

Building Up

April 2006

Comfort, safety and energy efficiency are top priorities when designing any home heating, ventilation and air conditioning (HVAC) system, especially with the recent increases in fuel costs.

Minnesota Power offers rebates to encourage homebuilders, homebuyers and homeowners to purchase and install energy-efficient furnaces with electronically commutated motors, improve the efficiency of new or existing central air conditioners, and consider geothermal heat pumps. These individual energy-efficient heating and cooling components are excellent places to start, but unless they are designed into an HVAC system with proper sizing, ducting, ventilation, insulation and positioning, some of their energy- and cost-saving benefits may be lost.

This issue of *Building Up* looks at HVAC within the context of Minnesota Power's Triple-E, energy-efficient "House as a System" approach. Delivering comfort, safety and top performance to your customers will help build your business on energy-efficiency.

DEAN

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Design HVAC as a System

for High Performance

Modern houses are more complex than houses of the past. It is important that architects, builders and trades professionals work together to ensure that all systems within a new home operate efficiently without getting in each other's way.

Heating, ventilation and air-conditioning (HVAC) is a good example. HVAC technology has improved dramatically over the past decade. High-efficiency furnaces, boilers, air-to-air heat exchangers, ground source heat pumps, and central air conditioning systems have the potential to reduce energy use and save homeowners substantial money—if they are properly sized and designed into the context of an energy-efficient home.

"Heating and cooling plants in houses often are oversized because people don't consider the improved insulation and air-tightness of modern construction," said Rachel Wagner of Wagner Zaun Architecture in Duluth. Her firm conducts a calculated heat loss analysis of each home it designs and recommends optimally sized HVAC equipment for the space. It also considers the distribution system and works with general contractors and system installers to design efficient paths for HVAC ductwork within the conditioned envelope. (See "HVAC: Hot Tips and Cool Ideas.")

"As home architects, we're making choices that impact people's comfort, health and use of natural resources. It is a serious responsibility," Wagner said. "We're building our business on energy efficiency because it is smart, good for our clients and fits our philosophy."

Architect Rachel Wagner visits with builder Troy Walker of Walker Construction in Duluth at a new home construction site in Duluth. Ongoing communication helps ensure that all systems within the home are designed and installed for maximum performance and energy efficiency. This home utilizes an energy-efficient electric boiler on the Dual Fuel rate for heating.

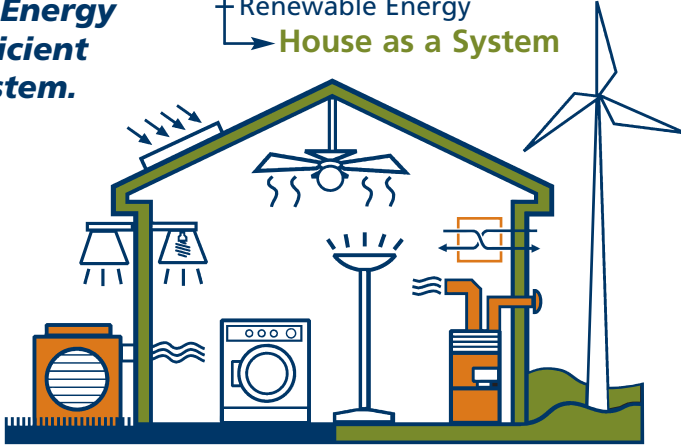




HVAC: Hot Tips & Cool Ideas

Think of Your Home as an Energy Efficient System.

- Triple E Home
- Energy-Efficient Construction
- ENERGY STAR® Lighting
- ENERGY STAR® Appliances
- **High-performance HVAC**
- Renewable Energy
- House as a System



Visit www.mnpower.com/foundmoney for more information on energy-efficient HVAC and links to additional resources.

- Compare fuel types and costs before choosing a heating system.
- Select a high efficiency furnace or boiler (90% or greater). Furnaces with electronically commutated motors (ECMs) use less electricity to distribute air than conventional models.
- Consider a 300% efficient geothermal heat pump.
- Consider selecting a high efficiency central air conditioner (CAC) system with a seasonal energy efficiency ratio (SEER) of 13 or higher based on where you live. (Also remember to have your existing CAC serviced on a regular basis to ensure optimum efficiency.)
- Properly size all heating and cooling units.
- Design ductwork into conditioned space when possible (or properly seal and insulate). Minimize elbow turns and accordion flex duct so air can move efficiently.
- Choose a properly sized and ducted air-to-air heat exchanger (.35 air exchanges/hour) with a high heat recovery efficiency range (80-90%).
- Avoid atmospherically vented appliances. Power ventilation eliminates back drafting and lowers the risk of carbon monoxide.

ECM Furnaces Maximize Efficiency



An electronically commutated motor (ECM) is a brushless direct current motor with built-in speed and torque controls. This allows the motor to adjust its speed to ensure optimal airflow at all times. ECMs are significantly quieter and cheaper to operate than conventional furnace fans. ECM furnaces

operate with as little as 80 watts of electricity (about 10 times less than standard fan motors). They also have lower annual operating costs and can save \$40 to \$300 per year depending on how a homeowner uses the furnace fan.

Featured Incentives

Educate your customers about Minnesota Power conservation incentives and build your business on energy efficiency.

Home Heating and Cooling

High Efficiency Furnace with an Electronically Commutated Motor (ECM): \$200 rebate (through Dec. 31, 2006); **Home Show Special** - \$250 rebate from April 1 through May 31, 2006

Central Air Conditioning (CAC): \$50 rebate for improving the efficiency of a new or existing CAC system (through Dec. 31, 2006); **Home Show Special** - \$75 rebate from April 1 through July 31, 2006

Geothermal Heat Pump: \$200/ton closed loop system rebate; \$100/ton open loop system rebate (through Dec. 31, 2006)

Triple E New Construction

If you are a licensed builder or homeowner constructing an all-electric home, you may qualify for up to \$2,000 in rebates, based on specific Triple E standards for thermal integrity, airtight construction, moisture control, ventilation and heating performance. Call 218.722.5642 ext. 2843 or toll-free 800.228.4966.

Other Minnesota Power conservation incentives include ENERGY STAR® lighting and appliance rebates, FREE in-home and business energy audits, rebates for installing a grid-connected solar photovoltaic electric system, and PowerGrant rebates and grants for commercial, agricultural and industrial customers.

Visit www.mnpower.com/foundmoney for details on these offers and other seasonal specials.

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