ALL-COLLEGE MEETING

31 October 2008
CDES DEFICIT

- Started with disproportionate amount of non-recurring funding
- Overestimate of FY07 tuition
- Cost pool and salary increases absorb all tuition increase dollars
- Addressing through attrition and responsible spending
- Sans new reductions, on track to be in the black in 2-3 years
PROGRESS

- Academic departments absorbed salary increases in FY09
- Administrative reduction accomplished through increased efficiencies and reduction of 7.5 staff positions, with reassignment of workload.
  - 2006-2007: $ 0 (due to one-time funding)
  - 2007-2008: $ (~800,000)
  - 2008-2009: $ (~400,000)
ECONOMIC REALITY

- State budget outlook
  - deficit estimates as high as $3 billion
  - University asking for increase in funding

- Retirement Incentive
  - five participants
  - savings now kept centrally
  - positions require Provost approval

- 1% reduction: $224,837
  - tuition giveback
    - $126,337
  - O&M allocation
    - $98,500

- 2% reduction: $449,674
  - tuition giveback
    - $252,674
  - O&M allocation
    - $197,000
BIENNIAL COMPACT PROCESS

- This is a full-compact year
- CDes request will be for funding to strengthen and support the core activities of the college
  - Common theme among all colleges
  - Planning meetings scheduled in February & March
  - Opportunity to identify issues and needs that are core and in need of additional support
  - Compact request will be presented to CDes community prior to submission
SOLAR DECATHLON

- Shengyin Xu
  - student project manager, architecture team leader
- Rose Lin
  - interior design team leader
- Steve Peichel
  - engineering controls team leader
Solar Decathlon 2009

“The Solar Decathlon joins 20 college and university teams in a competition to design, build, and operate the most attractive and energy-efficient solar-powered house.”

http://www.solardecathlon.org/
Boston Architectural College, Tufts University, Boston, Medford, Massachusetts
Cornell University, Ithaca, New York
Iowa State University of Science and Technology, Ames, Iowa
Missouri University of Science and Technology, Rolla, Missouri
The Ohio State University, Columbus, Ohio
The Pennsylvania State University, University Park, Pennsylvania
Rice University, Houston, Texas
Santa Clara University, California College of the Arts, Santa Clara, San Francisco, California
Technische Universität Darmstadt, Darmstadt, Germany
Universidad de Puerto Rico, San Juan, Puerto Rico
Universidad Politécnica de Madrid, Madrid, Spain
The University of Arizona, Tucson, Arizona
University of Calgary, SAIT Polytechnic, and Mount Royal College; Calgary, Alberta, Canada
University of Illinois at Urbana-Champaign, Urbana, Illinois
University of Kentucky, Lexington, Kentucky
University of Louisiana at Lafayette, Lafayette, Louisiana
University of Minnesota, Minneapolis, Minnesota
University of Waterloo, Ryerson University, Simon Fraser University, Ontario, Toronto, Burnaby, Canada
University of Wisconsin-Milwaukee, Milwaukee, Wisconsin
Virginia Polytechnic Institute and State University, Blacksburg, Virginia

University of Minnesota
The Competition

The Decathlon includes 10 contests, which in turn define our multi-disciplinary team.

- Architecture
- Photovoltaics
- Solar Thermal
- Energy Modeling
- Controls
- Communications
- Commissioning
- Next-Use
- Logistics/Transportation
- Structures
- Construction Management
- Interior Design
- Economics/Marketing
- Procurement

University of Minnesota
Our Team

150 students faculty and staff working on it from the following departments

- Architecture
- Electrical Engineering
- Mechanical Engineering
- Structural Engineering
- Construction Management
- Logistics/Transportation
- Interior Design
- Journalism
- Communications
- Web Design
- Graphic Design
- Marketing

20-30 students and faculty leading the work

University of Minnesota
Current Phase: CD Set Production

Next Phase: Construction Beginning in Spring Semester

Summer 2009: Testing and Exhibiting

Sept-Oct 2009: Competition

UNIVERSITY OF MINNESOTA
Competition ends Oct 2009
- Shipped back directly to UMore
- Potential stop at UM campus for exhibit

Exhibit Phase 2-3 Years
2012 Establish House on Permanent Site

University of Minnesota
ICON - “An image; a representation... An important and enduring symbol”

SOLAR - “Of, or relating to, or proceeding from the sun.”

The SOLAR ICON transforms the traditional gable form to maximize south-facing solar collector area.
Icon Concept

University of Minnesota
Building Integrated Design

Integrated PV panels serve as roof cladding, also includes flashing and weather barrier.

Thermal panels wrap from south wall to south roof and also serve as cladding and weather barrier.
Building Integrated Design
Building Integrated Design

University of Minnesota
The interior of the houses maximizes the small spaces by maintaining the height and view of the gable. It visually reinforces the ICON shape, while daylighting and ventilating the space.

The built-in shelving provides storage for the small house, while integrating partitions for privacy, ductwork, and electric lighting.
Lighting Design

Daylighting
• North windows for daylighting.
• Exterior lighting for drama and way finding
• Interior lighting is added where daylighting is lacking.

• Gradient of lighting from east, where light is dramatic, to west, where it is more subdued.
The Site

Exterior Spaces

- Water catchment, treatment, and storage
- Deck areas feature dining and seating areas
- Tour areas for the competition can also become tour stops for the demonstration house
The Site

Minnesota-Native Plants

University of Minnesota
Integrate Commercial and Custom Systems

- Home automation control system purchased off the shelf.
- Custom programmed system for energy and comfort systems.
Using TRNSYS software to model energy performance
Energy Modeling – Competition Output

Current Model Results
- Increased glazing created a marginal increase in heating and cooling loads
- Model indicates different conditions ranging from overcast to clear, sunny days.
- Competition performance will depend on controlling heat gain through windows.
- Year-round performance will depend on tightness of house envelope.
Life-Cycle Analysis

The Underlying Nutrient Concept

Integrated Life-Cycle Analysis

• House as a resource that grows in value
• All elements considered in terms of where material came from and where it will go
• Strategies include recycling, biodegrading, donating, re-selling.
• Different life-cycle spans ranging from short spans, which may include
  • 1 interior elements, or other easily upgraded elements;
  • 2 medium spans, which may be 20-50 year range;
  • 3 long spans, which have spans are longer than our lifetimes;
**Life Cycle Assessment (LCA)**

measures the environmental impact of a product or material by calculating its energy and material inputs from cradle to grave.
On-Going Research

Research that can be continue after the competition....

Waste Stream documentation
  – At each next-use and transition

Health of the Wall
  – Indoor air quality
  – Performance of building

Post Occupancy Evaluation
  – Performance of systems
  – Maintenance issues

Market Transformation
  – How effective is the communication methodologies of the house
  – Outreach to kids, young people
  – Market transformation of construction industry, manufacturers
  – Translation to LEED or Greenstar, from the Next-Use stage on

University of Minnesota
Materials and Products

Structural Components
- Substructure
- Wood Cladding
- Insulation
- Sealant
- Weatherproof membrane
- Windows
- Doors
- Anchors/Footings
- Wood Trusses
- Connectors

PV & Electrical
- PV panels
- Aluminum framing system
- Inverters
- Electrical wiring
- Conduits, junction boxes
- Control system
- Sensors
- Data Logger
- Central Computer

Mechanical Components
- Thermal Panels
- Thermal Tanks
- Storage Tank
- ERV
- Ductwork
- Diffusers, vents
- Fans
- Heat Exchangers

Site Components
- Wood Decking
- Wood rails
- Planter beds
- Native plants
- Native trees
- Gravel and stones
- Water basins
- Irrigation piping

Appliances & Electronics
- Refrigerator
- Dishwasher
- Clothes Washer
- Clothes Dryer
- Induction Cooktop
- Oven
- LCD TV
- CD/DVD/MP3 player
- Speakers
- Wii
- Laptop computer

Interior Finishes
- Wood Millwork
- Wood trim
- Wood furnishings
- Tile
- Paints
- Lighting Fixtures
- Flooring
- Textiles

Plumbing Fixtures
- Toilet
- Bathroom Sink
- Bathroom Faucet
- Shower heat and faucets
- Kitchen Sink
- Kitchen Faucet

Transportation
- Trucks
- Trailers
- Securing Equipment
- Crane

Communications
- Built In Signage
- Banners
- Brochures
- Apparel
- Public Events
Potential Sponsorship

Total Project Budget

$1.2 million

We have $385,000 in cash donations.

And roughly $100,000 in in-kind donations

Sample Needs

Control System & Interface

• $30,000

PV/T system

• $50,000 - $100,000

University of Minnesota
Sponsors

Ted and Linda Johnson

University of Minnesota
ARCHITECTURE
This intensive technology module incorporated zero energy carbon neutral design as the framework for the design investigation. The course was structured around an integrated lecture/seminar and studio program in which graduate students worked in teams to critically investigate how sustainable strategies of lighting and thermal challenges in architectural design can be synchronized with a strong design focus. The module was co-taught between regular faculty and practicing architects (both with expertise and research interests in these areas).

Instructor(s): Abraham, Guzowski and McLellan

AN INCOMPLETE CURRICULUM FOR TRANSFORMATION: AIA 2008 EDUCATION HONOR AWARDS
SCHOOL OF ARCHITECTURE, UNIVERSITY OF MINNESOTA
CLOTHING DESIGN COURSEWORK

- Sustainability concepts incorporated into studio projects including:
  - material sources
  - recycled materials
  - appropriate fit
  - adaptable style
  - life cycle costs
CLOTHING DESIGN SENIORS’ LINES

Organic cotton embellished using a marbling technique with zero waste – Chess Rojas

Casual sportswear made of recycled clothing – Joan Hector

Inspired by UM ecology class representing the circle of life – a dung beetle, giraffe, lion and elephant – Kate Troutman

COLLEGE OF DESIGN  UNIVERSITY OF MINNESOTA
Recorded their consumption:
- a written journal of everything they consumed
- collected the physical aspects of what they had consumed over a span of six weeks

Analyzed these data for emergent patterns

Expanded on one salient quality of the information/objects collected

Exhibited the results of their research
Students created hand-printed posters for Clean Energy Research Teams to promote clean energy.

Because they are hand made and signed, they are still hanging in government offices and schools.
GRAPHIC DESIGN

- Made in Minnesota -- Green
Students in the course:

- Learn about sustainability theories and practices related to retail environments
- Visit retail stores and analyze sustainable and unsustainable aspects of the retail environment
- Share results with retailers
RETAIL MERCHANDISING RESEARCH AND OUTREACH

- Consumers' responses to design of retail environments to improve sustainability in store layout, merchandise display, and advertising
- Consumer usage and evaluation of product design to identify the dissatisfying and unsustainable aspects in the product design process
- Issues related to use and disposal of apparel products to address consumer's views on what it means to have a "sustainable" wardrobe
- Sustaining customer loyalty to improve company viability
- Inviting international designers and manufacturers to present cultural practices in sustainable design and retailing
HOUSING STUDIES COURSEWORK

- Sustainability addressed in:
  - Housing development process & practices
  - Multi-family property management
- Environmental quality
  - Home environments
HOUSING STUDIES
RESEARCH AND OUTREACH

*Sustaining homeownership and social justice*
- Crump's research on mortgage foreclosures and predatory lending
- Bruin’s and Yust’s research on first-time homebuyers among households of color

*Sustaining communities*
- Ziebarth’s work with rural communities and issues related to changing demographics, employment, and housing needs
- North Central Regional team (with Bruin and Yust) examining how housing and social capital sustain community vitality

*Sustaining indoor air quality*
- Angell’s outreach leadership in radon reduction and mitigation standards
INTERIOR DESIGN
COURSEWORK

- Sustainable design is introduced in the sophomore year; subsequent studios continue with sustainability
  - Fall 2008, ASID provided thumb drives that have LEED’s ReGreen loaded onto them to all sophomore year students. ASID Foundation helped to fund the development of ReGreen with the USGBC
  - Students use B-3 Guidelines of the Minnesota Sustainable Design Guide, LEED for Commercial Interiors, Existing Buildings, Schools, and ReGreen, the newest LEED program for residential design and construction
- Sustainability is a focus of the senior interior design students’ thesis projects
- Introducing a new lecture course focused on LEED-AP for commercial interiors
INTERIOR DESIGN
RESEARCH AND OUTREACH

- Working with the Center for Sustainable Building Research (CSBR)
  - Developing a post-occupancy evaluation (POE) questionnaire to investigate relationships between sustainable design and occupant satisfaction and building performance.
  - Examining the LEED EB, NC, CI criteria as well as the B3 and the Center for the Built Environment criteria.

- Corporate funders supporting InformeDesign® include:
  - Perkins + Will
  - Humanscale
  - Steelcase
  - USGBC
LANDSCAPE ARCHITECTURE
art: the aesthetics of landscape
ecology: design for ecosystem health
community: urban places and people

sustainability
in the department of Landscape Architecture
art: the aesthetics of landscape
ecology: design for ecosystem health
community: urban places and people
beauty, memorable landscapes
MLA studio courses
GD I ecology at site scale, the Lake Sarita projects
GD II Urban Options, Streetlife
GD III brownfield studio – Ford Plant, 2007
ASLA Honor Award Collaboration:
Laura Lyndgaard, Malea Jochim, Amanda Olson

GD III regional studio, metropolitan ecologies

sustainability studio
Climate change initiatives
Stormwater Linkage Committee
University Campus Master Plan,
Natural Features and Open Space
Facilities Management, DEHS

sustainability
outreach
Ford Plant Reuse Task Force
Laurentian Vision
Livable Communities Advisory Committee
St. Paul Riverfront Corporation Adjunct Committee

sustainability
outreach
Moving Communities Forward

AIA transportation and community enhancement, 2007
MN State Conservation Plan
Synthesis Grant, Multifunctional Landscapes
St. Cloud Corridor
Institute on the Environment, 2008

sustainability research
Landscape Journal

Special Issue: Metropolitan Landscape Ecology and Design

GIS
sustainability
MS track, PhD
Landscape Architecture
sustainability
Bachelor of Design degree, Landscape Architecture
technologies for sustainable landscapes
RESEARCH AND OUTREACH

Sustainability takes many forms in design
EXAMPLES OF SUSTAINABILITY

- Sustaining life-process design in health care
- Creating a sustainable future-through civic engagement
- Preserving and conserving history and design in the Goldstein
Center for Sustainable Building Research

Working to transform the built environment in ways that provide for the ecological, economic, and social needs of the present without compromising those of the future.

The EcoCalculator Wins Awards

- 2007 Sustainable Building Industries Council's Beyond Green™ Competition
- 2007 United States Environmental Protection Agency (EPA) Lifecycle Building Challenge Award

See Us at GreenBuild 2008!

CSBR staff will be attending and displaying at this year's GreenBuild International Conference & Expo representing areas of our work in Windows & Glazing, Housing, and Life Cycle Assessment

When: November 19-21, 2008
Where: Boston, MA

Athena EcoCalculator for assemblies

More information on the Athena EcoCalculator for Assemblies →
CSBR ACTIVITIES

Sustainable Guidelines, Standards and Tools
- Sustainable Buildings 2030
- Buildings, Benchmarks & Beyond (B3) Project: The State of Minnesota Sustainable Building Guidelines (MSBG)
- City of St. Paul Green Building Policy
- Life Cycle Assessment of Materials—Athena EcoCalculator
- Minnesota Building Materials Database
- Greening the College and the University

Windows and Glazing
- Efficient Windows Collaborative web site and selection tool
- “Window Systems for High Performance Buildings”
- Commercial Windows web site and façade design tool
CSBR ACTIVITIES

**Affordable Housing**
- Minnesota Sustainable Housing Initiative (McKnight Foundation)
- Sustainable Housing Research for Korea
- HUD Communities Outreach Partnership Center
  (Includes Department of Architecture, Metropolitan Design Center, and Cold Climate Housing Program)
- Demonstration Homes in the Frogtown Neighborhood
- Green Communities Program

**Building Evaluation**
- Post Occupancy Evaluations of buildings for MNSCU, University of Minnesota, Departments of Natural Resources and Transportation
- Post Occupancy Evaluations of sustainable pilot projects for Hennepin, Ramsey, Dakota, Carver and Washington Counties
- Evaluation of Green Community Pilot Projects
BENEFITS OF RESEARCH CENTERS

- Responsive to real world problems and emerging opportunities
- Ability to develop relationships and connect to funding sources
- Ability to assemble and manage interdisciplinary research teams and partner with other units in the college and the University
- Ability to partner with and connect to the professional community and the building industry which helps to frame research questions
- Ability to partner with faculty and provide opportunities for research
- Ability to provide a range of research experiences for students with different interests and backgrounds
FUTURE CHALLENGES FOR RESEARCH, PRACTICE, AND EDUCATION

- Magnitude of the problems and need for rapid response is unprecedented
- Design curriculum and faculty may not be able to change quickly enough
- Even if programs do change quickly, the students have limited influence in the profession initially
- Information is evolving quickly and but methods and strategies are primitive. We may not have the desired outcomes and it will be too late.
- Feedback loops in the design and construction industry are not well developed
- Everyone needs better information now—designers, educators, clients, contractors, manufacturers, state and local governments
THE POTENTIAL ROLE OF RESEARCH CENTERS IN THE TRANSFORMATION

- A research center can become a regional hub to coordinate the necessary transformation. Relationships to government, design practice, education and industry help frame research agenda.
- A research center can be a publicly accessible, credible knowledge base on new approaches, technologies and actual performance outcomes.
- A research center can be a critical component of the necessary feedback loop using faculty and students to collect and disseminate information on actual performance.
- A research center can fill major gaps in providing in-depth professional education.
- A research center can be a catalyst for demonstration projects and public education.
It takes energy to construct a new building. It saves energy to preserve an old one.
Metropolitan Opera, 318-320 Marquette Avenue, Minneapolis (Demolished: 1937)
Garrick Theater, 34 W. Sixth Street, St. Paul (Demolished: 1950)
House, 22 Lexington Avenue, St. Paul (Demolished: 1953)
Gateway Park Pavilion, Minneapolis (Demolished: 1953)
Newton Building, 357-59 Minnesota Street, St. Paul (Demolished: 1957)
East Fifth Street, St. Paul (Demolished: 1958)
Minneapolis Public Library, 10th & Hennepin Avenue, Minneapolis (Demolished: 1961)
Gateway District, Minneapolis (Demolished: 1963)