Energy, Environment, and Sustainability

The Relevant University: A University of Toledo Case Study

New England Board of Higher Education
April 23, 2010
The University of Toledo and the Engagement Strategy Project
- One of Ohio’s 13 public universities
  - 2006 merger—University of Toledo & Medical University of Ohio
  - Students: 23,000
  - Operating budget: $793 MM
  - Clinical revenues: $270 MM
  - Six campuses; CRV @ $1.7BB
- UT Medical Center = only academic health sciences center in NW Ohio region
- Unusual array of colleges (for non-land grant)
  - Arts & Sciences
  - Education
  - Business
  - Engineering
  - Law
  - Medicine
  - Nursing
  - Pharmacy
  - Health & Human Services
  - University College
- Funded research expenditures: $71 MM
- High ranking in licensing of IP (AUTM)
- Recent Strategic Plan—*Directions 2007*
How *The Relevant University* Came About

- Began as consulting engagement for *Strategic Business Plan for Economic Engagement Strategy*
- Became broader effort to rethink the University in context of its own founding/history and contemporary challenges
- Discovered that University’s motto is particularly apt:
  - *Engaging the Present; Creating the Future*

- Resulted in just-published book
The Relevant University:
Quick Overview as Context
The Relevant University Responds to New Framework of the Global Knowledge Economy

The Global Knowledge Economy

The Knowledge Economy is now defined by:

- Global business models
- Supply chains
- Applied and commercialized research
- New networks and alliances between universities, industry and government

New View of Assets and Metrics

Universities need to rethink how they organize for:

- Global research prominence
- Growth in company-sponsored research and innovative start-ups
- Increased innovation with existing companies
- Community-based metrics (“what do others want”)

The Relevant University: Making Community and Economic Engagement Matter
The Relevant University

- Considers significant trends and the rate of change in the world around us
- Implies connections with our community—locally, regionally, and globally
- Requires shift of perspective—to look at ourselves from the outside in—difficult, but necessary in order to be more relevant, more related, and more connected.

*Dr. Jacobs’ annual spring address to The University of Toledo community, April 14, 2010*
The Relevant University: Rethink Mission Language with Changed Perspectives

Inside-Out

20th CENTURY UNIVERSITY
- TEACHING (Learning and Learners)
- RESEARCH (and Tech Transfer)
- SERVICE (Varied Definitions)

Ivory Tower Culture Still a Major Influence

Outside-In

21st CENTURY UNIVERSITY
- HUMAN CAPITAL (All Levels / Forms of Education)
- INNOVATION SYSTEM (Research, Applications, Creation of Value)
- KNOWLEDGE COMMUNITY (Mixed-Use Campus & Quality of Place)

Stewardship and Engagement Culture is Pervasive

The Relevant University: Making Community and Economic Engagement Matter
The Relevant University: Four Domains

- **Human Capital**
  - Formation of the knowledge workforce

- **Innovation System**
  - Innovation created by a complex set of resources, programs, services, and funding

- **Health Care & Wellness**
  - Quality, access, cost-efficiency; emphasis on wellness

- **Quality of Place**
  - Desirable, vibrant livable community and region

Stewardship & Engagement Permeate All
175 Strategies
And Four Major Initiatives (Focus)

- 175 strategies in sub-domains; all interrelated

- 4 major initiatives for distinction and impact—selected based on university strengths AND regional priorities:
  - Solar & Renewable Energy & Environment
  - Biomarkers
  - Transportation & Logistics
  - Advanced Manufacturing

- Undergraduate Education
- Graduate & Professional Education
- Successful Lifelong Learners
- Pre-K to 12 Education

- Research, Discovery, Creative Works & Engaged Scholarship
- Technology Management, Incubation & Entrepreneurship
- Initiatives for Distinction & Impact
- Solutions-Focused Research University

- Regional Clinical Care
- Health Care Workforce
- Healthy Lifestyles & Communities
- National Health Care & Insurance Reform

- Mixed Use Partnership Campuses
- Land Use Plan Stewardship – University City
- Arts, Humanities & Culture
- Sustainability
Renewable Energy, Environment, and Sustainability: Integrated Strategies
Energy and Sustainability: Application of the New Model

In Energy and Environment, UT demonstrates new mission interpretation and integration.

HUMAN CAPITAL
School of Solar & Advanced Renewable Energy

FULLY INTEGRATED UT STRATEGY

INNOVATION SYSTEM
Center of Excellence in Advanced Energy and the Environment

KNOWLEDGE COMMUNITY
Scott Park Campus of Energy & Innovation
• Reorganize and focus existing multidisciplinary faculty, degree programs, and research
• Build a new School of Solar & Advanced Renewable Energy
**SCHOOL OF SOLAR AND ADVANCED RENEWABLE ENERGY**

*SSARE*

*A Continuum from Education to Economic Development at The University of Toledo*

**Education**
- Interdisciplinary undergraduate and graduate programs leading to B.S., M.S., and Ph.D. degrees are offered through the College of Arts and Sciences, with majors in physics, chemistry, environmental sciences, and biological sciences, as well as the College of Engineering, in fields of electrical, computer science, chemical, environmental, mechanical, industrial, and civil engineering.
- A professional science masters degree in photovoltaics and a Ph.D. degree in alternative energy are currently under development.
- World-class faculty and state-of-the-art research facilities.

**Research**
- Key research areas include photovoltaics, biomass, fuel cells, electricity management, energy storage, and wind research.
- Over $47 million in grants and contracts for energy-related efforts during the past three years.

**Incubation**
- Clean and Alternative Energy Incubator houses and supports startup companies that benefit from interaction with UT faculty and students.

**Commercialization**
- UT Innovation Enterprises (UTIE) serves to identify, facilitate, stimulate and support commercial activity that is aligned with the University’s mission, vision, and community engagement.

**Regional Economic Development**
- UT now has 16 active spin-off businesses, which have generated over 100 local high-paying positions.
- More than 60% of the total U.S. photovoltaics production in 2008 occurred within 100 miles of The University of Toledo.

“Ohio has everything that is needed to become a center for the country, and even a supplier to the world, of what is needed to take us from where we have been to where we need to be in terms of energy.” - **Ohio Gov. Ted Strickland, Oct. 2009**

**Toledo is a hub for advanced energy companies**
Innovation System
Build on Strong Research Base in Energy

- Breadth of energy research base
- Significant research partnerships in Ohio and beyond

<table>
<thead>
<tr>
<th>Energy Area</th>
<th>Funding FY 2004-08</th>
<th>Major Sources of Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photovoltaic</td>
<td>$32,539,069</td>
<td>NREL, DOD (Air Force) DOE, NSF, State of Ohio,</td>
</tr>
<tr>
<td>Electricity and Hydrogen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel Cells</td>
<td>$4,859,987</td>
<td>State of Ohio, DOE, DOD, NASA, Catacel</td>
</tr>
<tr>
<td>Biomass</td>
<td>$760,112</td>
<td>USDA, CIFT, NSF, ODOD</td>
</tr>
</tbody>
</table>
Innovation System
Research Center of Excellence in Advanced Renewable Energy and the Environment

- Approved under Ohio Board of Regents Center of Excellence (COE) program, building on:
  - The Wright Center for Photovoltaics Innovation and Commercialization
  - Clean & Renewable Energy Incubator
  - Connections with new SSARE degree programs
  - Technology commercialization and economic development

- Tied to regional priorities

- Research focus areas:
  - Solar energy
  - Biomass energy
  - Wind energy
  - Energy Storage, Conversion, Management and Related Technologies
  - Environmental and Ecosystem Sciences, Monitoring, & Remediation
Innovation System
Expanded Capabilities and Partnerships for Technology Management

- Significant progress in transfer and commercialization of energy discoveries
- Significant incubation accomplishments
- Home of University Clean Energy Alliance of Ohio
- Generated two major solar firms in NW Ohio
160-acre campus; endowment of the University’s founder

Now dedicated to Energy/Innovation
- Building a new green grid
- 569,640 SF of existing space for private company use, primarily for energy-related partnerships with UT scientists.
- One 60,000 SF facility immediately dedicated as an accelerator facility for UT incubator graduates.
A Green Knowledge Community: Campus Sustainability Plan

- Partnership with Bottom Line Resource Technologies, Inc. (Columbus, OH), for the grid
  - Phase 1: 1 megawatt of grid-tied solar and wind at Scott Park Campus
  - Phase 2: All of Scott Park Campus will be carbon-neutral
  - Phase 3: All university campuses will be carbon-neutral
  - Will be $150 MM investment
    - The grid
    - Renovating Scott Park space for private companies

- In addition:
  - Evaluate expansion of the grid beyond UT campuses to neighborhoods
  - Assist neighbors (residential and corporate) in conservation and green practices
  - Collaborate with community colleges on technician training (in addition to University’s advanced degree programs)
  - Participate actively in all State of Ohio and University System of Ohio green initiatives
Energy, Environment, and Sustainability

The Relevant University: A University of Toledo Case Study

New England Board of Higher Education

April 23, 2010