Influencing Behavioral Change through GIS/Smart Campus Initiatives

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How can we use GIS and the Smart Campus Initiatives to help us improve sustainability efforts? Are there any best practices to help us garner high levels of participation? How do we take advantage of campus data sets to display information? How do we spatially display this data so it makes sense to end users and helps influence and incentivize positive behavioral change? These are just a few of the questions we are looking at from the sustainability perspective.

Let’s explore just one area, energy conservation, through behavioral change to look at this issue. Energy conservation is an important component in any plan to reduce Greenhouse Gas (GHG) emissions from building energy use. Our new President, Janet Napolitano, has set a target of climate neutrality by 2025. In order to achieve this level of energy conservation it is essential that a program inform energy consumers of their present and historical energy use, provide them with examples of energy-saving measures and activities, and give frequent, even real-time, feedback on how their energy use compares to “social norms.” In addition, a successful program builds on making users “energy aware” by motivating individuals to get involved, identifying and supporting committed individuals, and rewarding users for reducing energy waste. A number of programs on campus induce behavioral change and reduce energy waste, such as PowerSave Campus, LabRATS, and The Green Initiative Fund. However, more robust efforts, like the Smart Campus Initiatives, need to be taken in order to meet the aggressive emissions reduction goals our campus has set. UC Berkeley estimates that they will see a persistent electricity consumption reduction of 3-5% through their behavioral change/energy incentive program, and evidence from campus residence halls indicates that even higher reductions are potentially achievable. UCSB forecasts a 5% reduction in total electricity use through the Energy Incentive Program (EIP), which would reduce CO₂(e) emissions by 3,149 MT CO₂ E annually.

<table>
<thead>
<tr>
<th>% Reduction</th>
<th>Energy savings (kWh/Year)</th>
<th>Electricity cost savings ($/year)</th>
<th>GHG Savings (MT CO₂E/yr)</th>
<th>Program costs</th>
<th>Payback Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>3% Reduction</td>
<td>6,390,595</td>
<td>$671,012.42</td>
<td>1,916</td>
<td>$558,750</td>
<td>8.3 months</td>
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<tr>
<td>5% Reduction</td>
<td>10,651,001</td>
<td>$1,118,355.07</td>
<td>3,194</td>
<td>$558,750</td>
<td>4.9 months</td>
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<td>10% Reduction</td>
<td>21,302,001</td>
<td>$2,236,710.13</td>
<td>6,388</td>
<td>$558,750</td>
<td>2.5 months</td>
</tr>
</tbody>
</table>

As part of the University of Cambridge’s Energy and Carbon Reduction Project, a laboratory pilot program (that did not take advantage of GIS tools or spatial displays) at the university’s
Gurdon Institute utilized behavioral change towards energy use to successfully garner energy reductions throughout a department. The pilot program achieved a 76% participation rate across the department and achieved an overall reduction of 19% in energy usage over a 5-month period.

Looking at behavioral changes as a portion of the mechanism to help fund programs is a strategic way to move initiatives forward in the current financial climate at public universities. If we can successfully develop visual imagery via GIS/Smart Campus initiatives to spatially display information that could influence users, this same strategy could apply to the areas of waste, water, procurement, food, the built environment, transportation, the landscape/biotic environment, etc.

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