Building America U.S. Department of Energy

# CARBNEWS

A MONTHLY UPDATE ON SWA'S PARTICIPATION IN THE U.S. DEPARTMENT OF ENERGY'S BUILDING AMERICA PROGRAM

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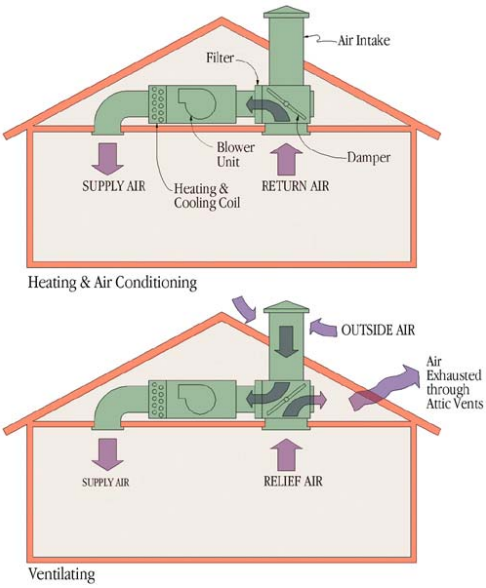
## Modular Housing Uses Building America Lessons

Lessons learned through CARB's **Building America** projects around the U.S. are being applied in new affordable housing now under construction in Carbondale, Colorado. The 52-unit community of affordable modular homes, designed by Steven Winter Design (SWD), will provide efficient and comfortable homes in the town of Carbondale, which is in dire need of affordable housing. The town is home to many people who work in ritzy Aspen, about 30 miles up the valley, but can not afford to live there. Based on recommendations made by CARB and SWD, the multi-family and single-family homes will feature low-e windows; a tight building envelope resulting in R-21 walls and R-38 roofs; and a highly efficient mechanical system. **All American KanBuild**, of Milliken, Colorado, is the modular manufacturer. With the assistance of local planner and architect Jode Schoberlein of **Civic Forum Associates, Inc.**, a market-rate, energy-efficient modular home prototype (above) has just been completed for a local elementary school principal who could not find adequate affordable housing in Carbondale. The two-and-a-half-story home has a habitable attic to meet the needs of a growing family. **Lipkin Warner Design and Planning**, a local architect, helped to make the unit fit in with the prevailing "mining" design esthetic of the region. This home now serves as a model for the new development of 52 units (16 multi-family and 36 single-family, detached). The general contractor, **B & H Construction**, has said that without the use of offsite fabrication the project could not be built as affordable housing.

## Advanced Foundation Systems in Buffalo

With funding from the **New York State Energy Research and Development Authority (NYSERDA)**, CARB recently coordinated and assisted in the insulation of a **Thermal Krete** pre-cast foundation system installed in a Buffalo, New York house. Since concrete is not poured on site, pre-cast foundation systems save time in the construction process and are unaffected by cold outdoor temperatures during installation. In the Thermal Krete pre-cast system, metal studs are affixed to the face of the concrete stud ribs so that an interior finish can be easily attached (left). This system features encapsulated fiberglass batts installed in the cavities and a continuous layer of ¾" poly-iso insulation board mounted across the metal studs to eliminate thermal bridging. CARB is building on its ongoing effort to promote the design and implementation of durable, safe, and effective interior basement insulation systems (see related story in CARBNews, September 2003) by monitoring the thermal and moisture performance of the Buffalo Thermal Krete assembly.

## Research Continues on Better Ways to Cool




CARB team member **Davis Energy Group** has developed and is testing an innovative ventilation technology to ease mechanical cooling loads. "NightBreeze" is borne from the "Alternatives to Compressor Cooling" project, an initiative to reduce residential peak load by designing homes that employ ventilation cooling and other features that enhance summer performance and reduce or eliminate the air conditioning load. Originally sponsored by the **California Institute for Energy Efficiency** and supported by the **California Energy Commission Public Interest Energy Research (PIER)** programs, NightBreeze takes advantage of lower night temperatures by bringing in cool outside air at night to cool concrete floors, walls, and other thermal masses. The system is integrated into the home's heating and air conditioning systems. This design approach allows ventilation air to be delivered to all occupied spaces and keeps installation costs down. A user-friendly wall-mounted control with graphic signals encourages occupants to use the ventilation system instead of air conditioning. Previous monitoring and simulations have demonstrated energy savings exceeding 70% in some California climates, and elimination of the need for air conditioning in at least five of the 16 California climate zones.

Current research is merging the intelligent features of the NightBreeze system with a residential economizer system called SmartVent (drawing above), developed by RCS/ZTECH and CARB member **Beutler Corporation** of Sacramento, California. These intelligent features include a ventilation cooling "low limit" temperature and ventilation rate that varies with weather conditions, and metered fresh air ventilation that precisely meets ASHRAE 62.2 requirements. The collaboration with RCS/ZTECH and Beutler will produce a NightBreeze system with multi-zone capability that will operate with variable speed furnaces, and that will additionally vary airflow in accordance with the number of zones requiring heating or cooling. **Building America** is providing field testing opportunities for this next generation of NightBreeze. Other research funded by the DOE-SBIR program is exploring opportunities to apply NightBreeze variable airflow capabilities to achieve improved humidity control.

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