air quality, a balanced system with recovery is a must-have.

Perhaps one day energy/heat recovery ventilation systems will be as common as refrigerators or 60-inch flat-screen TVs … you simply won't be able to live without them.

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John Koenig drives quality and innovation in home building as a building performance coach at IBACOS.