kitchen and bathroom venting. In the kitchen, that means a range hood ducted to the outdoors. In the bathroom, wire the exhaust fan into the light switch. Also add exhaust fans in any high-moisture areas, such as laundries. These should take care of moisture, cooking odors, and combustion gases if there's a gas stove.

All vented combustion appliances should have their own air supplies. Atmospherically vented gas furnaces and water heaters pose special problems, because if they backdraft, there is little warning and lives will be at risk.

Your main options with furnaces are sealed-combustion appliances (if you can find one), induced-draft furnaces (with a fan to drive flue gases up the chimney), or an isolated and fully vented furnace room (following Uniform Mechanical Code recommendations). If you install fireplaces, make sure there's outside combustion air. The same goes for woodstoves. What you don't want is these appliances competing with one another for air, because if the wrong ones win, you and your customer lose.

Mechanical ventilation

If you take these steps, do you still need general ventilation to dilute pollution? If you've taken the proper precautions, and the house is not airtight, the answer is probably no—in the sense that the air will be no worse than in the average American home and better than in many.

At some level of tightness, though, bringing in fresh air has obvious value. For one thing, our homes contain traces of hundreds of chemicals. Many of them didn't exist 25 years ago. We simply don't know the effects of living in what Canadian researcher Bruce Small has called "a thin chemical soup."

A split-level, cantilevered raised ranch with chimney and bay windows is a tough house to build tight.

While an air-to-air heat exchanger would solve the problem neatly, simply tacking one onto an average tight house may not make economic sense. If it runs constantly, it will create too much ventilation. Run intermittently, it will never pay for itself. Some type of exhaust-only system seems to make more sense for the almost-too-tight house. Such a system can be simple, cheap, and add little to the house's total infiltration. It simply redirects leaks through a controlled opening rather than letting air escape randomly. The difference is that infiltration can be controlled at will. If an economical form of heat recovery becomes avaliable, so much the better.

Little work has been done on these types of systems. The ideal one would be cheap and simple to install (an exhaust fan) and would circulate clean air throughout the house. In a hot-air heating system, it might consist of make-up air added at the furnace. In houses with hydronic or electric heat, a few adjustable small openings around the perimeter (the Scandinavians have neat little vents) and a small fan high up might do the trick. Homeowners could flip the fan on when windows fog up, or after cooking, or when smoking. Or get fancy and hook it up to a humidistat, carbon-dioxide monitor, or gas sensor such as the one vanEE, a Canadian heat-exchanger manufacturer, has developed. Part of the responsibility for clean air lies with the homeowner—particularly when it comes to smoking, sloppy use of woodstoves, strong household chemicals, and such. And when things really get rough, you can always open a window.