The Solar Decathlon is a competition in which 20 teams of college and university students and faculty compete to design, build, and operate an effective, and energy-efficient solar-powered house. “

The project is organized and sponsored by the National Renewable Energy Laboratory.

“The Solar Decathlon is an event to which the public is invited to observe the powerful combination of solar energy, energy efficiency, and the best in home design.”

The houses are to be built and exhibited on the Mall, Washington DC in September 2007.

MIT is a DoE funded participant. It involves us in an 18 month program of design and technological research to further our interests in sustainability for (pre) manufactured housing.
Faculty and Researchers

Andrew Scott: department of architecture
sustainable architecture, bio-climatic design

Kent Larson: House n
environmental sensing/ pre-fabricated assemblies

Les Norford: Building Technology Group
energy modeling

John Fernandez: Building Technology group
Materials performance and selection / Life Cycle assessment

Larry Sass: Computation Group
Digital Fabrication

Kurt Keville: Research scientist
Power systems and storage

Ed Kern: MIT Energy lab/ Irradiance Inc
Photovoltaic systems

Marilyne Andersen Building Technology Group
Daylighting modeling
2007 TEAMS

California Polytechnic State University, San Luis Obispo, California
Carnegie Mellon University, Pittsburgh, Pennsylvania
Cornell University, Ithaca, New York
Georgia Institute of Technology, Atlanta, Georgia
Kansas State University, Manhattan, Kansas
Lawrence Technological University, Southfield, Michigan
Massachusetts Institute of Technology, Cambridge, Massachusetts
New York Institute of Technology, Old Westbury, New York
Team Montreal (École de Technologie Supérieure, Université de Montréal, McGill University),
Technische Universität Darmstadt, Darmstadt, Germany
Texas A + M University, College Station, Texas
Pennsylvania State University, University Park, Pennsylvania
Universidad de Puerto Rico, Río Piedras and Mayagüez, Puerto Rico
Universidad Politécnica de Madrid, Madrid, Spain
University of Cincinnati, Cincinnati, Ohio
University of Colorado, Boulder, Colorado (Winner 2005)
University of Illinois at Urbana-Champaign, Urbana, Illinois
University of Maryland, College Park, Maryland
University of Missouri-Rolla, Rolla, Missouri
University of Texas at Austin, Austin, Texas
previous projects  Virginia Tech / RISD / Madrid/Maryland/ Colorado/ Michigan/ Virginia Poly / Cornell /Florida
American History Museum
Natural History Museum
Dept. of Agriculture
Smithsonian Castle
07 Solar Decathlon
Ten Solar DECATHLON Contests: 7 days in september 2007

Architecture 200 points

firmness/ commodity / delight
design/ materials/ integration /space / detail

Dwelling 100 points

livability/ build-ability/ marketability/

Documentation 100 points

drawings/ submittals/ construction documents/ energy analysis

Communications 100 points

web site / tours/ ‘branding’

Comfort Zone 100 points

temperature/ indoor air quality

Appliances 100 points

appliance demonstration, control and operations

Hot Water 100 points

collection, storage, operations

Lighting 100 points

integration and effectiveness of natural and artificial lighting

Energy Balance 100 points

producing a net amount of energy of zero or more …battery storage

Getting Around 100 points

mileage credit for running a electric car off excess stored battery power
What will the MIT group bring to the project?

1. Innovation- integrating bio-climatic design and new technologies for manufactured housing with sustainability
2. Collaborations: across boundaries and departments at MIT – and with industrial partners.
3. “Mens and Manus”- enabling students to engage in thinking and making in one project
4. Energy and sustainability- responding to recent initiatives for MIT leadership in energy research

MIT project principles and priorities:

1. Integrated architecture with solar
   *bio-climatic; designing a house for living where the spaces and elements integrated and coordinated*
2. Integrated assemblies
   *Dry assembly / industrial components and composites/ low skilled site labor/ capable of disassembly*
3. New materials and systems
   *New and emerging materials with environmental profile/ life cycle assessment*
4. Scalability and Adaptability
   *Design from single house to community scale / adaptable to multiple climates and contexts*
Schedule

Spring 2006
Research / brainstorm / concept design / model/ analysis/ sponsorship

Fall 2006
Prototype and test systems, materials and components

Spring 2007
Fabricate full scale

Summer 2007
Transport

Sept 2007
Assemble

Sept 2007
Exhibit

Oct 2007
Disassemble/ transport and re-assemble
> DoE Solar Decathlon site: for all details of past and present Decathlons
http://www.eere.energy.gov/solar_decathlon/

> Yahoo! Group site: for all team communications with the organizers:
MIT team members to sign up individually:
http://groups.yahoo.com/group/SD2007/

Web site development- our portal for the project to the outside world

MIT team site for ongoing graphic and analytical material

COMMUNICATIONS
Funding from DoE ....$100K

workshops / research positions/ travel/ equipment/ materials and prototyping

Additional funding and sponsorship……..$300 – 500K ???

effective organization required

cash works best?

industrial collaborators for materials, products and composite constructions

primary/ secondary/ tertiary/ friends and alumni

SPONSORSHIP + $$$$$$
Impossible to satisfy everyone! But try and be flexible

Signup for preference- we will communicate what works best for the majority of students and the faculty

MEETING TIME
This week:

Register for the class! 4.162

- Familiarize yourself with the Solar Decathlon web site
- Read the Rules and regulations (at least the major elements)
- Read our initial proposal for Solar D. to NREL
- Sign-up for the Yahoo! Group site
- we will email details of Yahoo! and the original MIT proposal
- Show up next week – be ready to work collaboratively

Next week: get started with

> researching past projects- the ins and outs of what happened. Critiquing design and technology integration…..including video

> researching the implications, needs and balances of the 10 decathlon criteria

> Energy strategies-

> materials, products and assemblies researching

> house studies: design and research