Money Isn't All You're Saving

Reduce System Costs by Right Sizing HVAC Equipment

Builder Guide

DESCRIPTION

A highly efficient building envelope can significantly reduce the amount of energy needed to heat and cool a house. As a result, conventional HVAC sizing rules-of-thumb no longer apply, resulting in significantly oversized equipment. But, bigger is not better! Oversized HVAC equipment operates less efficiently, costs more, and can cause comfort and humidity problems. Properly sizing the HVAC equipment to account for energy efficient features will result in a more efficient system, a more comfortable house and lower first costs.

BENEFITS

You can distinguish your houses by providing properly sized equipment. Educate customers that high-capacity equipment is not desirable - it is an indication that a home is not built to high-efficiency standards. On the other hand, properly sized HVAC equipment ensures your customers of both energy efficient operation and improved comfort.

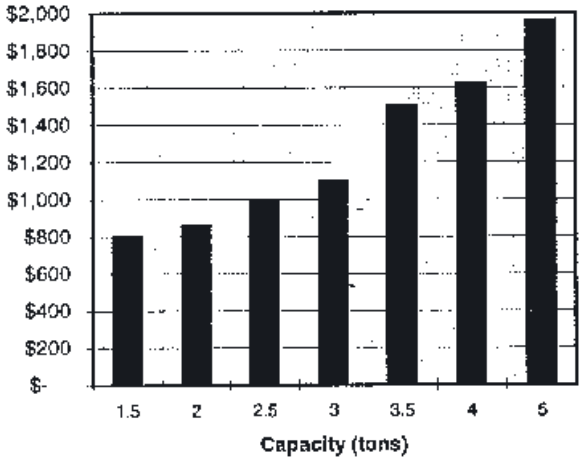
❑ Right-sized HVAC equipment costs less to install.

If you're building a more energy efficient house, a smaller HVAC system may save your customer money - these savings may even cover the cost of upgrading to higher efficiency equipment. The chart on this page shows some typical costs for air-conditioners by size, and the potential for savings from right-sizing.

❑ Right-sized HVAC equipment costs less to operate.

When equipment is properly sized it operates longer at maximum efficiency. Oversized equipment runs for shorter periods of time (short cycling) - much like cars getting worse gas mileage in stop and go traffic. Undersized equipment may also cost more to operate. Since it cannot meet the load, it frequently runs longer to "catch up". Thus, both oversized and undersized equipment cost more to operate (see chart on back page).

Right-Sized Air-conditioners Cost Less to Purchase



❑ Properly sized air-conditioners provide better humidity control.

Properly sized HVAC systems provide good humidity control, reducing potential moisture damage and improving occupant health and comfort. In humid weather, an air conditioner not only cools the air, it also condenses moisture out of the air. Less dehumidification can occur in oversized equipment because of reduced operating times (short cycling).

❑ Right-sizing improves occupant comfort.

Properly sized equipment provides a more uniform space temperature. Comfort can be compromised with oversized equipment. Short-cycling can cause frequent and wide temperature swings in supply air. As a result, occupants may feel uncomfortably hot and cold drafts from the supply registers.

❑ Right-sized equipment lasts longer.

Starting and stopping is hard on equipment. When HVAC equipment operates at full load for longer periods, rather than repeated cycling, it lasts longer.

INTEGRATION

Your reputation as a builder rests not only on the quality of your work, but on the quality of the comfort control (HVAC) system installed. By ensuring your HVAC contractor properly sizes the HVAC system, you will improve the quality of your product and increase customer satisfaction.

❑ Avoid "rule-of-thumb" sizing calculations.

"Rule-of-thumb" sizing usually results in a system that works, but is bigger than necessary. Rules-of-thumb do not apply to energy efficient construction. Accurate sizing for each house requires a loads calculation (using ACCA Manual J or equivalent) and proper system sizing (ACCA Manual S) be performed. If you build energy efficient houses, your HVAC subcontractor should include those efficiency features in sizing calculations to be accurate.

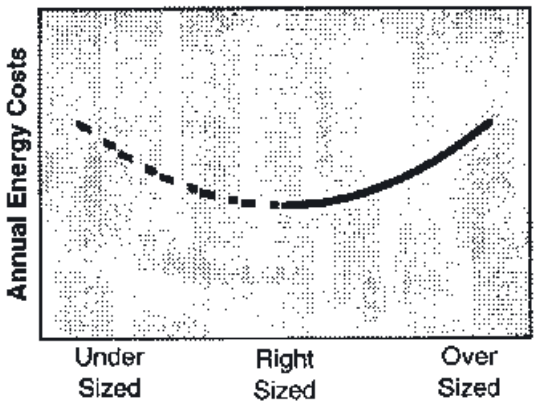
❑ Ensure the HVAC contractor follows manufacturers recommended installation instructions.

Benefits from properly sized equipment can be lost if improperly installed. Ignoring installation instructions with the "I've done it before" approach can cause problems when installing higher efficiency equipment. Ask the manufacturer's rep or distributor about special installation procedures.

❑ Right sizing HVAC equipment typically results in less airflow and smaller duct system requirements.

Right-sized HVAC equipment can also result in smaller duct sizes, as well as shorter duct runs. Your HVAC contractor should use industry standard duct sizing procedures (ACCA Manual D) to ensure the HVAC and duct systems are designed as a system. See Fact sheet: "Right-Sizing Duct Systems".

Right-Sized Air-conditioners Cost Less to Operate



RESOURCES

- ❑ *Manual J Load Calculation for Residential Winter and Summer Air Conditioning, 7th Edition*, 1986. ACCA. Available at 202-483-9370.
- ❑ *Manual S Residential Equipment Selection*, 1995. ACCA. Available at 202-483-9370.
- ❑ *Manual D Residential Duct Systems*, 1995. ACCA. Available at 202-483-9370.
- ❑ "Bigger Is Not Better: Sizing Air-Conditioners Properly", John Proctor, et. al., Home Energy Magazine, May/June 1995. Available at 510-524-5405.