

# UMR's Lessons learned



Presentation including knowledge and experience gained by the UMR team with media coverage documentation after the 2002 Solar Decathlon

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# Overview

- About the 2002 Solar Decathlon



- Design Strategy



- Lessons learned



- Media



# About the 2002 Solar Decathlon



U.S. Department of Energy

**Office of Energy Efficiency and Renewable Energy**

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable.



The Solar Decathlon is an event where college students compete in designing, building, and operating the most effective and efficient solar-powered house. From September 26<sup>th</sup> to October 6<sup>th</sup>, 2002 on the National Mall in Washington, D.C., fourteen student teams participated in the first competition, accruing enough solar energy to operate a modern house, office, and small car. During the event, only solar energy was used to generate the power needed to compete in the **ten Solar Decathlon contests.**

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# The Ten Solar Decathlon Contests

- Design and Livability
- Design Presentation and Simulation
- Graphics and Communication
- The Comfort Zone
- Refrigeration
- Hot Water
- Energy Balance
- Lighting
- Home Business
- Getting Around



# Design Strategy



From the start the UMR/RTI Solar House was intended as a way to show the average Missouri citizen the benefits of solar power and energy management in a largely conventional design.



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# Further Design



The team had no desire to make a cutting-edge design statement; in turn making a package that would appeal to most Americans.

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# Lessons Learned



Before, during, and after the competition many lessons were learned...

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# Lesson #1



## Have a strong team:

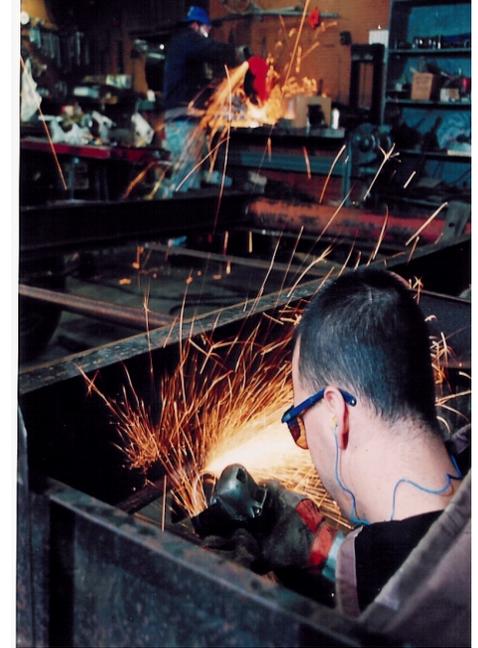
A team must be large and proactive in design issues, fundraising, hands-on work and public outreach. Individuals must track problems and take steps to ensure that goals are met.



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# Lesson #2



## Recognize resources:

Keep contact and communication in all levels of planning and design in order to find out what unique parts of the team can offer.



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# Lesson #3



## Fundraise, Fundraise, Fundraise:

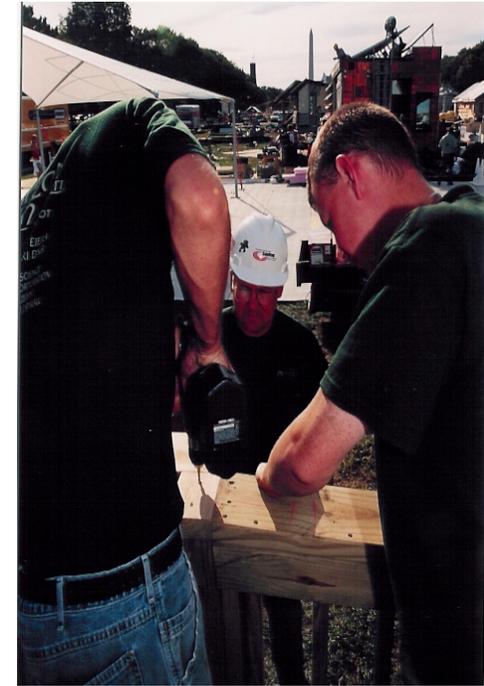


The team must break from depending on small, local resources for funding; however, include them in other more scaled fundraising events to provide a sense of ownership. The team needs to use industry-wide organizations and trade groups to draw on a larger field of support contacts and larger donations.

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# Lesson #4



## Build green:

Use green building products, as opposed to petroleum-based. The use of vinyl siding, common in many homes and popular with many of the event visitors, counted against the team in architecture.

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## Transportation:

The largest design and construction challenge was the fact that the house would have to be moved over 2000 miles. Many things were done to insure a ridged construction and the roof even folded for more ease in transportation.

# Media



## Take a tour of the UMR/RTI Solar House after the parade

Find out how to save money on your next electric bill by touring the University of Missouri-Rolla/Rolla Technical Institute's solar house. The UMR/RTI Solar House Team is holding an open house from noon-4 p.m. on March 15, following the annual UMR St. Patrick's Day Parade.

The UMR/RTI Solar House is located on the corner of 10th and Poole streets, across from the UMR Gale Bullman Multi-Purpose Building.

Members of the team will give tours and hand out information

on how to make your home more energy efficient. Tickets will be on sale for a drawing of items donated by local businesses.

In the first-ever Solar Decathlon, the UMR/RTI team's quaint blue solar cottage -- along with 13 other universities' unique solar homes -- competed for 10 days last fall to design, build and operate a solar-powered, energy-efficient home. Each house had to generate enough sun power to meet the needs of a small household, a home-based business and the

transportation needs of both.

Overall, the team placed ninth out of the 14 contestants based on evaluation in 10 different areas, including design and livability and getting around. But team finished first in refrigeration, second in energy balance and third in hot water.

The UMR/RTI Solar House Team has a goal of raising \$60,000 this semester in order to turn the solar house into a student-funded, on-campus solar energy research center. All donations made to the team are tax-deductible.



The documentation of the competition is critical to its survival. Here are some articles that were generated.

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# Articles

## UMR/RTI solar house to hold open house after St. Pat's Parade

ROLLA, Mo. - Find out how to save money on your next electric bill by touring the University of Missouri-Rolla/Rolla Technical Institute's solar house. The UMR/RTI Solar House Team is holding an open house from noon-4 p.m. on March 15, following the annual UMR St. Patrick's Day Parade.

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For more information e-mail [sunhome@umr.edu](mailto:sunhome@umr.edu).

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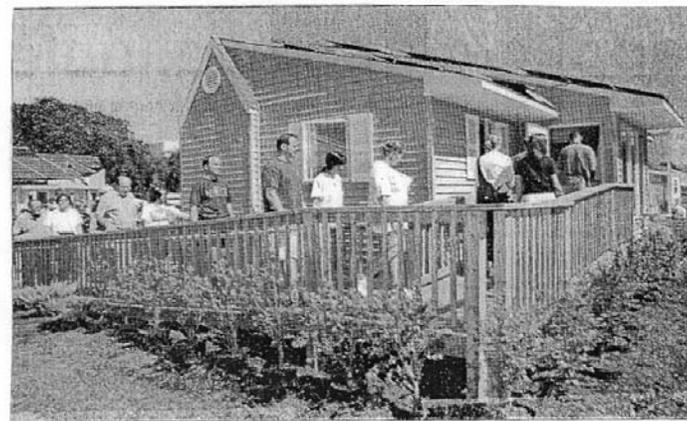
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UMR/RTI Solar House Team  
The UMR/RTI Solar House will be open to the public after the St. Pat's Parade Saturday.

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## Energizing our energy future



As summer turns to fall and we begin to prepare for winter, many of us are beginning to wonder whether turning up our thermostats will put a dent in our pocketbook. Spurred by the electricity crisis in California and other western states, the political turmoil in the oil-exporting Middle East and the uncertainty about whether the Energy Conference Committee will ever complete the Energy Bill, there's been a lot of concern about alternative energy and energy security in America.

While we can't simply flip a switch and ease all of these concerns, we can, as University of Missouri - Rolla (UMR) student Amy Schneider said, "bridge the gap" and begin to explore and promote alternative sources of energy.

Last week, in an effort to address the energy challenges facing our nation, the Department of Energy held the first-ever Solar Decathlon. The contest involved students from 14 different universities designing homes equipped with televisions, stoves, refrigerators, washers, dryers, and computers - but no electricity. So, with the sun as their guide - and their only energy source - each team had to find a way to secure enough solar energy to power a house, a home-based business and a car. Then, limited to 500 square feet, they had to build the entire solar structure.

One of the teams participating in the Solar Decathlon was the University of Missouri - Rolla. On the first day of the competition, I visited their house and what I saw was amazing. I imagined that a true solar house would resemble something in a science fiction movie. That wasn't the case with the house that the UMR students designed. Instead, they really thought outside the box and worked hard to design a house that was both attractive and functional.

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They succeeded and I believe they met and exceeded their expectations. The students designed and built a conventional bungalow ranch style home that was warm, friendly and inviting. At the same time, the home had all the modern conveniences of houses that you would find in most neighborhoods across America.

The house also had many special features that really set it apart from other homes in the competition. One of the most immediate features was the "no-nails" policy (They glued and then screwed the house together) used to build the house. This made it possible for the students to transport the house in three parts because it was stiff, well-structured and ideally suited for the 1,000 mile drive to Washington, DC. In addition to the building and design, they also concentrated on maximizing their ability to capture solar energy. That led to the most celebrated feature of their home - the sunroom. In this room, the windows stretched from floor to ceiling, ceramic tiles lined the floor and they also employed the use of multicrystal panels. These choices allowed for the windows to garner the most sunlight possible and for the tiles to absorb heat when it's hot and radiate heat when it's cool. Finally, they chose panels that are ideal for and perform well under changing weather conditions - which is very common in Missouri.

Out of the 14 schools competing in this year's Solar Decathlon, UMR placed ninth. Regardless of where they finished, their efforts make us all winners. First, the students benefited from the invaluable hands-on learning experience of the competition. Second, the event changed the way we think of energy by heightening our awareness of market-ready technologies that, when combined with renewable energy sources like ethanol and biodiesel, can help lessen our dependence on foreign sources of energy while still meeting our energy needs.

In Congress, we have made some progress toward increasing energy development by investing in biodiesel and ethanol, but more work remains to be done. I am proud that I can share with my colleagues the work Missourians are doing everyday to secure our energy future. Whether we generate our energy from the sun, from soybeans or from corn, renewable energy is here to stay. It's real and it works. With awareness and a commitment to research and development, the possibilities for our energy future couldn't be brighter.

DATE COPY  
SUBJECT: Solar house  
ANNUAL FILE:  
BIO:  
COPIES TO: Amy Schneider

# Articles

## College students bring solar power to National Mall

WASHINGTON (AP) — When Auburn University's architecture and engineering students teamed up to build an aesthetically pleasing yet technologically advanced solar-powered home, everything went smoothly.

Until it was time to pick out the light fixtures.

The architects wanted an oversized dome lamp for the hallway, but the engineers vetoed it as inefficient. They ultimately settled on one that was attractive but not elaborate and required little power.

In the Solar Decathlon, a contest conceived by the Department of Energy, students from 14 universities designed homes equipped with televisions, stoves, refrigerators, washers, dryers and computers — but no electricity.

Collectively, the homes — most with less than 500 usable square feet — make up a solar village on display this week on the National Mall, the grassy space between the Capitol and the Washington Monument.

Each school received a startup grant of \$5,000, but trophies and prestige — not money — are the only prizes.

"Many people have an image of solar power as something a long way off, and it doesn't have to be," said Energy spokesman Christopher Powers.

Students were only required to create the design, and some schools handed the actual construction off to contractors. But Auburn raised \$250,000 and let students handle every detail, from wiring the power inverter box to sanding the back porch.

A home designed by students from the University of Missouri-Rolla concealed the solar requirements in a cottage filled with beautiful woodwork, including a bookshelf opening into the bedroom.

"We didn't want people to necessarily associate solar-powered with futuristic," said Amy Schneider, a civil engineering student. "It's really just a typical Missouri home."

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# Articles

## Students look to the sun for energy

### Two Missouri schools building houses in Solar Decathlon in Washington

By MATT STEARNS  
The Kansas City Star

WASHINGTON — Call it the Show-Me aesthetic.

At the U.S. Department of Energy's Solar Decathlon, which kicked off Thursday on a corner of the National Mall, 14 colleges and universities are competing to see who can design and build the best solar house.

Two of the 14 competing schools are from Missouri — the University of Missouri-Rolla and Crowder College, a community college in Neosho, Mo.

In a landscape of futuristic houses, all harsh, modern angles and glimmering silvery surfaces, the Missouri entrants stand out for a simple reason.

They look normal, like any houses anywhere in Missouri. Both are small ranch-style one-bedrooms: the Rolla entry a light blue vinyl-sided place with a sunroom, and the Crowder entry a slightly larger cedar-sided house with a deck and a hot tub. The rooftop solar panels on the Missouri houses are much less noticeable than those of their competition.

Team members have noticed the similarity — and the difference from

the other contestants.

"I don't know if it's the Missouri mind-set or what," said Cory Hailley, 21, an architectural engineering student who worked on the Rolla house. "We were afraid people would look at solar houses and say, 'That's so futuristic, it's not practical.' We feel ours are the most practical, the most consumer-friendly."

The houses' practicality will be put to the test until the contest ends Oct. 6. The decathlon rules require the houses to be livable as well as energy efficient and attractive. Students must live in the houses, take showers, run washing machines and televisions and stereos — all on solar power.

The contest replaces the department's long-running solar car contest, said Chris Powers, a department spokesman. If the contest goes well, it will be repeated every two years.

"We felt this would be the most efficient way to show the American public that solar power is here already," Powers said. "It's practical, it's affordable, it's off-the-shelf technology. There's nothing exotic about it."

It may seem odd for the Energy Department under the oil-friendly Bush administration to sponsor a

### On the Web

For more information on the Solar Decathlon and to keep track of rankings, go to [www.eren.doe.gov](http://www.eren.doe.gov).

high-profile forum touting renewable and sustainable energies. Critics noted the administration tried to slash research and development funding for such energies — including solar energy — by 50 percent.

Bipartisan congressional opposition halted the cut, and the Bush administration has at least partly changed its tune, said Glenn Hamer, executive director of the Solar Energy Industries Association.

"They're not going home and listening to Jerry Garcia and saying, 'Man, we miss the '70s,'" Hamer said. "But they are trying to increase renewable energies in a different kind of way. We'd still like to see the administration at a higher level say flat out, it's a great idea."

The participating students aren't much interested in the politics of energy funding. They are happy to show off their creativity, ecstatic to be erecting houses (temporarily) right on the National Mall and giving tours to VIPs and tourists alike. While everyone hopes to win, most seem more concerned with spreading the word about solar energy.

Tiny Crowder College is the only two-year school in the contest and is up against such engineering powerhouses as Carnegie-Mellon University, Virginia Tech and Texas A&M.

But team leader Joel Lamson would not indulge in talk about trying to beat the bigger, better-known schools.

"We like being the underdog," said Lamson, 32, a pre-engineering student. "We feel we have as good a chance as anybody... But I'd give up a top-three finish to have every house run well. We want to show people that this stuff works."

To reach Matt Stearns, Washington correspondent, call (202) 383-6009 or send e-mail to [mstearns@krwashington.com](mailto:mstearns@krwashington.com).

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# Articles

## University of Missouri Joins Solar Decathlon – Their Mission: Harness The Sun

**SUSAN TRUDEAU**  
FEATURE WRITER

It's still hot! The sun shines and shines and shines!

Take heart, friends. From Sept. 26 through Oct. 6, student teams from 14 universities will be using all their education, ingenuity and dedication for the greater good to create solar designed homes, home offices and transportation in the first ever Solar Decathlon. Their mission: to capture, convert, store and use enough solar energy to power our modern lifestyle.

The solar decathletes must supply all the energy for an entire household, including a home-based business, along with the transportation needs of the household and business.

The teams will have six days to build their model homes on the National Mall in Washington D.C. Each home must then stand alone using only solar power to complete the 10 contests.

Several university teams

already have their homes built in a prefab format. The University of Missouri at Rolla

team displayed theirs at the Missouri State Fair this summer and intends to use it as a guesthouse or student housing after the contest. They hope to eventually have an entire solar village on campus.

So, what's all this solar stuff got to do with us? In a nutshell, these budding architects and engineers will be creating solar-powered, sun friendly homes, businesses and transportation that will not only save energy (energy = money) but save our environment as well. Hopefully, when they hit the job market after graduation we will begin to see more earth-friendly, pocket-book-friendly construction.

The 10 contests to be held include Graphics and Communication that involves creating a Web site and newsletters. Design

**Fourteen universities, including University of Missouri-Rolla, will compete in the Solar Decathlon.**

Presentation and Simulation involving computer models, drawings and models. Design and Livability is judged on design, innovation and aesthetics. No more ugly solar collectors in the roof but homes and businesses that fit comfortably into the landscape.

The Comfort Zone is judged on space heating and cooling – the largest users of energy in residential building. The house will be judged on consumer appeal of the space conditioning system.

Each dwelling will also be monitored to measure performance in air temperature, and humidity.

Measurements of the electrical energy consumed will also be monitored. Innovation here could really

help our pocketbooks.

Refrigeration judges the appropriate temperature in refrigerators and freezers while minimizing energy use.

Hot Water will show how a homeowner can install solar water heating to reduce expense and fossil fuel consumption. The house must supply all the energy necessary to heat water for common uses such as bathing, laundry and running a dishwasher.

Lighting, the third largest consumer of energy in buildings, is addressed here. Judges will determine the amount of illumination supplied by both electric lights and daylighting.

More and more homes are equipped with home offices and the Home Business contest takes on the challenge of the electronic equipment, fax machines, computers, televisions and such, that are the biggest consumers of energy in buildings, commercial and residential combined.

This contest requires that the home provide enough



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# Thank you for reading this presentation



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