Executive Summary

The Problem Defined

In 2008, the Indiana University Task Force on Campus Sustainability (Task Force) released the Campus Sustainability Report, identifying seven key areas of sustainability: (1) Academic Initiatives; (2) Energy; (3) Environmental Quality/Land Use; (4) Resource Use/Recycling; (5) Transportation; (6) Built Environment; and (7) Food. Within the Built Environmental focus area, the Task Force identified a key sustainability objective for the University: “to promote campus sustainability through innovative building design and engineering principles that promote functionality, safety, and energy efficiency while respecting campus culture and heritage.” The Task Force recommended that IU use LEED-certification for all new building projects to assess sustainable progress on the built environment. The Task Force believed that LEED could provide IU with a complete framework for meeting sustainability goals and assessing building performance through LEED’s use of six performance categories: (1) Sustainable Sites; (2) Water Efficiency; (3) Energy and Atmosphere; (4) Materials and Resources; (5) Indoor Environmental Quality; and (6) Innovation and Design Process.

Also in 2008, Governor Mitch Daniels issued an executive order encouraging all state-funded buildings over a certain size to be LEED certified or certified using an equivalent green building rating system.1 In response to the state executive order and the University Task Force’s recommendation, Indiana University began exploring LEED certification for new building projects. In 2010, in the Campus Master Plan, the University formally set LEED Silver certification for all building projects (both new construction and renovations) on the Indiana University campus. While IU has made much progress achieving LEED certification for building projects, there are opportunities to enhance the certification process. While some buildings have successfully achieved Silver, or even Gold certification, some project teams on Indiana University’s campus have struggled to obtain certification. Recognizing a need to streamline the LEED certification process to improve certification efficiency and standardize the processes necessary for successful LEED projects, the IU Office of Sustainability created the LEED Tools, Processes, and University Standards internship for the summer of 2013.

Internship Goals and Vision

Overall, my goals for this internship involved streamlining the certification process, clarifying responsibility of key players involved in the LEED certification process, creating a working LEED website, and comparing IU LEED/green building progress with other higher education institutions, specifically Big Ten peer universities. In this Final Report, I will focus on my three main objectives for the internship.

Summer Objectives

2. Create a working LEED webpage within the Indiana University Office of Sustainability website.
3. Identify current obstacles that prevent IU building projects from achieving LEED certification and recommend streamlining initiatives.

1 http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=IN08R
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Part I – Big Ten Green Building Comparison

Introduction
My goal for the report was to gain a better understanding of the current green building efforts among the 12 (and soon to be 14) member schools of the Big Ten conference.

Evaluating sustainability efforts for the built environment is particularly important as the Environmental Protection Agency (EPA) estimates that buildings account for roughly 40% of total U.S. energy consumption. Buildings additionally contribute to heat island effect, nearly 40% of the nation’s total carbon dioxide emissions, 70% of electricity use, 66% of solid waste from construction and demolition, water waste, soil erosion, and many other environmental problems. It is important for institutions of higher education to be at the forefront of efforts like green building because they influence the way our culture values green building. In terms of the environment, greener university building operations help decrease carbon emissions and other negative effects of buildings. As educational institutions, the universities can cultivate a sense of sustainability and environmental awareness in students. Green buildings demonstrate the principles taught in the classroom and the buildings themselves can be used as teaching and research tools. Green buildings with enhanced indoor air quality and access to daylight and views have been shown to enhance employee and student health and productivity.

The Big Ten Green Building report is divided into four sections: (1) Background, (2) Green Building Commitments, (3) LEED Certified Projects, (4) Best Green Building Practices; and (5) Conclusion. The full report can be found on the IUOS LEED/Green Building Oncourse site.

The Big Ten
The Big Ten Green Building Comparison Report compared and contrasted Big Ten green building efforts. There is quite a bit of competition between the schools, and they often use one another as metrics for evaluating progress. Currently, there are 12 Big Ten member schools, but the report also included two schools that will be joining the Big Ten Conference in 2014: University of Maryland and Rutgers University.

\[\text{Source: } \text{http://www.epa.gov/greenbuilding/pubs/gbstats.pdf; page 2}\]
Background

Green Building Defined
According to the Environmental Protection Agency (EPA), green building is “the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building’s life-cycle from siting to design, construction, operation, maintenance, renovation, and deconstruction.”³ Green building practices complement classical building design concerns of “economy, utility, durability, and comfort.”⁴ Synonyms for green building include: sustainable building, sustainable development/design, natural building, or green architecture.

Green buildings are a part of what is called the “built environment;” the built environment, the human-made surroundings that provide the setting for human activity (buildings, parks, neighborhoods, etc.), impacts our natural environment in many ways. While some of these impacts are positive, like increased activity from tourism and creation of centers of economic activity, many impacts have negative effects on humans and the natural world.⁵ Green buildings combat and prevent the negative effects of the built environment. A well-designed green building can reduce overhead costs, conserve energy, reduce the use of raw materials, and create healthier environments for people to live and work, as a result of higher quality air, natural daylight, and thermal comfort.⁶

What is LEED?
In 2000, USGBC developed the LEED (Leadership in Energy and Environmental Design) green building certification system; LEED is a voluntary, consensus-based, national certification system for developing high-performance, sustainable buildings.⁷ It provides building owners with a framework for identifying and implementing practical and measurable green building design, construction, operations, and maintenance solutions.⁸ LEED is flexible enough to address all buildings types: new construction, commercial interiors, core and shell, operations and maintenance, homes, neighborhoods, and specific applications such as retail, multiple buildings/campuses, schools, healthcare, laboratories, lodging, etc.⁹

This system, a point-based rating system, rewards commercial, institutional, and residential projects for “stellar environmental and health performance.”¹⁰ LEED has become an extremely popular metric system within the green building industry; as of the end of 2008, more than 269.2 million square feet of commercial space was LEED certified.¹¹ According to FacilitiesNet, a site dedicated to facility and maintenance

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³ http://www.epa.gov/greenbuilding/pubs/about.htm 5/22/2013
⁴ http://www.epa.gov/greenbuilding/pubs/about.htm 5/22/2013
⁵ http://www.epa.gov/greenbuilding/pubs/about.htm 5/22/2013
⁶ http://buildgreen.co.nz/definition.html 5/22/2013
⁷ http://www.usgbc.org/Docs/Archive/General/Docs4896.pdf p. 3
⁸ http://greenwisestrategies.com/sustainability-leed/what-is-leed
⁹ http://www.usgbc.org/Docs/Archive/General/Docs4896.pdf p. 3
¹⁰ http://www.usgbc.org/about/history 5/24/2013
¹¹ http://www.usgbc.org/Docs/Archive/General/Docs4896.pdf p. 6
management, “A project can certainly be green without being LEED certified, but if public recognition and acceptance of a project’s green building credentials are desired, LEED has become the consensus standard.” In this sense, LEED has become a valued and reliable standard for successful green building.

The LEED certification system offers four certification levels: Certified, Silver, Gold, and Platinum. These certification levels correspond to the number of points a building project earns during the course of certification.

To organize the point system, LEED offers six main credit categories where buildings can achieve points towards certification.

Table 1: LEED Credit Categories

<table>
<thead>
<tr>
<th>Credit Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Sites</td>
<td>Encourages strategies that minimize the impact on ecosystems and water resources</td>
</tr>
<tr>
<td>Water Efficiency</td>
<td>Promotes smarter use of water, inside and out, to reduce potable water consumption</td>
</tr>
<tr>
<td>Energy &amp; Atmosphere</td>
<td>Promotes better building energy performance through innovative strategies</td>
</tr>
<tr>
<td>Materials &amp; Resources</td>
<td>Encourages using sustainable building materials and reducing waste</td>
</tr>
<tr>
<td>Indoor Environmental Quality</td>
<td>Promotes better indoor air quality and access to daylight and views</td>
</tr>
<tr>
<td>Innovation in Design/Operation**</td>
<td>BONUS CREDIT**: Addresses sustainable building expertise as well as design measures not covered under the five LEED credit categories</td>
</tr>
</tbody>
</table>

---

15 http://www.usgbc.org/leed/rating-systems
Within each of the LEED credit categories, projects must satisfy credit category prerequisites and earn points.\textsuperscript{16} The number of points a building project earns then determines its level of LEED certification.\textsuperscript{17}

\textbf{Why LEED?}

There are many reasons that a university, or any building owner, would want to construct a LEED certified building. Green buildings, specifically LEED certified buildings, are designed to reduce harmful greenhouse gas emissions, conserve energy, reduce water consumption, reduce waste sent to landfills, improve indoor air quality, and help make better building material choices.\textsuperscript{18} These benefits in turn help develop healthier and safer buildings for occupants.\textsuperscript{19} Building owners are required to use performance analysis systems, which helps building owners manage the building throughout its entire lifecycle. Additionally, these procedures allow building owners to measure the ongoing performance of the building, ensuring that energy, water, and cost savings are realized.\textsuperscript{20}

Because LEED is a third-party certification system, LEED buildings are less likely to appear to be “green washing” or “green marketing” stunts, as they have been evaluated by a neutral party.\textsuperscript{21} A commitment to LEED demonstrates an owner’s commitment to environmental stewardship and social responsibility.\textsuperscript{22} Other benefits from a business perspective include reduced overhead costs, increased property values, faster lease-up rates, tax rebates, and zoning allowances.\textsuperscript{23}

Last, but not least, LEED project developers must consider external factors like site placement within the pre-existing community, which helps create compact and walkable communities with good access to neighborhood amenities and transit.\textsuperscript{24} LEED principles protect natural resources and farmland by encouraging growth to be located in areas with existing infrastructure.\textsuperscript{25}

\textbf{Commitment to Green Building/LEED Standards}

All fourteen Big Ten schools have made a commitment to green building standards; additionally, all schools (except Purdue) have opted to use the LEED rating system to define green building standards. Further, most schools have pledged a commitment to new construction and renovation meeting LEED Silver certification requirements or higher. The University of Illinois Urbana-Champaign has set the highest LEED certification goals of Gold; the University will most likely be the forerunner for Big Ten Green Building, as the school will be elevating its LEED certification requirement to Platinum for all new construction and renovations in 2015. Michigan State University, Northwestern University, and Pennsylvania State University have the lowest LEED certification goals by requiring the lowest LEED certification level: certified. For a more in-depth look at each University’s commitment to Green

\textsuperscript{16} http://www.usgbc.org/leed/rating-systems
\textsuperscript{17} http://www.usgbc.org/leed/rating-systems
\textsuperscript{18} http://www.usgbc.org/leed/rating-systems
\textsuperscript{19} http://greenwisestrategies.com/sustainability-leed/what-is-leed
\textsuperscript{20} http://www.usgbc.org/leed/why-leed
\textsuperscript{21} http://www.usgbc.org/leed/why-leed
\textsuperscript{22} http://greenwisestrategies.com/sustainability-leed/what-is-leed
\textsuperscript{23} http://www.usgbc.org/leed/why-leed
\textsuperscript{24} http://greenwisestrategies.com/sustainability-leed/what-is-leed
\textsuperscript{25} http://greenwisestrategies.com/sustainability-leed/what-is-leed
Building, see the full Big Ten Green Building Comparison Report. The table below maps each school’s LEED standard; the table also maps each schools’ commitment to actual certification of the buildings or commitment to meeting LEED standards but not pursuing certification (“certifiable”).

**Table 2: Big Ten LEED Commitment**

<table>
<thead>
<tr>
<th>University</th>
<th>Current LEED Standard?</th>
<th>Certified/Certifiable Requirement?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois</td>
<td>Gold</td>
<td>Certified</td>
</tr>
<tr>
<td>Indiana</td>
<td>Silver</td>
<td>Certified</td>
</tr>
<tr>
<td>Iowa</td>
<td>Silver</td>
<td>Certified</td>
</tr>
<tr>
<td>Maryland</td>
<td>Silver</td>
<td>Certified</td>
</tr>
<tr>
<td>Michigan</td>
<td>Silver</td>
<td>Certified</td>
</tr>
<tr>
<td>Michigan State</td>
<td>Certified</td>
<td>Certifiable</td>
</tr>
<tr>
<td>Minnesota</td>
<td>Silver</td>
<td>Certifiable</td>
</tr>
<tr>
<td>Nebraska</td>
<td>Silver</td>
<td>Certifiable</td>
</tr>
<tr>
<td>Northwestern</td>
<td>Certified</td>
<td>Certified</td>
</tr>
<tr>
<td>Ohio State</td>
<td>Silver</td>
<td>Certified</td>
</tr>
<tr>
<td>Penn State</td>
<td>Certified</td>
<td>**Other</td>
</tr>
<tr>
<td>Purdue</td>
<td>Silver</td>
<td>**Other</td>
</tr>
<tr>
<td>Rutgers</td>
<td>Silver</td>
<td>Certified</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>Silver</td>
<td>**Not Yet Confirmed</td>
</tr>
</tbody>
</table>

**Big Ten LEED Standards**

**Big Ten Commitment to LEED Certification**
LEED Buildings
This section reports on the number of LEED certified buildings each Big Ten member school has on its campus. As of the summer of 2013, there are approximately 52 LEED certified buildings in the Big Ten Conference. 6% of the buildings are LEED Platinum; 42% of the buildings are LEED Gold; 48% of the buildings are LEED Silver; 4% of the buildings are LEED certified (See Table 6).

Below, the bar chart represents the number of LEED certified buildings at each university (See Table 7).
Conclusion

This chart compares LEED certified building progress. Pennsylvania State University has the most LEED certified buildings with 8 buildings. The University of Iowa comes in a close second, with 7 certified buildings. The University of Iowa also has the most Platinum buildings on its campus (2 Platinum buildings) and the most Gold buildings on its campus (5 Gold buildings). For a more in-depth look at each University’s Green Building achievements, see the full Big Ten Green Building Comparison Report.

External Forces Affecting Green Building Efforts
Many forces may have an impact on a school’s sustainability culture and attitude towards green building. This section will identify two external factors that may have an influence on the LEED certification requirements and LEED building progress: (1) State legislation and (2) American Colleges President Climate Change.

State Legislation
There has been a recent trend across the United States for the executive and legislative branches to require LEED certification (or a similar certification) for new construction and renovations on governmentally funded buildings. As 13 out of the 14 Big Ten schools are publically funded universities, an executive order or new legislation requiring LEED certification would also impact the university. The chart below lists political action taken to require LEED certification for state funded buildings.

<table>
<thead>
<tr>
<th>School</th>
<th>State</th>
<th>State LEED Policy</th>
<th>LEED Certification Required</th>
<th>Applies to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois</td>
<td>IL</td>
<td>Yes</td>
<td>Certified</td>
<td>New state construction and major renovations must seek applicable LEED Green Globes, or equivalent certification and achieve highest level of certification possible given budget limitations</td>
</tr>
<tr>
<td>Indiana</td>
<td>IN</td>
<td>Yes</td>
<td>Silver</td>
<td>All new state buildings/renovations</td>
</tr>
<tr>
<td>Iowa</td>
<td>IA</td>
<td>No</td>
<td>---------------------------</td>
<td></td>
</tr>
</tbody>
</table>
Currently, a little over half of the Big Ten universities (~64%) have some type of state order, requiring the university to meet LEED certification requirements.

**American College & University President’s Climate Commitment**

A second external factor that may be influencing green building practices in the Big Ten Conference is the American College and University President’s Climate Commitment (ACUPCC). The focus of the commitment is to reach carbon-neutrality/climate-neutrality as soon as possible. However, the Climate Commitment also includes a requirement that a signatory “establish a policy that all new campus construction will be built to at least the U.S. Green Building Council’s LEED Silver standard or equivalent.”

So far, only four Big Ten schools have signed the ACUPCC: the University of Illinois at Urbana-Champaign, the University of Minnesota, Ohio State University, and the University of Maryland. Indiana University has also included ACUPCC language and requirements in its *Campus Master Plan*, but has not signed to commitment.

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27 [http://www.presidentsclimatecommitment.org/about/commitment](http://www.presidentsclimatecommitment.org/about/commitment)

28 [http://www.presidentsclimatecommitment.org/about/commitment](http://www.presidentsclimatecommitment.org/about/commitment)
Best Practices

Best Big Ten Practices
This section will explore some of the best practices that I have observed while exploring Big Ten green building sites and resources.

Effective Website
Overall, I was able to find the most information about green building, LEED commitments, and LEED buildings from schools that had well-developed green building webpages. A well-developed green building page clearly identifies and defines green building policies, commitments, and past work. A well-developed green building page also should be easy to find by using simple key word searches in Google or another search engine. For example, the University of Iowa’s green building webpage is easily located online and clearly lays out the University’s commitment to LEED; the webpage also provides information about LEED certified projects.29

LEED Customization
Another best practice was Pennsylvania State University’s LEED Policy 2011 Update.30 The Update “prioritizes the implementation of sustainable elements in the design of University facilities.”31 The document customizes the LEED Process for Penn State and helps all parties involved understand and focus on issues that are most important to the University. The Update classifies LEED credits into the following divisions:

<table>
<thead>
<tr>
<th>Division</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandatory</td>
<td>• “credit compliance is required on all Penn State University construction projects. Credits may be inherently achieved through current campus layout, location of new construction, or typical OPP construction methodology. However, if not already present, credit achievement must be completed prior to project completion.”</td>
</tr>
<tr>
<td>Significant Effort</td>
<td>• “proof of serious attempts at credit achievement must be completed and proven to reviewing OPP personnel. If compliance is not achieved, failure reasoning must be demonstrated by design professional and accepted by the Pennsylvania State University.”</td>
</tr>
<tr>
<td>Minimal Effort</td>
<td>• “Investigation of possible credit compliance must be completed and approved by the Pennsylvania State University. If credit requirements are beyond a project’s programmatic requirements, documentation must be completed; however, no additional efforts or resources will be dedicated towards it.”</td>
</tr>
<tr>
<td>Not Pursued</td>
<td>• “credits will not be pursued on Penn State University construction projects and documentation will not be required.”</td>
</tr>
</tbody>
</table>

---

30 [https://stars.aashe.org/media/secure/70/2/33/255/PSU_LEED_Policy_2011[1].pdf](https://stars.aashe.org/media/secure/70/2/33/255/PSU_LEED_Policy_2011[1].pdf); See also: [http://www.opp.psu.edu/planning-construction/design_and_construction_standards/standards-and-forms](http://www.opp.psu.edu/planning-construction/design_and_construction_standards/standards-and-forms)
31 [https://stars.aashe.org/media/secure/70/2/33/255/PSU_LEED_Policy_2011[1].pdf](https://stars.aashe.org/media/secure/70/2/33/255/PSU_LEED_Policy_2011[1].pdf)
Penn State then classifies each credit as mandatory, significant effort, minimal effort, or not pursued.\textsuperscript{32} The University of Illinois has also created a credit classification system, although Illinois only identifies required prerequisites and required credits.\textsuperscript{33}

\textit{Process Guidelines}

Ohio State University has extensive green building policies in place to help all parties involved comply with Ohio State University building requirements.\textsuperscript{34} Ohio State University has developed standard process guidelines for use when moving through each step of the LEED process.\textsuperscript{35} The LEED process guidelines (long version) divides the LEED process into five stages: (1) Planning/Project Team election; (2) Schematic Design; (3) Design Development; (4) Construction Documents/Bidding; and (5) Construction Administration; within each stage, Ohio State University has described what activities must be accomplished and who must accomplish those activities.\textsuperscript{36} Ohio State University also offers this information graphically via the “LEED Certification Matrix."\textsuperscript{37} Last, Ohio State University has created a list of credit with required signatories to help parties understand who is responsible for signing off on certain credits.\textsuperscript{38}

\textit{Best Practices -- Outside of the Big Ten}

Perhaps the most widely known college-level green building initiative is the Harvard Green Building Resource. The resource is divided into 6 parts: (1) Green Building Standards; (2) Implementation Tools; (3) Case Studies; (4) LEED Submittals; (5) Green Building Services; and (6) Links. This report will focus on (1) Green Building Standards; (2) Implementation Tools; (3) Case Studies and LEED Submittals.

\textit{Green Building Standards}

The Green Building Standards section of the website outlines the Harvard Green Building Standards and includes a Green Building Standards Deliverables Checklist.\textsuperscript{39} The Checklist is designed to be a cover sheet to be used when submitting Harvard Green Building Standards documentation and helps ensure that no documentation is forgotten.

\textit{Implementation Tools}

The Implementation Tools section of the website has seven components: (1) Integrated Design; (2) Design Phase Guide; (3) LEED Roadmap; (4) Specifications; (5) Energy Modeling; (6) Life Cycle Costing; and (7) OPR and RFP Language. The most helpful tool is the LEED Roadmap, which is divided into the main LEED credit categories. For example, if a user were to click on “Sustainable Sites,” he/she would be directed to a page that details the recommended approach to take for the credit at each phase of the

\begin{flushright}
\small
\begin{tabular}{l}
\textsuperscript{32} \url{https://stars.aashe.org/media/secure/70/2/33/255/PSU_LEED_Policy_2011[1].pdf}  \\
\textsuperscript{33} \url{http://cfapps.fs.illinois.edu/2010Standards/I.%20General%20Requirements/LEED%20Requirements.PDF}; see also: \url{http://www.fs.illinois.edu/facilitiesstandards/generalrequirements.htm}  \\
\textsuperscript{34} \url{http://fod.osu.edu/ess/}; \url{http://www.busfin.ohio-state.edu/FileStore/PDFs/310_InterimGreenBuildandEnergy.pdf}  \\
\textsuperscript{35} \url{http://fod.osu.edu/bds/App_X.pdf}  \\
\textsuperscript{36} \url{http://fod.osu.edu/leed/process-guideline_long.pdf}; \url{http://fod.osu.edu/leed/process_guideline_short.pdf}  \\
\textsuperscript{37} \url{http://fod.osu.edu/leed/matrix.pdf}  \\
\textsuperscript{38} \url{http://fod.osu.edu/leed/credits_regd_signatories.pdf}  \\
\textsuperscript{39} \url{http://green.harvard.edu/theresource/building-standards}
\end{tabular}
\end{flushright}
Additionally, Harvard has included recommended responsibilities for involved parties. See chart below for an example:

<table>
<thead>
<tr>
<th>Design Phase</th>
<th>Recommended Approach: Activities</th>
<th>Recommended Approach: Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conceptual Design</td>
<td>Analyze soil and stormwater flow to outline a plan for erosion and sedimentation control.</td>
<td>Geotechnical or Civil Engineer</td>
</tr>
<tr>
<td>Design Development/Construction documents</td>
<td>Create the construction activity pollution plan per SS8-1 requirements. Include in construction documents and specifications.</td>
<td>Civil Engineer</td>
</tr>
<tr>
<td>Construction</td>
<td>Review and implement plan per construction documents and specifications. Log and photograph erosion and sedimentation control measures during construction. Sign off on LEED Letter Template and provide submittal requirements.</td>
<td>Contractor</td>
</tr>
<tr>
<td>Construction</td>
<td>This credit is part of the Construction Submittal and should be submitted to the USGBC at the end of the project.</td>
<td>OFS or LEED consultant</td>
</tr>
</tbody>
</table>

**Case Studies and LEED Submittals**

These two webpages detail all Harvard LEED projects, including those in progress and those completed. The Case Studies page offers a picture of the LEED project, a project summary, basic highlights, and a link to a more detailed case study. The LEED Submittals page offers a more technical break down of the points each LEED certified project earned. Additionally, the page offers a listing of the buildings in progress, the building’s potential LEED Rating, and the credits the project will be trying for. Last, the LEED Submittals page identifies the documentation of each credit. See the screenshot below:

---

40 [http://green.harvard.edu/theresource/new-construction/design-element/sustainable-sites](http://green.harvard.edu/theresource/new-construction/design-element/sustainable-sites)
41 [http://green.harvard.edu/theresource/new-construction/design-element/sustainable-sites](http://green.harvard.edu/theresource/new-construction/design-element/sustainable-sites)
42 [http://green.harvard.edu/theresource/case-studies](http://green.harvard.edu/theresource/case-studies)
43 [http://green.harvard.edu/theresource/leed-submit/nc](http://green.harvard.edu/theresource/leed-submit/nc)
44 [http://green.harvard.edu/theresource/leed-submit/nc](http://green.harvard.edu/theresource/leed-submit/nc)
45 [http://green.harvard.edu/theresource/leed-submit/nc](http://green.harvard.edu/theresource/leed-submit/nc)
### Conclusion – Looking to the Future and Staying Competitive

To reduce energy consumption and associated costs and emissions impacts, Indiana University must implement some of the best practices observed through my research. My observations of the Best Practices from peer Big Ten Universities and universities external to the Big Ten network fueled my work for creating the Green Building webpage and the streamlined certification process initiatives.

### Part II – Green Building Webpage

#### Introduction

While researching for the Big Ten Green Building Comparison Report, it became apparent to me that a green building webpage is crucial for any university. From my research for the Big Ten Green Building Comparison report, I have learned that the best green building pages offered a variety of easily-accessible information: from how the school defines green building, its university standards, to building projects and progress.

#### Process

I began the process of making a green building website for Indiana University by looking at peer schools to gauge what content was pertinent for such a website. I focused my research on the Big Ten Network (including the University of Maryland and Rutgers), but also researched high-achieving outliers – like Harvard University and the University of Florida. Once I had collected a garden-variety list of elements I would like to feature on IU’s green building webpage, I met with Jessica Plassman at the IU Office of Sustainability for help. She helped me turn general ideas into concrete, achievable goals. After meeting with Jessica, I spent several days developing the content for the website and uploading resources.

#### Content


#### Background

The first category that I worked on for the website was the Background information. The Background page features the following sections: Green Building Defined, What is LEED?, IU’s Green Building Commitment; and Why Commit to LEED & Green Building. The purpose of the Background section is to educate website users about Green Building and the LEED rating system. It also aims to teach users about Indiana University’s commitment to green building design.

<table>
<thead>
<tr>
<th>Green Building Background</th>
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<tbody>
<tr>
<td><strong>Green Building Defined</strong></td>
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<td>According to the Environmental Protection Agency (EPA), green buildings are the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building’s lifecycle from site development, construction, operation, maintenance, renovation and deconstruction. Green building practices complement classic building design concerns of economy, utility, durability, and comfort.</td>
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<thead>
<tr>
<th>Green Building Projects</th>
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<td>Green Building Projects are part of strategies to &quot;build environment&quot; the built environment, the human-made surroundings that provide the setting for human activity (buildings, parks, neighborhoods, etc.), impacts our natural environment in many ways. While some of these impacts are positive, like increased activity from tourism, and creation of centers of economic activity, many of the impacts of the built environment have negative effects on humans and the natural world.</td>
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<tr>
<th>ASPECTS OF BUILT ENVIRONMENT</th>
<th>CONSUMPTION</th>
<th>ENVIRONMENTAL EFFECTS</th>
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<tr>
<td>Land</td>
<td>Energy</td>
<td>Water</td>
</tr>
<tr>
<td>Environment</td>
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Creating the content for this page was relatively easy because most of the content was identified during my research for the Big Ten Green Building Comparison report. This section of the website was a good place to start because most of the content was already developed, meaning I could spend my time adjusting to the WCMS website and format. The challenges of creating the Background information section was choosing a layout that would not be overwhelming or hard to navigate. Jessica and I chose a Tier 2 layout, which means that all of the content is displayed on one page, but there is a navigation bar at the top of the page to allow the webpage user to jump to any subsection of the Background page.

**Green Building Projects**
The second category completed was the Green Building projects page. The purpose of this page is to provide information about the LEED certified buildings on all IU Campuses. This page links to individual building pages, which contain building pictures, rating level achieved, highlights, and links to more information. The biggest challenges for this page were locating high-quality pictures of the buildings and locating pertinent information for the project’s summary and highlights sections. However, once these challenges were addressed, the pages were relatively easy to create.

**IU LEED Toolkit**
The third category completed was the IU LEED Toolkit page. The purpose of this page is to educate website users about completed LEED projects and in-progress LEED projects; additionally, the page provides sample LEED submittal templates from previous projects. This page is intended to be a resource for consultants and contractors to view what LEED credits IU has previously achieved.

This page was the hardest page to create because it required aggregating massive amounts of data. Additionally, uploading and linking PDFs to the webpage is an extremely time-intensive process. I spent the majority of my website time on this page.
IU LEED Map
The fourth category of the webpage, the LEED Map, is an interactive map of all certified and in progress LEED buildings on all Indiana University campuses. This page has little content but is aimed at providing an additional way to interact with IU’s green buildings and the IUOS website. The page was created with Google maps and should be easy to update.

Problem Areas and Concerns
One of the biggest challenges for the green building webpage will be that it requires frequent updates. As projects become certified, an intern (or member of the IU Office of Sustainability) will need to create new pages for the website, update pre-existing information, locate pictures of LEED projects, etc. The information on the website is very interconnected, meaning that making changes to one page will most likely lead to changes needed on other pages.

A problem that I encountered while working on the webpage was when I uploaded PDFs to the LEED Toolkit. There is an error in the way the PDFs are previewed online; for example, some of the PDFs when viewed online, appear as blank forms (instead of the filled out forms that were uploaded to the website). However, when the PDFs are actually downloaded to a user’s computer, they appear correctly. Over the summer, I spoke with Jessica Plassman, University Information Technology Services, and someone from the Harvard Green Building Team. The way the PDFs are formatted when downloaded from LEED Online makes them impossible to save as an image file or save as a regular PDF. Therefore, for now, I need to add a caveat on the website explaining the problem. I will try to contact LEED Online support to ask for their help later in the summer or during the next semester.

A final problem is that there is some concern from the University Architect’s Office that by publishing all of the documents that are uploaded to the USGBC with the LEED credit template submittal to the Green Building webpage some consultants may simply copy information for the next project. Additionally, the University Architect’s Office highlighted that some information uploaded to the USGBC is too
voluminous and project specific to be useful for future projects. In response, I removed some content from the LEED Toolkit; however, future interns must be aware of the sensitivity of some information that is included in LEED project submittals and seek appropriate guidance from the University Architect’s Office, as well as members of the Office of Sustainability.

**Future Growth**
In the future, a direct link to the website would be very helpful. Eventually, it would be useful for the green building webpage to be connected to the University Architects Office’s website and the Vice President of Capital Planning and Facilities’ website as well.

Also, as LEED rating systems evolve and develop, the website will most likely need to change to keep up-to-date. Additionally, the only LEED buildings information that are currently posted on the website are all from LEED NC v 2.2 and the website will need to adjust subtly to incorporate information from LEED NC v 2009, as well as LEED v 4 (when that system is premiered).

**Part III – Streamlined Certification Process**

**Introduction / the Problem Defined**
While the internship had three objectives, the main focus of the internship was to identify current obstacles that prevent or hinder IU building projects from achieving LEED certification. After common obstacles had been identified, I was to recommend streamlining initiatives that would increase certification efficiency and standardize the processes necessary for successful LEED projects.

While researching for the Big Ten Green Building Comparison Report, I identified several best practices from other universities that aided the LEED certification process. Universities like Harvard University and the University of Florida, which have over 50 and 30 LEED buildings certified, respectively, have well-defined LEED process guidelines. Both universities have completely assimilated LEED certification goals into university capital and facilities planning processes. To achieve the level and ease of LEED certification that Indiana University desires, the university must rework construction guidelines and standards to include LEED goals.

**Identified Initiatives**
During the course of my research, I identified three main ways in which Indiana University can improve the LEED certification process: (1) modified construction contracts; (2) updated process guidelines; and (3) a clarified responsibility matrix.

**Construction Contracts**
The first way that Indiana University can streamline the LEED certification process is by modifying current construction contracts. IU currently makes contractual agreements with many parties in the construction process: architects, engineers, commissioning consultants, construction manager, etc; however, as the contracts currently stand, there is no mention of LEED or green building aspirations. Because of this, parties to the construction process may not be aware of LEED certification goals until
the construction process has already begun. The University of Florida has included LEED language in construction contracts; Indiana University can do the same to make LEED goals more explicit. Further, adding green building language to the contracts will give the University more certainty that LEED certification goals will be met, as required by Indiana’s Executive Order and the Campus Master Plan.

During my internship, I created two sample, modified contracts as representations of language that Indiana University could adopt to construction contracts. First, the university could add contract language that highlights the university’s expectation that the construction professional “work with Owner to pursue Owner’s goal, if any, of a Leadership in Energy and Environmental Design (LEED) certification for the Project.” This language will illustrate the university’s commitment to green building achievement and force the construction professional to make a public, written commitment to LEED certification. Second, the university could add contract language that explicitly states the construction project’s LEED certification goals. Sample contracts can be found on the IUOS LEED/Green Building Oncourse site.

Process Guidelines & Responsibility Matrix
The second way that Indiana University can streamline the LEED certification process is by creating/updating construction process guidelines. Both the University of Florida and Harvard University have created extensive construction process guidelines that highlight LEED requirements and expectations. In a similar fashion, I created LEED process guidelines, which outline green building expectations throughout the entire construction process from (1) Pre-Design, (2) Design, (3) Construction, and (4) Operations Maintenance. Additionally, I created a LEED responsibility matrix, which displays the content of the LEED process guidelines in a graphical version. More explicit LEED Guidelines have the great potential to increase the success and efficiency of the LEED certification process at Indiana University because all parties to the construction process will be aware of LEED certification expectations at the beginning of the construction process. The LEED Guidelines can be found on the IUOS LEED/Green Building Oncourse site.

Recommendations
I recommend that the next intern meet with key players in the University Architect’s Office and the Vice President of Capital Planning and Facilities Office to initiate a dialogue about the documents I have created to streamline the certification process. An open dialogue will be crucial for the successful implementation of these documents because without cultural acceptance, the documents will most likely fail to be implemented. I also recommend meeting with consultants and contractors to hear their opinions on the usefulness of the documents.

Final Conclusion
Summary
In conclusion, I believe that this internship has been largely successful. I started the internship with three goals: create a Big Ten Green Building Comparison Report, create a working LEED webpage on the IUOS website, and recommend streamlining initiatives. I accomplished much of the work that I intended
to accomplish this summer. The Big Ten Green Building Report was very informative; additionally, while researching for the report information, I became aware of many green building “best practices” which led to more effective ideas for the website and streamlining efforts. While the website needs a few modifications, it is workable and useful. Further, while the streamlined LEED certification process documents have not yet been adopted to Indiana University’s constructions standards, they have been created.

**Overall Recommendations and the Future of LEED Internships at IUOS**

I believe there is enough work for another LEED internship through the IUOS. I would recommend that in the next internship, the intern work on further developing the website (i.e., fixing the PDF problems, updating the LEED Toolkit, etc.) and work on persuading Indiana University to adopt LEED process guidelines and LEED language into construction contracts. Additionally, in the next internship, the intern should work on developing a relationship with the USGBC Students group at IU; a strong relationship with this group could potentially result in the high quality, in-depth case studies that IU currently does not have for its LEED certified buildings.

Moreover, the next intern could work on developing a Green Building Policy, possibly in conjunction with an intern from the University Architect’s Office. The Green Building Policy would differ from LEED Process Guidelines because it could focus more on the technical expectations of Indiana University. For example, Ohio State University adopted a Green Building Policy, which mandates certain life cycle costs analyses to be performed, minimum ASHRAE standards to be achieved, required/university mandated LEED credits to be earned, etc. Also, Pennsylvania State University created the LEED Policy Update, which ranks the University’s commitment to each LEED credit, further defining the University’s green building goals. Some combination of these best practices could further help streamline the LEED certification process at Indiana University by making expectations very clear.

In the more distant future, I believe that an intern could work on persuading Indiana University to adopt a commitment to increasing the number of LEED accredited professionals on campus. Additionally, an intern could work on creating educational opportunities for employees interested in achieving accreditation at both the University Architect’s Office and the Vice President of Capital Planning and Facilities’ Office. Such opportunities are already offered to students on campus. Last, policy could be written (and adopted) which considers LEED accredited professional certification and continuing education when determining merit-based pay increases.