Monitoring Cultural of Sustainability at the University of Michigan: A Model for Measuring Behavioral Change in Universities and Other Organizations

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University of Michigan

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Overview

• The Big Picture
• The University of Michigan - Background
• A Model for Measuring Cultural Change
• Sustainability Cultural Indicators Program (SCIP)
• Research Design & Process
• Some Findings
• Current Status - Next Steps
The Big Picture
Ann Arbor and The University of Michigan

Central Campus

Medical Campus

North Campus

South Campus

East Campus

5 campus's

>3,000 acres (>12 sq. km)

>450 buildings - 3.4 million sq. ft.

>40,000 students; >38,000 faculty & staff

>80,000 computers

Releases more than 722,000 metric tons of greenhouse gas emissions annually
# Integrated Assessment Themes

<table>
<thead>
<tr>
<th>THEME</th>
<th>GUIDING PRINCIPLE</th>
<th>2025 GOALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate Action</td>
<td>We will pursue energy efficiency and fiscally-responsible energy sourcing strategies to reduce greenhouse gas emissions toward long-term carbon neutrality.</td>
<td>Reduce greenhouse gas emissions (scopes 1&amp;2) by 25% below 2006 levels. Decrease carbon intensity of passenger trips on U-M transportation options by 30% below 2006 levels.</td>
</tr>
<tr>
<td>Waste Prevention</td>
<td>We will pursue purchasing, reuse, recycling, and composting strategies toward long-term waste eradication.</td>
<td>Reduce waste tonnage diverted to disposal facilities by 40% below 2006 levels.</td>
</tr>
<tr>
<td>Healthy Environments</td>
<td>We will pursue land and water management, built environment, and product sourcing strategies toward improving the health of ecosystems and communities.</td>
<td>Purchase 20% of U-M food from sustainable sources. Purchase Huron River water quality by: minimizing runoff from impervious surfaces (outperform uncontrolled surfaces by 30%), &amp; reducing the volume of land management chemicals used on campus by 40%</td>
</tr>
<tr>
<td>Community Awareness</td>
<td>We will pursue stakeholder engagement, education, and evaluation strategies toward a campus-wide ethic/culture of sustainability.</td>
<td>The report recommends investments in multiple actions to educate our community, track behavior, and report progress over time.</td>
</tr>
</tbody>
</table>
TOWARD A CULTURE OF SUSTAINABILITY

Engagement & Education

Measuring, Monitoring, & Evaluation
Toward a Culture of Sustainability:
Engagement & Education

Staff & Faculty
- Sustainable Workplace Certification
- Sustainable Lab Recognition Program
- Green Teams
- Energy Managers

Students
- Planet Blue Student Leaders
- Water Bottle Initiative
- Planet Blue Room
- Student Groups (SSI)
- Sustainability Courses

- Earthfest
- Planet Blue Ambassadors Program
- Sustainability Town Halls
- Annual Sustainability Guide
- Annual Report
- RecycleMania
- Planet Blue Room
What is Culture of Sustainability?

“..........a culture in which individuals are aware of major environmental (and social/economic) challenges, are behaving in sustainable ways, and are committed to a sustainable lifestyle for both the present and future”

How do we measure, monitor, and evaluate it?

...through a program called SCIP...

*Sustainability Cultural Indicators Program*

a multi-year U-M program of research designed to measure and track the culture of sustainability on campus so as to inform /guide university operations and policies
Sustainability Cultural Indicators Program - SCIP

What do we measure? How do we measure? How do we know if it's changing?

Knowledge, Awareness
Behaviors, Actions
Commitments
Values, Dispositions

Travel & Transportation
Waste Reduction & Conservation
Natural Environment
Sustainable Foods
Climate Change

CLIMATE ACTION
reduce GHG emissions by 25%; decrease GHG/passenger trip for UM trans. options by 30%

WASTE PREVENTION
reduce waste tonnage to disposal facilities by 40%

HEALTHY ENVIRONMENTS
protect Huron River water quality by reducing volume of chemicals used in land management by 40%; purchase 20% of U-M food from sustainable sources.

COMMUNITY AWARENESS
educational programs; monitoring/evaluating progress; reporting
Research Design

**WEB SURVEYS**—annually

Undergraduate students (2000)
Graduate students (400)
Staff (750)
Faculty (750)

*Undergraduate student panel (800)*

**SUPPLEMENTAL DATA (OBJECTIVE INDICATORS)**—annually

Building Information covering:
- Energy Use (BTU/sq ft)
- CO2 emissions metric tons per sq ft
- Recycling material (lbs per sq ft)
- Waste sent to disposal facilities (lbs per sq ft)
- Sustainability program initiatives.
<table>
<thead>
<tr>
<th>SURVEY MODULE</th>
<th>Knowledge</th>
<th>Disposition</th>
<th>Behavior</th>
<th>Other</th>
<th>Demographics</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel &amp;Transp.</td>
<td>9</td>
<td>10</td>
<td>21</td>
<td>1</td>
<td>0</td>
<td>41</td>
</tr>
<tr>
<td>Cons. &amp; Waste Prev.</td>
<td>5</td>
<td>5</td>
<td>33</td>
<td>1</td>
<td>0</td>
<td>44</td>
</tr>
<tr>
<td>Natural Environm't</td>
<td>4</td>
<td>2</td>
<td>9</td>
<td>1</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Food</td>
<td>7</td>
<td>6</td>
<td>19</td>
<td>2</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>Climate</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Sustainability</td>
<td>0</td>
<td>20</td>
<td>13</td>
<td>3</td>
<td>0</td>
<td>36</td>
</tr>
<tr>
<td>(general)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Univ. of Michigan</td>
<td>8</td>
<td>0</td>
<td>8</td>
<td>8</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Demographics</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>45</td>
<td>103</td>
<td>18</td>
<td>42</td>
<td>242</td>
</tr>
</tbody>
</table>
## Sample questions

How much do you know about the following at U-M?

<table>
<thead>
<tr>
<th></th>
<th>A lot</th>
<th>A fair amount</th>
<th>A little</th>
<th>Not much/Nothing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recycling glass</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Recycling plastic</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Recycling paper</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Recycling electronic waste (i.e. computers, cell phones)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Property Disposition services</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Sustainability Cultural Indicators

**Primary**

*Climate Action*
- Travel Behavior (1)
- Conservation Behavior (4)

*Waste Prevention*
- Waste Prevention Behavior (4)

*Healthy Environments*
- Protecting the Natural Environment (3)
- Sustainable Food Purchases (3)

*Community Awareness*
- Travel and Transportation (4)
- Waste Prevention (5)
- Natural Environment Protection (4)
- Sustainable Foods (7)
- U-M Sustainability Initiatives (8)

**Secondary**

*Sustainability Engagement*
- U-M (3)
- General (4)

*Sustainability Commitment* (1)

*Sustainability Disposition* (3)

*Evaluating U-M Sust. Initiatives* (8)
CULTURAL INDICATORS CHANGES – AWARENESS
DIFFERENCES AMONG STAFF AND FACULTY

STAFF

FACULTY

Waste Prevention
Sustainable Foods
Natural Environment Protection
Travel & Transportation
U-M Sustainability Initiatives

↑ Significant change from 2012
CULTURAL INDICATORS CHANGES – BEHAVIORAL
DIFFERENCES AMONG STAFF AND FACULTY

Waste Prevention Behavior
Conservation Behavior
Protecting the Natural Environment
Sustainable Food Purchases
Travel Behavior
U-M Sustainability Engagement

STAFF

FACULTY

↑ Significant change from 2012
CULTURAL INDICATORS CHANGES – BEHAVIORAL AMONG STUDENTS

Travel Behavior
Waste Prevention Behavior
Conservation Behavior
Sustainable Food Purchases
Protecting the Natural Environment
Sustainability Engagement Generally
U-M Sustainability Engagement

STUDENTS
STUDENT PANEL

↑ Significant change from 2012
UNIVERSITY OF MICHIGAN CAMPUS AND REGIONS
WASTE PREVENTION BEHAVIOR INDICATOR
DIFFERENCES AMONG STAFF-FACULTY –2012 & 2014
Relationships between Changes in Waste Prevention Behavior, Recycled & Trash Material

CHANGE IN RECYCLING, TRASH*, & WASTE PREVENTION BEHAVIOR AMONG STUDENTS IN U-M HOUSING by PLACE OF RESIDENCE: 2012-2014

<table>
<thead>
<tr>
<th>U-M Housing*</th>
<th>Recycling Pounds per Square Feet</th>
<th>Trash Pounds per Square Feet</th>
<th>Change in Waste Prevention Behavior 2012-2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Quad</td>
<td>0.24</td>
<td>0.27</td>
<td>0.27</td>
</tr>
<tr>
<td>West Quad*</td>
<td>0.43</td>
<td>0.40</td>
<td>0.35</td>
</tr>
<tr>
<td>South Quad*</td>
<td>0.45</td>
<td>0.44</td>
<td>0.02</td>
</tr>
<tr>
<td>East Quad*</td>
<td>0.29</td>
<td>0.03</td>
<td>0.54</td>
</tr>
<tr>
<td>Stockwell</td>
<td>0.20</td>
<td>0.20</td>
<td>0.20</td>
</tr>
<tr>
<td>Mosher-Jordan</td>
<td>0.71</td>
<td>0.63</td>
<td>0.86</td>
</tr>
<tr>
<td>Many Markley</td>
<td>0.53</td>
<td>0.53</td>
<td>0.53</td>
</tr>
<tr>
<td>Alice Lloyd****</td>
<td>0.04</td>
<td>0.24</td>
<td>0.25</td>
</tr>
<tr>
<td>Couzens</td>
<td>0.18</td>
<td>0.21</td>
<td>0.19</td>
</tr>
<tr>
<td>Bursley-Baits</td>
<td>0.37</td>
<td>0.35</td>
<td>0.38</td>
</tr>
<tr>
<td>Northwood Apartments</td>
<td>0.23</td>
<td>0.25</td>
<td>0.26</td>
</tr>
</tbody>
</table>

*The term, Trash, is sometimes referred to as Waste. In the context of The University of Michigan, it refers to non-recyclables that are diverted to disposal facilities (i.e. landfills, etc.)

*Data are excluded for the smaller residence halls having relatively small numbers of respondents. These include: Betsy Barbour, Martha Cook, Fletcher, Henderson, Newberry, and Oxford.

*Data are based on pounds of recyclables and trash collected from dumpsters associated with each building for the proceeding 12 months. For example the 2012 data cover the period from September 2011 to August 2012.

*In 2005, U-M launched a long-term program of selective upgrades and complete renovations to its housing stock. In 2012, East Quad was closed for renovations followed by the closure of South Quad in 2013 and the West Quad closure in 2014. Figures for recycling and waste during renovation do not reflect the normal occupancy use.

**During renovations, residence halls were unoccupied. Therefore, there were no East Quad students in the 2012 SCIP sample while the 2014 SCIP sample had no West Quad participants. Consequently, survey data covering both 2012 and 2014 were not available to measure change scores for students in these residence halls.

***2012 data covering recycling and waste for Alice Lloyd are low since the building was being renovated and therefore unoccupied during the previous year. Change for this building is based on the difference between 2014 and 2013.
Current Status - Next Steps

Launch 4th wave of surveys in Fall 2015 (next week)

Design and conduct interventions (tests/experiments) in conjunction with U-M operational units

On-going analysis
• Develop and test causal models using panel data
• Examine relationships between behavioral change & changes in energy consumption, CO2 emissions, & other “hard” indicators
• Other

Continue to promote uses of the data within U-M and elsewhere

Explore Opportunities for Replication
• Other universities
• Other organizations
• Cities and neighborhoods
Questions?

marans@umich.edu
http://graham.umich.edu/leadership/scip
AWARENESS OF U-M SUSTAIN. INITIATIVES INDICATOR
DIFFERENCES AMONG STAFF-FACULTY –2012 & 2014