Sustainability at Stanford: Meeting the Challenges of Growth

by Therese Brekke, Stanford University for the Sustainable Campus Conference Zurich, Switzerland 26 April 2007

Stanford is integrating sustainability throughout the university

Sustainability goals

- Involve all academic disciplines in finding solutions
- Grow while conserving resources
- Cut greenhouse gas emissions

Sustainability drivers

Momentum comes from:
- Competitive advantage
- Culture of innovation
- Operational cost savings
- Legal mandates

Top challenge: growth

Stanford today:
- 8,180 acres (3,310 hectares)
- 7 schools
- 17,000+ students
- 2,400+ faculty
- 8,700+ staff
- 12.5 million square feet (1,161,288 square meters)

Growth trend: up
- Population
- Energy-intensive buildings

Dimensions of growth

Need to build:
- 2 million academic square feet (185,806 square meters)
- Housing for 2,400 people
Sustainable building principles

- Don’t build unless you have to
- Build well
- Conserve what you have

Rigorous capital planning

Space planning guidelines ensure:
- Equity
- Consistency
- Efficiency
- Flexibility

High-performance buildings

Stanford’s Guidelines for Sustainable Buildings covers:
- Site design and planning
- Energy use
- Water management
- Materials, resources, and waste
- Indoor air quality

Environment + Energy Building

Features include:
- Natural light and ventilation
- Heat recovery system
- Photovoltaic solar panels

Expected benefit:
- 44% lower total energy costs

The Green Dorm

Goals include:
- Zero carbon emissions
- Latest technology
- Living laboratory

Sustainability in Existing Buildings

Target: high-energy-use buildings
- $15 million investment
- $4.2 million per year savings (cost recovery in less than 4 years)
- 28 percent reduction in energy use
**Energy Retrofit Program**
- **Expense:** $8 million over 10 years
- **Energy savings:** 158 million kilowatt-hours
- **Payback period:** 5 years or less

**The Keck Building**
- **Benefits:**
  - 48% reduction in chilled water
  - 18% reduction in electricity
  - 33% reduction in steam
- **Savings:** about $270,000 per year

**A double challenge: Conserve energy + reduce greenhouse gases**

**Cardinal Cogen power plant**
- **Benefits:**
  - Highly efficient
  - Relatively clean
- **Downsides:**
  - Nonrenewable fossil fuel
  - Emits greenhouse gases

**Energy Conservation Incentive Program**
- **Cash for kilowatt hours =**
  - 3% reduction in budgeted electricity use
  - $718,000 more for program activities

**University GHG emissions**
- **Greenhouse gas inventory is under way**
  - Preliminary assessment:
    - 239,220 metric tons in 2005
  - Final figures due August 2007
  - Next steps: develop reduction targets and strategies
What’s next?

Producing renewable energy on campus?

Carbon offset projects?

Solutions still in the lab or classroom?

Initiative on the Environment and Sustainability

Seek solutions through research

Educate and train environmental leaders

Move ideas into action by collaborating with decision makers

Sustainability Working Group

Big ideas

Policy and program recommendations

22 departments, schools, groups, and institutes

Sustainability at Stanford:
Meeting the Challenges of Growth

by Therese Brekke, Stanford University
for the Sustainable Campus Conference
Zurich, Switzerland
26 April 2007