OCTOBER 2, 2002

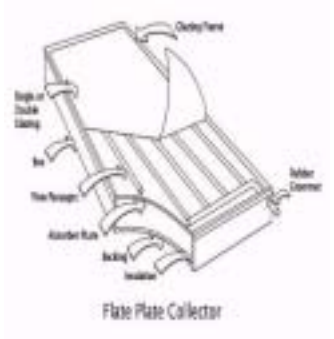
THE SOLAR MEGAPHONE

AUBURN UNIVERSITY

Decisions, Decisions

Students meet to make important design decisions.

View of the overhang on the west side of the house.



A flat plate collector used in heating the water. On our house, these panels are located in the middle of the South roof.

The students in both architecture and engineering spent quite a few months at the outset of this solar decathlon challenge researching solar energy, efficient systems, solar home design, and solar symbolism. This research, beginning in the fall of 2001, provided a solid bank of information which students could draw upon when it was time to make important design decisions. It can be said that much of the success of Auburn University's solar home is due in great part to important strategic architectural and engineering design decisions made early in the project.

Auburn students were compelled to design a house that was beautiful, efficient, and unmistakably "Auburn." To achieve this, students decided to draw from the energy efficient design, materials and vernacular of the southern home. This can be seen in the modified dogtrot design and the corrugated steel roofs and cladding that provide an exterior thermal barrier and beautiful finish.

Students researched alternative methods and materials of construction that would result in better efficiency and ease of assembly and transportation. This research resulted in the decision to use structural insulated panels (SIPS) as the home's building materials. SIPS are more efficient than traditional stick frame construction; the decision to use them was based on their higher R-value and ease of assembly.

Window placement was also an important design decision made early in the process. Through case studies, it was found that windows on the south facing side of the house would be beneficial to heating in the winter, while not causing overheating in the summer. In addition to the windows facing south, students chose to place water filled tubes to act as thermal masses. These water tubes, coupled with insulated window coverings, help to regulate the interior temperature.

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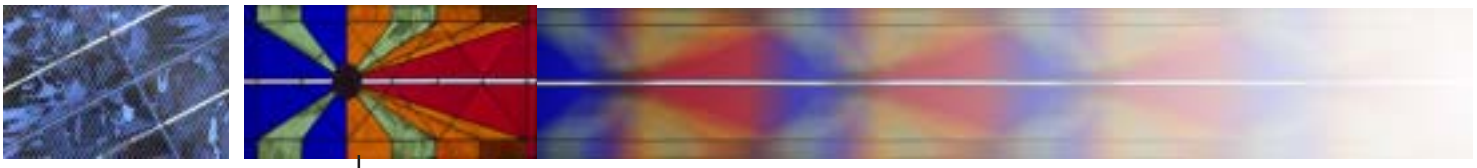

The clear, water-filled tubes also allow natural light to illuminate the space. Students felt that transporting plastic tubes would be much easier than trying to haul a concrete floor. They also learned that windows on the north, east, and west sides of the house would not be beneficial from an energy standpoint. This resulted in few windows on those elevations, with light coming into the house from the south wall.

After much research and debate, the students decided that a smaller square footage of enclosed space would not only result in less area to heat and cool, but would also free up limited roof area so that it may be used for abundant shading on the west side of the home. This decision to place a large overhang on the west side also provided a car port, more space on the south side roof for solar panel placement, and a nice covered outdoor area.

The decision-making converged when discussion turned to transporting the house to Washington, D.C. Aesthetics would have to merge with practicality as students made decisions about the method and manner of moving the house. Students chose to design a chassis system that would serve as both a transportation platform and foundation system. The consolidation of these systems provided the most efficient solution to the two problems that faced the team.

Another important decision made by the students was to shorten the length of the plumbing runs to minimize heat loss between destinations. This was achieved by placing the bathroom and kitchen in close proximity to one another in the plan. Students carefully considered placement of plumbing and wiring so that they would not be visible to the consumer. This decision resulted in a home that looks and feels “finished”.

Through cross-disciplinary research, meetings, and discussions, Auburn engineering and architecture students were able to make well-informed decisions about the design and systems of the solar home . . . and the results have been pleasing.

“The sun is the prime factor whose emanations evoke the symbolic vectors and energetic regulating lines forming our design synthesis.”

--Alan Cook, Architect Prof.

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