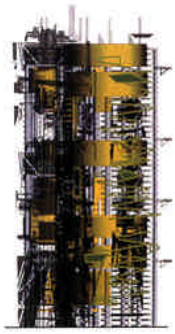

University of Southern California, School of Architecture **Fall 2004 ARCH 402**
Topic Studio Faculty: Thomas Spiegelhalter, spiegelh@usc.edu, **MWF 2-6PM**

Solar powered High-Rise-Building Development
for Work Life Environments

Los Angeles as an experimental Laboratory for the International Solar Decathlon Competition 2003-2005

Project: What constitutes a high-rise building? A high-rise is, in fact, any building with more than nine storeys and not just those striking skyscrapers which shape modern city skylines. However, the sheer complexity of designing and planning the construction of a sustainable efficient, modular, solely solar-powered high-rise as opposed to other building types requires a wealth of specialized experience and expertise. The studio will explore alternative solar high-rise infill building typologies in high-density urban contexts, which are critically derived from sprawling low-rise and medium-rise building typologies.

Intention: In summer 2003 a student team from the School of Architecture was selected for the U. S. Department of Energy's International 2005 Solar Decathlon competition "to design, simulate, engineer and build an experimental, solar-powered two-story building (500sf2 footprint!) on the USC campus to power our modern life- and work-styles". It is planned that USC students, together with teams from other selected universities, will show-case the built project on the Mall in Washington D.C, for two weeks in 2005. The Solar decathlon contest is of pedagogical importance, not only because it offers the opportunity to investigate experimental and energy-efficient building design in an area of world-wide growing concern of environmental sustainability, but also because it will allow students to gain real-world experience, scientific systems integration thinking, marketing, and to learn through doing.

Program description: What should the environmentally-responsible building design in an urban context of the future offer its resident global citizens beyond *green washing*? The decentralized suburban configuration (consisting of low- to medium-rise buildings dispersed throughout the landscape) claims to create habitats that "coexist with nature". But while this perception of the decentralized low-rise building style seems "ideal and green" to many, it is in actuality myopic and anti-ecological, because the dispersed layout and resource use of built forms disrupts the natural ecosystem over a wide land area! Our answer should be a new paradigm striving toward the facilitation of high-dense, long-term adaptable, self-sufficient, sustainable live/work lifestyle. Today, every development will be very critical as humanity's demands upon the planet's limited fossil-energy resources increase exponentially. This will be achieved through cultural identity with affordable solar typologies, technological adaptability, spatial flexibility and environmental sustainability with the ultimate goal of maximizing personal comfort and live/workability. The studio will analyze the current two storey USC Solar Decathlon building design proposal and will develop new individual design solutions for an urban modular **multi-storey solar "Infill" tower building.**

Studio Structure/Schedule:

The Solar Decathletes students are expected to work in the Studio and in the Power Station, intensively to use the blackboard system and participate in **training workshops** and special field trips. We will follow this approximate schedule:

Week 1	Collaborative **case studies** of appropriate International precedents of measure-able, modular solar-powered low-rise, medium-rise and high-rise building typologies – *(Learn to interpret solutions from analysis of International research source material)*
Week 2-3	**Systems Integration & Strategies** – Presentations dealing with occupancy, consumption patterns, circulations, infrastructures, life-cycle of materials, building systems, and particular design strategies – *(Learn to generate sustainable design alternatives and how to select tools and resources for environmentally preferred urban building systems)*
Week 4-5	**Re-Design/Refinement** of the preliminary DOE Solar-Decathlon Proposal and integrate other ongoing sustainability competitions (Learn to evaluate and formalize design competition alternatives)
Week 6-7	**Project synthesis** for the detailed design development *(Learn to synthesize the competition building project rules for the qualification of Stage 2)*
Week 8-14	**Building Typology and Design, Construction and Technology** ***(****Learn to develop professional conceptional detail plans based on performance simulations)*
Week 15	**Presentation design** *(Learn to communicate and present with different media in different situations)*

Links:
Competition Web Page – Rules 2005: http://www.eere.energy.gov/solar_decathlon/
USC Building Science Tools Web Page: http://www.usc.edu/dept/architecture/mbs/tools/index.html

Literature:
"High-Rise Manual, Typology and Design, Construction and Technology", Editor: Johann Eisele Ellen Kloft, Birkhauser Basel-Boston-Berlin November 2003 and "Bioclimatic Skyscrapers", Editor: Ken Yeang, London, 1994