

Ventilation and Solar Heat Storage System Offers Big Energy Savings

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Technology Summary

Researchers at ORNL developed the Dynamic Attic Heat Exhaust System, an attic ventilation system designed to minimize heat loads in summer and heat loss in winter. The technology can provide an estimated 30 to 70 per cent reduction in energy consumption, compared with current technology. Over a 10 year period, the technology could save 1.14 million metric tons of carbon emissions.

Residential attics are subjected to the worst temperature extremes of any part of a building. Daily temperature fluctuations in U.S. attics frequently exceed 50 degrees F. The ORNL technology effectively shaves and reshapes peak hour load with a series of airtight, insulated ventilation channels installed between the rafters.

During summer, it reduces roof heat using photovoltaic-powered active ventilation. Heat is either reflected away from the building with radiant barriers, or heat is absorbed and stored in phase change materials. During winter, the system absorbs and stores solar energy during the day and disperses heat during the colder night hours. This method reduces cooling through the roof by 30 to 50% for a small building. For more savings, the air space can also be closed and used as additional insulation.

Advantages

- Ventilation channels disperse air in multiple ways
- Heat storage capability
- 30 to 70% in energy savings compared with current technology

Potential Applications

- Residential houses
- Modular buildings
- Small office buildings

Patent

Jan Kosny and William A. Miller. *Building Thermal Management System*, U.S. Patent Application 11/564,660, filed November 29, 2006.

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