

manufacturers need to apply for waivers from the Department of Energy to market their products in the U.S. Although these waivers have been granted, new applications need to be submitted for new product groups. Furthermore, an ARI standard will enable stakeholders to compare different manufacturers' products more accurately and will provide them with a greater comfort level with the products. A draft provisional standard is under review with final publication expected in 2008.

- **Energy Modeling Tools.** Current, non-proprietary building energy simulation tools like Energy Plus and DOE-2 cannot model VRF systems. Manufacturers are working to resolve this issue. In the meantime, only proprietary tools are available, which some stakeholders view with skepticism.
- **Integration of Outside Air.** Currently, ventilation systems used in conjunction with VRF systems are engineered separately on a case-by-case basis. Manufacturers are evaluating potential approaches for an integrated solution, incorporating controls to ensure adequate outside air and economizing, while optimizing overall performance.
- **Broaden Installer Base.** The shortage of skilled installers is problematic for the HVAC industry as a whole but expanding the number of installers who are comfortable with extensive refrigerant piping work is particularly critical for the VRF market.

Conclusions

VRF systems are not suitable for all commercial building applications. However, they are an excellent option for certain projects, and one more tool for engineers to consider. As more VRF units are installed and we gain further operating experience in the U.S., many of the concerns expressed by industry professionals are likely to diminish.