Sustainabiliity

IIT Campus Sustainability Plan

2010–2020

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www.iit.edu/campus_sustainability

ILLINOIS INSTITUTE OF TECHNOLOGY

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IIT President John Anderson's first President's Letter from IIT Magazine Fall 2007

Sustainability

I am confident that I will fit in well at IIT: I am getting rid of one of my cars.

For me, this decision answered questions of both need and want—specifically, do I need two cars in the city, and do I really want the hassle of owning two cars while living downtown?

In academe, issues such as sustainability have a tendency to unite the needs and wants, bringing together those who pursue research for the benefit of society and those who explore the same topics for the benefit of science.

Many of our students and faculty are exploring sustainability through their work because they want to improve the environment. They are now joined by millions of people for whom the term "going green" has become a cultural phenomenon. While improving technology may be a positive residual, theirs is a motivation to ignite change in society, and a mountain of statistics supports the need. Through their work, they will educate and persuade others to take part in this movement; the IIT Green Home [page 6] and Cool Globes [page 4] projects are two such examples.

On the other end of the spectrum are those who are responding to a shift in the needs of the market and of science. As consumers increasingly demand eco-friendly products—cars, fuels, building materials, food, and clothing—the science behind and design of these goods in many cases require a shift in technology. Having identified a need, these researchers want to be on the cutting edge of advancements, indeed changes, in this exciting area of research. For someone like alumna Susan Solomon [page 30], research that may yield environmental ramifications is not a matter of politics but of science.

Ultimately the reasons for the pursuit are not as important as the determination to take on the challenges that this pursuit inevitably presents. The challenges are many. Can greener technologies be more cost effective than current technologies? What are the costs versus benefits in the relationships between energy and green technologies? How is the public culture shifted toward greener technologies, for example hybrid-powered vehicles, when the economics are not persuasive in today's world? How does the United States become a role model for the entire world in sustainability?

At IIT a determination—call it attitude, spirit, or ambition—to explore these questions and others like them is rooted in a strong passion for both learning and seizing challenges. The university is united in its determination to create change, no matter how disparate the reasons for pursuing it may be. IIT's tenacity is infectious, and certainly played no small part in my decision to go to a one-car household.

On a fundamental level, the want and need to pursue sustainability both lead to the same outcome—to leave the world for our children in the same or better condition than we inherited it. This is an important part of the IIT mission, one that has already affected me and no doubt countless others in both societal and scientific contexts. Thank you for welcoming me into the IIT community and for giving me the opportunity to share this bold mission with you.

Sincerely,

John L. Anderson

Campus Sustainability Vision

Illinois Institute of Technology is proud of its leadership position in university sustainability. Our national strength in the sciences, engineering, psychology, architecture, design, law and business provide a powerful coalition of faculty, staff and students to develop sustainability initiatives. These new initiatives will be technically sound, environmentally responsible and economically justified.

The university strategic plan sets forth five strategic priorities:

- **Distinctively define the IIT graduate**
- **Increase the impact of IIT's research by focusing on interdisciplinary themes**
- **Promote innovation and excellence throughout the university**
- **Elevate engineering's reputation to international stature**
- **Improve the financial strength of the university**

Financial strength is a fundamental prerequisite to sustainability and our initiatives will support the overall university financial strategy. The plan is broad, aggressive and promotes innovation and excellence. As we move forward to implement the plan and learn from our efforts, these commitments and goals will be adjusted as we have successes or even a few failures. What is important is the commitment to the vision.

"IIT will become the most sustainable urban, university campus in the United States."

Alan W. Cramb
Provost

John P. Collins
VP, Business and Operations

Introduction

For over a decade, colleges and universities have attempted to address the concept of sustainability from both the point of view of curriculum and operations. The Illinois Institute of Technology supports and encourages change, especially those that come from the innovative ideas of our strong faculty, students and staff. The question remains how IIT sifts through the myriad ideas and focuses change to the greatest, and most immediate, benefit of the community, the environment and the world.
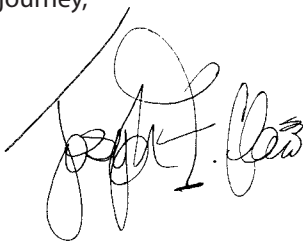
Beginning with the challenge laid down by President Anderson in his first official letter to the university community, IIT has taken decisive steps towards making the university a more sustainable enterprise. Although these changes have occurred in both the academic and administrative arenas, this plan focuses on the campus operations. Six months after the president's challenge, IIT formed the Office of Campus Energy and Sustainability, and within three months, IIT hired its first Director of Campus Energy and Sustainability. From that time in 2008 until now, the university has undergone a deliberate and exhaustive planning process to develop and document a Campus Sustainability Plan by which IIT can achieve its Sustainability Vision.

The university could not develop this plan without countless hours of dedication and hard work from students, faculty and staff. Through Campus Sustainability Forums, committee meetings, planning sessions and hours of research, the members of the IIT community displayed the tenacity and ingenuity that have become hallmarks of the university. Sustainability requires not only the desire and ability to change, but also a critical mass of passionate individuals ready to design and implement that change.

The document that follows provides a springboard from which annual planning and resource allocation can occur. The commitments and recommendations contained herein do not represent a blueprint, but rather a guide; the plan focuses on achieving the targets knowing that technology and knowledge change rapidly, and organizations must adapt to those changes. If one element of the plan holds greater importance than the others, that distinction belongs to measurement and reporting. In order for administrators and operators to make decisions, they need reliable, honest information. If the IIT community makes changes, they will want to know that the changes resulted in tangible benefit.

This document organizes the Executive Summary into three sections: Background, Commitments, Metrics. IIT welcomes feedback and input on the implementation of this plan. Please contact the Office of Campus Energy and Sustainability at www.iit.edu/campus_sustainability. Specific action plans for each target will follow the publication of this Executive Summary, and the Office of Campus Energy and Sustainability will oversee updates to those action plans and this summary. Additionally, the Director of Campus Energy and Sustainability will oversee production of an annual report to the IIT community on the progress against the plan.

Enjoy the journey,

Joseph F. Clair, P.E., MSME '95
Director of Campus Energy and Sustainability

Acknowledgements

Special thanks goes out to the following individuals for their support and counsel during the creation of this Campus Sustainability Plan:

IIT administration, notably
> John Anderson, President of IIT
> Alan Cramb, Provost of IIT
> John Collins, Vice President for Business and Operations
> Terry Frigo, Associate Vice President for Facilities, Real Estate and Construction
> Jean Bingham, Associate Vice President for Auxiliary Services

The Student Government Association

Wanger Institute for Sustainable Energy Research (WISER)
> Dr. Hamid Arastoopour, Director
> Peggy Murphy, Assistant Director

Center for Sustainable Enterprise
> Dr. George Nassos

The IIT Office of Communications and Marketing

Sodexo/IIT Dining Services
> Kelly Schaefer, Director of Campus and Conference Centers, IIT
> Wendy Surak, General Manager, Sodexo

Specific IIT Community Members Involved in the creation of the Campus Sustainability Plan: 2010-2020 (* denotes group leader)

Transportation
> Bob Anderson is in charge of intellectual property transfer and an adjunct faculty
> Tejaswi Guppata is pursuing a Master's degree in Civil and Architectural Engineering
> Bob Hoel is a Board member of State Street Village
> Adam "Cezar" Jenkins is a staff member at the Institute of Design
> Brendan Neuman is pursuing a Master's in Psychology
> *Maureen Sertich is pursuing an MBA and MS in Environmental Management and Sustainability
> Chris Tucker is pursuing an MBA

Stormwater/Landscape

Paul Anderson is a professor of Environmental Engineering and Management at IIT

Scott Beslow is a graduate student majoring in Environmental Engineering

*Amy Blaine is pursuing an MS in Environmental Management and Sustainability

Craig Colella is pursuing an MS in Environmental Management and Sustainability

Blake Davis is a professor in the Industrial Technology Management program

Peter Osler is the Director of the Landscape Architecture program in the IIT College of Architecture

John Sebby is the Campus Operations Manager in Facilities

John Stecyk is a graduate student in the Landscape Architecture program

Lei Wang is a second year graduate student in the Environmental Engineering program

Students of IPRO 326: Spring 2010 lead by Irina Papuc

Material Flow: Supply Chain/Waste Management

Olaolu Adeola is pursuing a BS in Mechanical Engineering

Frank Fiorito is the Director of Purchasing for IIT

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Green Building

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Ralph Muehleisen is a professor in the Civil/Architectural Engineering Deparment

Tommy Zakrzewski is pursuing a Master's degree in Civil and Architectural Engineering

Energy

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*Joseph F. Clair is the Director of Campus Energy and Sustainability

Ruthanna Gordon is an Assistant Professor in the College of Psychology

Amy Henson is the Communications Manager for the ECE Department

Peggy Murphy is the Assistant Director of WISER

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Emissions

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Charles Bessler is the General Manager of the IIT power plant for DTE Energy Services

*Amy Blaine is pursuing an MS in Environmental Management and Sustainability

Kyoung Choi is pursuing an MBA

Ricardo Valdez is pursuing a Bachelor's degree in Mechanical Engineering

Section I:
Background

- **Sustainability Vision for the Illinois Institute of Technology**

- **IIT Academic Entities on Sustainability**

- **Professional Organizations/Societies on Sustainability**

- **Campus Sustainability Plan and IIT Many Voices, One Vision Strategic Plan**

- **Implementing Sustainability**

Sustainability Vision for the Illinois Institute of Technology

Vision Statement

"IIT will become the most sustainable urban, university campus in the United States."

Definition of Sustainability

As a world-class institution of higher learning, IIT recognizes the critical importance of the pursuit of the university's mission—"To advance knowledge through research and scholarship, to cultivate invention improving the human condition, and to educate students from throughout the world for a life of professional achievement, service to society, and individual fulfillment."—in moving our world toward a more sustainable path. With this opportunity comes the responsibility to understand and mitigate the impact that actions of the Institute have on local and global ecology.

To support this recognition through action the Institute pledges that in all future endeavors IIT will use resources effectively in pursuit of its mission. Further, recognizing that solutions to problems and issues of the present often require thinking beyond the source that caused the problem or issue, IIT encourages collaborative research, scholarship, invention and education bringing together students, faculty and staff to develop and implement programs, systems and projects that move IIT closer to its vision at the fastest rate possible. These solutions should in all cases result from open discussion, even from dissenting views, and should maintain a wide vision of outcomes to maximize the effectiveness of IIT in serving its core mission of research and scholarship.

From this, IIT defines university sustainability as having the following aspects:

- Effective resource management, in constant pursuit of serving the Institute's core mission.

- Continuous reduction of waste and pollutants toward a goal of zero waste.

- Consideration of immediate and long-term benefits and consequences when making long-term decisions.

- Giving members of the IIT community the tools to improve their resource management in actions associated with their attendance at, or work for, the university.

IIT Academic Entities on Sustainability

President John Anderson, President's Letter Fall 2007

"At IIT a determination – call it attitude, spirit, or ambition – to explore these questions [related to sustainability] and other like them is rooted in a strong passion for both learning and seizing challenges. The university is united in its determination to create change, no matter how disparate the reasons for pursuing it may be. IIT's tenacity is infectious…

On a fundamental level, the want and need to pursue sustainability both lead to the same outcome – to leave the world for our children in the same or better condition than we inherited it. This is an important part of the IIT mission, one that has already affected me and no doubt countless others in both societal and scientific contexts."

Wanger Institute for Sustainable Energy Research

"The mission of WISER is to continue to improve the quality of life in our nation while preserving our natural resources and the environment for future generations. Fulfillment of this mission will reduce our nation's dependence on foreign energy and, at the same time, provide our nation with sufficient affordable domestic sources of clean energy."

Center for Sustainable Enterprise

"Securing a desirable present and future for all of us, our cities, our centers of enterprise, will need to become centers of 'sustainable' enterprise that can effectively merge the diverse elements of society that often compete in our traditional models. These can provide a focus on sustainability and facilitate exploration, development, testing and implementation of new enterprise models designed to protect, complement and restore the natural capital that is essential for sustainability."

WANGER INSTITUTE FOR SUSTAINABLE ENERGY RESEARCH
AT ILLINOIS INSTITUTE OF TECHNOLOGY

Professional Organizations/Societies on Sustainability

United Nations Rio Declaration on Environment and Development

"Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

The creativity, ideals and courage of the youth of the world should be mobilized to forge a global partnership in order to achieve sustainable development and ensure a better future for all."

American Society of Mechanical Engineers:

"…to an engineer, a sustainable system is one that is either in equilibrium, or one that changes slowly at a tolerable rate. In the face of limits becoming obvious today, the old industrial paradigm of unlimited growth is unsustainable, since it requires unlimited use of limited resources, and unlimited environmental capacity. Engineering conceived in those terms is also unsustainable. To achieve sustainability, there must be sustainable engineering."

Institute of Electrical and Electronics Engineers President's Sustainability Initiative

"Sustainable development is about the balanced pursuit of economic progress, environmental protection, and social equity, this last focusing on the distribution of resources and opportunities within and among human generations."

American Society of Civil Engineers Sustainability Action Plan

"A more environmentally, economically and socially sustainable natural and built environment is essential and achievable. This need and opportunity underscores civil engineers' evolving role as policy leaders, environmental stewards, and life-cycle planners. At this time, civil engineers are not perceived to be significant contributors to a sustainable world."

American Institute of Architects Committee on the Environment Mission

"COTE reflects the profession's commitment to provide healthy and safe environments for people and is dedicated to preserving the earth's capability of sustaining a shared high quality of life. The committee's mission is to lead and coordinate the profession's involvement in environmental and energy-related issues and to promote the role of the architect as a leader in preserving and protecting the planet and its living systems."

American Society of Heating, Refrigeration and Air Conditioning Engineers 2009 Fundamentals Handbook

"The far-reaching influence of the built environment necessitates action to reduce its impact.

Building environmental awareness continues to grow in communities around the world, making it even more important for the building community to get on board with and learn about this new high-performance green building standard. (ASHRAE Standard 189.1)"

American Planning Association Policy Guide on Planning for Sustainability

"There are several dimensions to the 'sustainability' issue:

1. We want to sustain communities as good places to live, and that offer economic and other opportunities to their inhabitants.

2. We want to sustain the values of our society — things like individual liberty and democracy.

3. We want to sustain the biodiversity of the natural environment, both for the contribution that it makes to the quality of human life and for its own inherent value.

4. We want to sustain the ability of natural systems to provide the life-supporting 'services' that are rarely counted by economists, but which have recently been estimated to be worth nearly as much as total gross human economic product.

A sustainable community is one that is consistent with all of these dimensions of sustainability."

American Academy of Environmental Engineers

"Sustainability is the supporting of the quality of life while living within the carrying capacity of all systems. A long term balance of environmental stewardship, economic development, and social well being must be achieved.

1. Renewable resources are not consumed faster than they regenerate

2. Non-renewable resources are replaced by renewable substitutes faster than they are depleted, and

3. Harmful substances are not released faster than they can be absorbed or rendered harmless."

American Design Council Design Principles of Environmental Stewardship

"1. Advocacy for safe products and services, 2. Protection of the biosphere, 3. Sustainable use of natural resources, 4. Reduction of waste and increase of recycling, 5. Wise use of energy, 6. Reduction of risk, 7. Sharing of information"

Campus Sustainability Plan and
IIT Many Voices, One Vision Strategic Plan

In 2009, IIT announced a five-year strategic plan for the university called "Many Voices, One Vision"; this plan refocused the university resources on academic opportunities that enhance the stature of the university. Pursuing sustainability, and meeting the challenges of that pursuit, has a direct impact on learning and education. This impact arises from the necessary goal of leaving the world for our children in the same or better condition than we inherited it. Meeting the challenges of sustainability benefits the university in so many ways, not the least of which comes from the spirit of innovation and cooperation required. Anything that brings students, faculty and staff together for a common goal benefits IIT.

Beyond this, focusing on making the campus more sustainable connects with the strategic priorities of Many Voices, One Vision:

1. **Improve the financial strength of the university**
   Improved resource management increases our financial sustainability through reductions in wasteful spending and lower risk associated with commodity pricing and regulatory uncertainty.

2. **Distinctively define the IIT graduate**
   Developing engineers who incorporate holistic thinking, multi-generational planning, and innovative problem solving into their practice will set IIT graduates apart from their peers. Implementing these elements in campus operations further distinguishes IIT graduates because of the opportunities to directly experience and apply these methods.

3. **Increase the impact of IIT's research by focusing on interdisciplinary themes**
   Opening up the campus as a living laboratory, brings together problem solvers from several disciplines and provides unique opportunities for the research performed at IIT to have immediate impact on the performance of the university.

4. **Promote innovation and excellence throughout the university**
   Creating a truly sustainable campus requires a commitment to innovation and excellence that drives the desire and justification for change.

5. **Elevate engineering's reputation to international stature**
   Meeting the challenge of sustainable living will set the accomplishments of this century apart from those of the past.

Implementing Sustainability

The following is an excerpt from a statement by faculty member Ruthana Emrys Gordon (Assistant Professor in the Institute of Psychology and member of the Campus Sustainability Plan committee) discussing the challenges organizations face when they attempt to change the behaviors of their members, even if the organization has sound reasons for implementing the change.

In order to implement [change], we must first identify and minimize barriers to [desired] behavior. These barriers may be social, psychological, physical, or financial. Lack of knowledge may also be a barrier. The university should identify what skills are necessary for sustainability, identify who needs to gain expertise in those skills, and provide the needed information or training.

The research on persuasion offers several additional strategies for integrating sustainable behaviors into the university environment. First, the opportunity for such behaviors can be made more salient. Turning off lights when not in use, for example, is an easy way to save energy, but a difficult habit to form even with the best of intentions. Simple reminders, such as signs, can make it easier for people to remember to perform this behavior. Other options would include automating the change, or increasing ease of light-switching remotely.

Pro-environmental initiatives should be interactive from the start. People should think of sustainability as something they do, not just something they believe in. Interactivity can include not only directly sustainable behaviors, but games and competitions that encourage people to think about sustainability. Competition can also encourage people to come up with their own ideas for improving sustainability, increasing their sense of ownership over IIT's green identity.

The consequences of sustainable and unsustainable behavior should be described in concrete, easy to imagine terms—and in relation to local as well as global effects. Negative environmental outcomes portrayed in popular media are often too abstract, or too distant, to have a strong impact. Our minds are wired to be most concerned about dangers that can be easily imagined, and that can be related to themselves and their local environment. Conversely, people are more likely to engage in sustainable behavior if they believe that it will make a concrete, imaginable difference to themselves and their environment. They need to know that individual action can make a positive difference.

Finally, decisions about sustainability should be made in a participatory fashion, drawing on input from all the populations who live, work, and learn at IIT. This will not only increase commitment, but will ensure that initiatives do not run aground on unforeseen barriers, and do not become so onerous as to cause resentment and rejection of the overall principles involved. Sustainability should draw on all the resources of innovation, wisdom, and expertise available in our academic community.

Section II:
The Campus Sustainability Plan

- **Core Themes in Sustainability at IIT**

- **Commitments and Targets**
  Transportation
  Stormwater/Landscape Management
  Material Flow: Supply Chain/Waste Management
  Green Building
  Food
  Energy
  Emissions

Core Themes in Sustainability at IIT

Culture of Sustainability

The IIT community must commit as a whole to making the changes necessary for IIT to become the most sustainable urban university campus in the country. At the same time, IIT must give its community members the tools they need to participate in those changes. Community members will build sustainable actions into their day-to-day interaction with the campus, the university will instill responsibility for sustainable operation throughout the administration, and all participants will hold each other accountable for performing.

Living Laboratory

Forward thinking faculty and students need a testing ground where they can see their ideas become reality; a campus looking to make rapid, controlled change requires innovators willing to try new methodologies. IIT will implement processes to allow the campus to serve as a testing ground for ideas, and will work with researchers to expand the possibilities to include the city and region. All projects and initiatives on campus will include aspects that increase the students' ability to be interactive with and learn from the project of initiative.

Constant Improvement

One cannot solve current issues by continuing to add to them. IIT will begin the process of becoming sustainable by refusing to add to the current issues. For example, if the university defines energy waste as an issue in operations, campus operations must not create more opportunities for wasted energy. Any new energy uses must include efficiency improvement. The university must treat progress against all goals in the same manner.

Strength in Numbers

The success of sustainability-related initiatives will require a commitment to reaching across disciplines to find innovative solutions, define metrics of success and measuring performance rigorously against those metrics. Continuously monitoring performance against sustainability metrics, and sharing the results of that measurement across the diverse academic, cultural and social groups represented by the university will increase the speed and efficacy of implementing solutions.

Professional Commitment

The university cannot reach its goal in isolation. Through voluntarily complying with codes and standards set by the professional societies whose areas of interest are represented in the academic units at IIT, collaborating with content experts in the region, and actively engaging those professionals who have graduated from IIT by keeping them connected to the university

Commitments and Targets

IT establishes targets and commitments in the following areas of campus sustainability:

- **Transportation**
- **Stormwater/Landscape**
- **Material Flow: Supply Chain/Waste Management**
- **Green Building**
- **Food**
- **Energy**
- **Emissions**

Through these commitments, IIT recognizes that creating a sustainable campus requires progress and excellence across all areas of campus operations. For each commitment, the plan identifies:

1. **How a sustainable campus would address the area of commitment.**

2. **The target goal that IIT will reach by the year 2020 in progress toward becoming a sustainable urban campus.**

3. **The justification for addressing the area of commitment in terms of economic, environmental and social measures.**

4. **Recommended solution methods.**

The justification section of each commitment includes references to general measures of sustainability that cross the boundaries between the commitments, and defines the specific reasons why a university like IIT should address the area of commitment. Some of these general measures come straight from the Core Themes (Culture of Sustainability, Living Laboratory, Constant Improvement), the Definition of Sustainability in the Vision (Resource Depletion, Zero Waste), and the Many Voices, One Vision Strategic Plan (Student Focus, Financial Sustainability, Multi-disciplinary Research, Innovation and Excellence, Ethical Decision Making, Connection to city). Still others come from accepted measures of environmental damage as defined by the Environmental Protection Agency (Air/Water Quality, Ecotoxicity). The plan groups these measures by economic, environmental and social justifications for action.

Economic refers to quantifiable measures that affect the fiscal health of the university. These measures include cost savings/shifting in the traditional accounting sense, but also include measures that retain staff and recruit students. Retention and recruitment have a significant impact on the economic health of the university.

Environmental refers to measures that define the impact campus operations have directly and indirectly on the ability of ecosystems to support life. Direct impacts include effects on the immediate ecosystem in which IIT sits, while indirect impacts affect ecosystems outside of the campus in such a way that the impacts would not occur except for the operations of the campus.

Social refers to the including the human impact in all decision-making. This includes addressing the culture of the campus, how people inside and outside the university interact with the campus, and the value that all place on the presence of the campus in the community. It also extends to the ethical decisions made in campus operations – how those decisions impact people outside of the IIT community as well as those generations to come.

Each section contains a list of recommended actions the university can pursue to meet the commitment. The working groups that developed the commitments produced detailed documents containing the background on the methods selected. The methods presented here form a starting point, and do not constitute a requirement of the university to pursue any specific recommendation in adopting the plan. (For the individual working group documents in each area of commitment, go to www.iit.edu/campus_sustainability.) In adopting the plan, the university commits to meeting the target by the most effective, available means possible. The opportunities will change over time, and the plan reflects the flexibility the university will need to meet its goals.

Transportation

Commitment:

On a fully sustainable urban campus, transportation within the IIT community and to/from all campuses will occur by modes of travel whose impact is within the capacity of the ecosystems through which travel occurs.

By 2020, IIT will develop a transportation plan and metrics to promote walking, biking, public transit, carpooling and alternative fuel vehicle use among students, faculty, and staff to commute in a more sustainable way, resulting in a transition to 33% of miles traveled occurring by these alternative means. The plan will also transition all IIT campus vehicles to a renewably-powered fleet, and all the university will recognize the responsibility for environmental impacts of non-commuting travel that supports the university's core mission.

Justification:

Economic: Financial Sustainability – alternative transportation costs less than conventional car travel reducing cost of employment to faculty and staff
Financial Sustainability – Fuels are no longer needed for campus fleet
Culture of Sustainability – IIT sits in an alternative-transportation rich area
Research and Scholarship – parking area takes away from space that can be used to further the core mission

Environmental: Air/Water Quality – transportation is the leading cause of CO and particulate emissions, and directly impact the urban setting.

Social: Living Laboratory – current practice does not follow the lessons taught
Connection to city – alternative methods promote connection to the city and region

Potential solution methods:

- Update parking management to encourage alternative means of transportation
- Continue Greening the Fleet program and extend to contracted services as appropriate
- Upgrade bike storage infrastructure
- Create student-run bicycling advocacy business
- Engage local authorities to increase access to public transportation and local housing
- Add alternative commuting support to Human Resources function
- Include tracking of commuting behaviors with timesheet functions

Stormwater and Landscape Management

Commitment:

On a fully sustainable urban campus, a comprehensive landscape and stormwater management program (that recognizes and respects the related social, economic, and environmental issues) ensures that water naturally occurring on the campus is treated as a resource.

By 2020, IIT will have an acclaimed landscape design in keeping with the historical modern aesthetic of the IIT campus that enables IIT to capture and retain all stormwater on campus. This is the next logical step for IIT given our history of bold urban architectural and landscape design and engineering leadership.

Justification:

Economic: Financial Sustainability – stormwater and excess wastewater from campus add wastewater treatment costs, and stormwater can reduce need for imported water
Innovation/Ethical Decision-Making – our current architectural heritage must be preserved as an asset to the community

Environmental: Resource Depletion – stormwater runoff requires energy for transportation and treatment
Ecotoxicity–stormwater runoff stresses the local watershed
Air/Water quality – current runoff water quality contains impurities delivered at a rate that the local ecosystem cannot presently assimilate

Social: Ethical Decision-Making – current practices transfer the environmental hazards to others
Living Laboratory – current practice does not follow the lessons taught
Culture of Sustainability – the campus landscape must invite those inside and outside the community to connect to the campus

Potential solution methods:

- Update the Caldwell Plan to include stormwater management, embodied energy and environmental impacts

- Increase amount of pervious surfaces

- Eliminate importation of off-site water for irrigation

- Install best-practices stormwater park for testing of strategies and their application to campus

Material Flows: Supply Chain/Waste Management

Commitment:

On a sustainable urban campus, material flows are managed such that all impacts: environmental, social and economic, are within the capacity of the ecosystems through which the materials move.

By 2020, IIT will have a supply chain/waste management process that enables IIT to minimize requirements, efficiently source, utilize, and dispose of supplies and waste for all IIT campuses, resulting in a 75% reduction of per capita waste.

Justification:

Economic: Financial Sustainability – improvement can eliminate costs not associated with core mission
Ethical Decision-Making – current practices must be updated from first-cost driven to true, sustainable cost benefit

Environmental: Air/Water Quality – transportation, packaging and production of materials uses energy and resources, and produces emissions that negatively impact ecosystems
Ecotoxicity – disruption of ecosystems due to landfilling/mining/harvesting

Social: Resource Depletion – non-mission resource use takes opportunity from others
Ethical Decision-Making – reduces transfer of environmental hazards, providing an example to the surrounding community and establishing the university as a good citizen
Culture of Sustainability – flexible, scalable and easy to use, employing transparency to increase effectiveness

Potential solution methods:

- Sustainable Procurement Policy and Sustainable Purchasing Guidelines (inclusive of lifecycle accountability, vendor information, embodied energy and emissions, social equity practices)

- Institution-wide Procurement Application (inclusive of vendor database, lifecycle costs, online tracking of sustainability and cost metrics)

- All new electronics purchased must be Energy STAR rated

- All Cleaning supplies used will follow the requirements outlined under the Illinois Green Cleaning Schools Act

- Material swap/exchange to be developed and managed by students (current IPRO proposal)

- Visibility of goals, measurements, trends, and feedback, etc. within the IIT community (through myIIT reporting module)

Green Buildings

Commitment:

On a fully sustainable urban campus, campus buildings become a living example of environmental research and education integration, causing no impact outside of that which the ecosystem has capacity to handle while meeting the fully functional requirements needed to achieve the university's core mission.

By 2020, all new buildings and renovations will have achieved LEED Gold Certification (LEED-New Construction) and IIT will make changes in operations such that seventy-five percent (75%) of occupied existing buildings meet LEED Gold Certification (LEED – Existing Buildings Operations and Maintenance). All spaces will comply with, or be on a compliance path to meet, all ASHRAE and IESNA standards for indoor environmental quality.

Justification:

Economic: Financial Sustainability – buildings that perform better cost less to operate
            Financial Sustainability – higher quality buildings are more comfortable and productive and can result in higher retention rates
            Student Focus – commitment to green building increases campus profile

Environmental: Resource Depletion – fewer resources used in building and maintaining structures
            Air/Water Quality – green buildings decrease stresses on occupants
            Student Focus – lighting, acoustics and thermal comfort affect productivity and comfort

Social: Living Laboratory – students and faculty can interact with high performance structures
            Culture of Sustainability – community members feel greater connection to campus
            Ethical Decision-Making – green buildings use resources more efficiently and provide framework for resource efficiency

Potential solution methods:

- Combined with energy policy, energy credits in LEED shall be a priority

- Building lifespan will include deconstruction and reuse, and all building projects will use full lifecycle accounting of economic, energy and environmental impacts

- Green Cleaning and Integrated Pest Management programs to reduce resource use, chemical sources while maintaining quality of the built environment

- Retrocommissioning of existing buildings to increase comfort

- Green performance contracting to increase efficiency of resource use while implementing green infrastructure upgrades

- Material performance criteria will be reviewed and updated by a committee on an annual basis, and including in a Sustainable Purchasing Policy
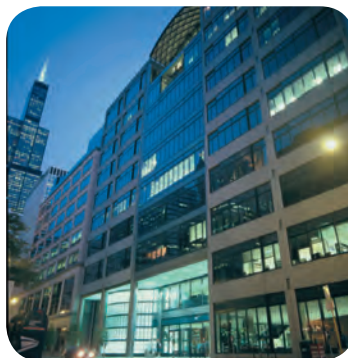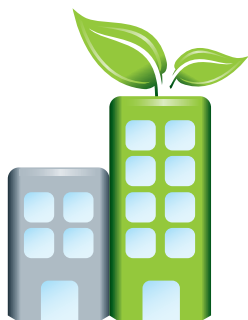
Food

Commitment:

On a fully sustainable urban campus, all food improves the quality of daily life both for the producer and the consumer.

By 2020, 100% of food available through IIT food service outlets will have at least one sustainability attribute (organic, local, fair trade) as defined by a recognized authority.

Justification:

Economic: Financial Sustainability – consumers increasingly demand that their purchases have benign or restorative environmental impact, and providing these items increases the amount of financial resources that stay within the IIT community
Ethical Decision-Making – supporting the local economy increases the strength of that economy, and increases IIT's value within it

Environmental: Air/Water Quality – transportation, packaging and production of food uses energy and resources and produces emissions that negatively impact ecosystems.
Resource Depletion – conventional growing processes use natural resources at a rate greater than sustainable methods

Social: Culture of Sustainability – Increasing transparency and responsibility brings everyone in the community into the process
Ethical Decision-Making – sustainable methods of growing food should include fair treatment of workers at every stage of the food growing, processing and transportation

Potential solution methods:

- Work with Sodexo to identify sound measures for sustainable food and track annually

- Work with Sodexo to increase transparency in food sourcing

- Implement pilot projects in sustainable food offerings: special events, meal specials, "grab-and-go" sections

- Partner with other universities and local organizations to increase market for sustainable food

Energy

Commitment:

On a fully sustainable urban campus, all energy serves the core mission of the institution, and any necessary energy transfer occurs within the capacity of the ecosystems through with the energy flows.

By 2020, IIT will reduce primary energy waste by ninety percent (90%) compared with fiscal year 2010, and reduce secondary energy waste (waste heat) by thirty percent (30%) compared with fiscal year 2010.

Justification:

Economic: Financial Sustainability – Energy accounts for five percent of the IIT budget. Prior to 2008, energy pricing significantly outpaced inflation.

Environmental: Air/Water Quality & Ecotoxicity – Combustion for energy transfer results in the release of carbon into the atmosphere at a greater rate than it can tolerate; nuclear wastes currently have no national strategy for management.
Air/Water Quality – Particulates from combustion increase the risk for respiratory illness

Social: Culture of Sustainability – Increasing transparency and responsibility brings everyone in the community into the process
Living Laboratory – As a leader in sustainable energy research, IIT has an opportunity to provide real-world experiences to its students
Resource Depletion – Energy and the embodied water necessary to affect the energy transfer are limited resources that cannot be used at a per capita rate greater than can be supplied

Potential solution methods:

- Renewable portfolio standards in Illinois climb to 15% in 2015, which will reduce secondary energy waste in energy delivered to campus

- Energy performance contracts on campus to reduce wasted energy through higher efficiency equipment, more building controls

- Power purchase agreements to increase on-site generation

- Shift loads using geothermal heating and cooling, daylighting and passive strategies

- Increase personal and professional responsibility of campus community members to reduce demand
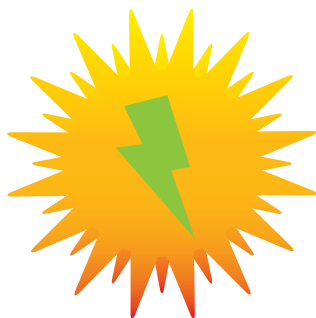
Energy Supplement

In addition to this Executive Summary, review the IIT Energy Policy: 2010 for details on changes in IIT resource management practices. Understanding the scope of the energy commitment requires knowledge of the following facts related to the current state of energy transfer at IIT:

- The IIT energy transfer profile baseline shows 398,700 MMBtu of energy distributed throughout the campus.

- This requires 1,014,600 MMBtu of energy input to the energy generation and supply systems to get the utilized energy to the campus. This includes energy to mine/harvest, transport, and effect energy transfer as well as energy that eventually is lost in transmission to the campus.

- Of the 398,700 MMBtu that reaches campus (and for which IIT receives invoices from energy suppliers), 62,200 MMBtu is lost in transmission between the point of entry to the campus and the eventual point of end-use.

- This results in an energy density of about 113 kBtu/square foot/year (this does not include the MMAE wind tunnel). The average building in the Midwest (according to CBECS by the DOE) is about 94 kBtu/sf/year, an efficient building is around 60 kBtu/sf/year, and the ideal building around 40 kBtu/sf/year.

- Using a range of 60-75 kBtu/sf/year as a benchmark, the current primary energy waste at IIT falls between 175,000 MMBtu and 220,000 MMBtu.

- The 2020 commitment would mean that IIT will reduce total energy transfer at the campus by 160,000 to 200,000 MMBtu. The energy transfer that remains would have 345,500 MMBtu of secondary waste (if we assume that a reduction in transfer yields a proportional reduction in waste); the commitment will require a reduction of this waste by 103,700 MMBtu.

Emissions

Commitment:

On a fully sustainable urban campus, the materials leaving campus do not exceed, in quantity or potency, that which the ecosystem can handle.

By 2020, will catalogue and measure all pollutants, direct and indirect, from campus operations, and will reduce carbon emissions by fifty percent (50%) compared with a baseline of fiscal year 2008. Any emissions classified as harmful by the Environmental Protection Agency will either be eliminated or have a quantifiable plan for elimination.

Justification:

Economic: Financial Sustainability – Regulation of carbon and associated emissions increase budget uncertainty and introduce risk into the funding of operations in direct proportion to the amount of carbon released by campus operations

Environmental: Air/Water Quality – Combustion for energy transfer results in the release of carbon into the atmosphere at a greater rate than it can tolerate
Ecotoxicity – Carbon emissions directly contribute to climate change, endangering the carrying capacity of the earth, and influencing the ecosystems on which IIT and its constituents rely

Social: Culture of Sustainability – Increasing transparency and responsibility brings everyone in the community into the process
Living Laboratory – As a leader in sustainable energy research, IIT has an opportunity to provide real-world experiences to its students

Potential solution methods:

- Reductions in energy, transportation, purchasing and stormwater areas directly lead to reductions in emissions

- Increase non-fossil-fuel-based sources of electricity

- Digitize lab management and operations management processes to include online cataloguing and reporting of emissions
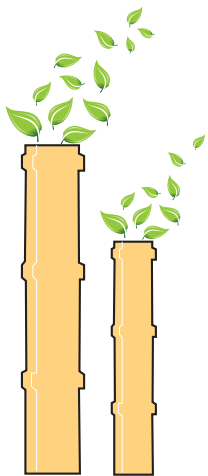
Section III:
Metrics

- **Project/Program Requirements of the Sustainability Vision**

- **Determining Metrics and Reporting Progress**

- **IIT Campus Sustainability Plan Metrics Table**

- **Externally-Developed Metrics**
  Association for the Advancement of Sustainability in Higher Education
  U.S. Green Building Council

- **Process for Amending or Varying from the Campus Sustainability Plan**

Project/Program Requirements of the IIT Sustainability Vision

IIT will achieve sustainability through action, not just words. In order to most effectively apply resources, the university will prioritize projects and programs that meet the following requirements and maximize the following metrics:

Supported

Although the university has established an Office of Campus Energy and Sustainability, the ultimate responsibility for long-term implementation of change rests with the individual operational departments. IIT provides the opportunity and support for moving operations to a more sustainable path, but the operational units must have the ability to maintain the practice in its daily business.

Transparent

The Office of Campus Energy and Sustainability will report on project/program progress, both during and after implementation. Through factual and honest reporting, stakeholders will have confidence in the movement towards, and eventual achievement of, the Sustainability Vision.

Evaluated

All projects will have specific metrics associated with their implementation, and project/program success relies on the accurate evaluation of those metrics. IIT will evaluate progress toward sustainability on the following:

1. **Energy:**
   Recognizing that energy can neither be created nor destroyed, but only changed in form, will accepting the proposal minimize the need for energy transfer, and provide for the transfer of more energy to useful form than to waste heat or similar energy loss over the lifetime of the proposed program, system or project?

2. **Environment:**
   Will accepting the proposal improve the local and global ecology or will it cause damage to the local or global ecology?

3. **Economy:**
   Will the proposal provide the most cost-effective solution, accounting for all market forces, and will accepting the proposal provide a financial benefit to the IIT community?

4. **Social:**
   Does the proposal address the engagement of the IIT community and ethical decision-making at all levels?

Exportable

IIT will maximize the benefit of project/program implementation by considering the applicability of a project/program to other community settings.

Pervasive

Every department, group, entity, organization, etc. within the IIT community will participate in the development of the Sustainability Plan, including specific actions to be taken by that department, group, etc. to comply with the Sustainability Vision.

Determining Metrics and Reporting Progress

Each year, as part of the measure of innovation and excellence in campus operations from the strategic plan, the Vice President of Business and Operations will report on progress against the commitment targets in the Campus Sustainability Plan. The Metrics Table that accompanies this document shows the specific targets, baselines and descriptions associated with each primary metric in each area of commitment.

In order to accurately and effectively track progress against these metrics, the Office of Campus Energy and Sustainability will develop a Metrics Plan. The plan will detail the specific protocols and procedures that IIT will follow in measuring and reporting progress. In addition, the plan will detail the frequency, responsible party, and method for gathering the data, as well as who will receive, process and report the information. Maintaining a rigorous and appropriate Metrics Plan forms the foundation of successful sustainability planning.
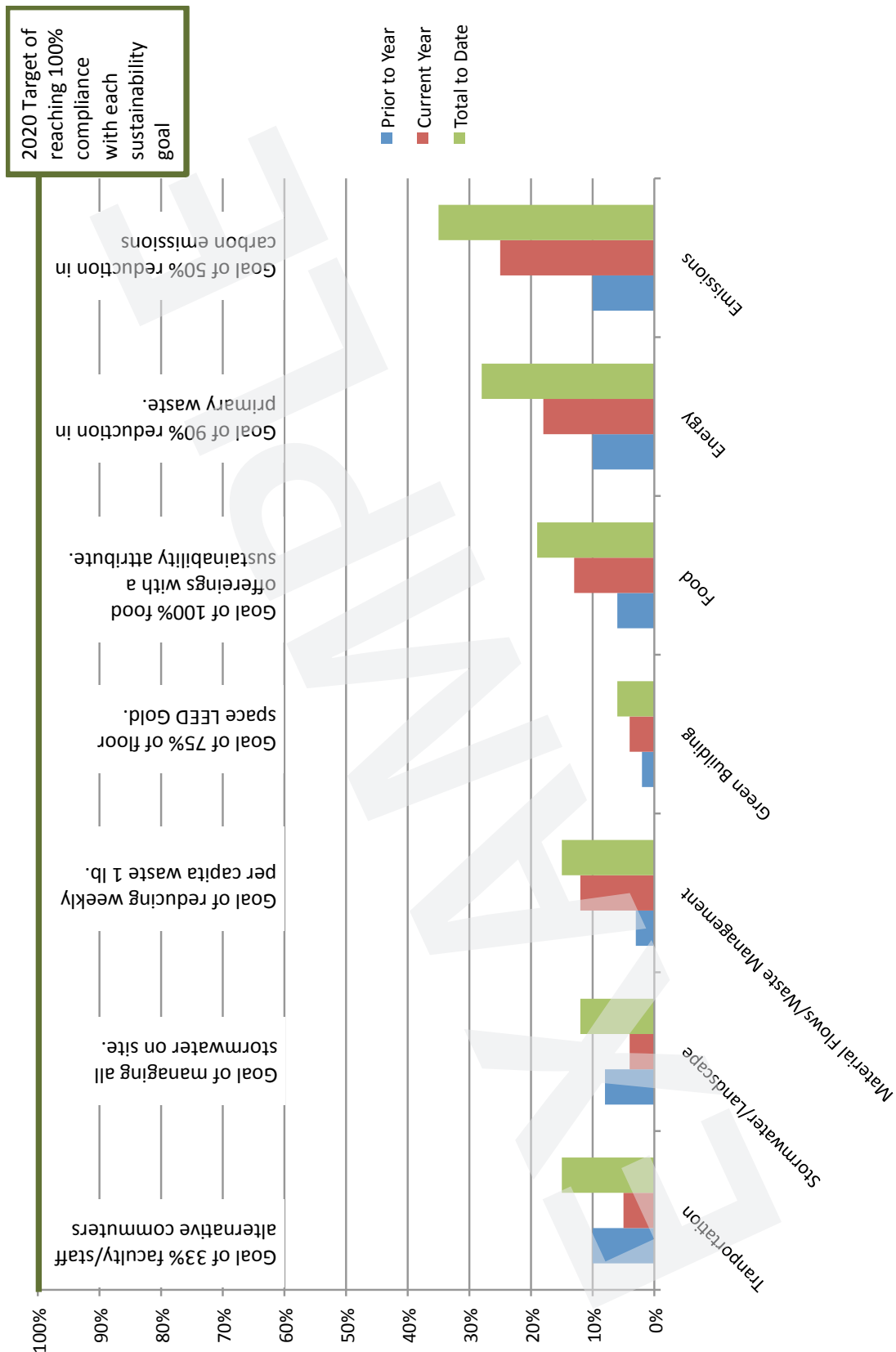
Managing resources to achieve the targets will require tracking progress in each area of commitment (Campus Sustainability Plan Progress Tracker). At present, maintaining consistent progress across all areas will drive the allocation of time and resources, however in the future, another method may provide a better way. The far right-hand side of the report shows three metrics that the Office of Campus Energy and Sustainability plans to track for each area of progress. By tracking these global metrics, IIT hopes to find a way to accurately allocate resources across the various areas of concern. The metrics listed represent a starting point, and as the implementation moves forward, other metrics of better value may emerge.

The Office of Campus Energy and Sustainability will hold an open forum each April reporting the progress against the Campus Sustainability Plan. Representatives from faculty, staff and student sustainability committees will review and provide comment on the annual report. Once received, with comments, the Vice President of Business and Operations will forward the report to the Provost and President to provide detail on progress against the strategic plan.

IIT Campus Sustainability Plan: Targets and Metrics

Program Area	2020 Goal	Primary Metric	Baseline	Target	Secondary Metric	Baseline	Target
Transportation	Increased alternative transportation (non-single-occupancy vehicle travel)	Commuter miles	5%	33%	Embodied Energy	TBD	TBD
	Use electric vehicles on campus	Number of electric vehicles	15%	100%	Embedded Water	TBD	TBD
	Mitigate impact of non-commuter travel (all forms)	Non-commuter miles mitigated	0%	100%	Engaged Community	5%	100%
Supply Chain / Waste Management	Reduce flow of materials	Weekly, per capita waste	3.5 lbs.	0.9 lbs	Embodied Energy	TBD	TBD
					Embedded Water	TBD	TBD
		Paper purchasing	TBD	25% reduction	Engaged Community	5%	100%
Green Building	All new buildings/spaces LEED Gold	LEED-Gold new buildings	0%	100%	Embodied Energy	TBD	TBD
	Existing floor space LEED Gold EBOM	LEED-Gold floor space	0%	75%	Embedded Water	TBD	TBD
	All spaces comply with ASHRAE & IES	Compliant floor space	UNK	100%	Engaged Community	5%	100%
Stormwater/ Landscape	Net all stormwater managed on site	Stormwater runoff	est. 15%	100%	Embodied Energy	TBD	TBD
		Off-site stormwater infiltration			Embedded Water	TBD	TBD
					Engaged Community	5%	100%
Emissions	Eliminate all harmful emissions	Catalogue harmful emissions	TBD	None	Embodied Energy	TBD	TBD
	Reduce carbon emissions	CO2E (2008 baseline)	34 kton	17 kton	Embedded Water	TBD	TBD
					Engaged Community	5%	100%
Energy	Eliminate wasted energy	Energy not serving core mission	220MMBtu	20MMBtu	Embodied Energy	TBD	TBD
	Eliminate lost heat from energy transfer	Waste heat related to energy use	616MMBtu	236MMBtu	Embedded Water	TBD	TBD
					Engaged Community	5%	100%
Food	Increase organic food offering	Percentage of food organic	4%	100% comply with 1 of these 3	Embodied Energy	TBD	TBD
	Increase fair trade food offering	Percentage of food fair trade	1%		Embedded Water	TBD	TBD
	Increase local food offering	Percentage of food grown locally	7%		Engaged Community	5%	100%

Campus Sustainability Plan Progress Tracker

2020 Target of reaching 100% compliance with each sustainability goal

Legend:
- Prior to Year
- Current Year
- Total to Date

Goal of 50% reduction in carbon emissions — Emissions

Goal of 90% reduction in primary waste. — Energy

Goal of 100% food offerings with a sustainability attribute. — Food

Goal of 75% of floor space LEED Gold. — Green Building

Goal of reducing weekly per capita waste 1 lb. — Material Flows/Waste Management

Goal of managing all stormwater on site. — Stormwater/Landscape

Goal of 33% faculty/staff alternative commuters — Tranportation

Externally-Developed Metric Tools

Over the past ten years, as issues of sustainability have become a major theme in building construction and operations, trade associations and not-for-profit corporations have coalesced to help institutions manage the process of change. Two such organizations, the Association for the Advancement of Sustainability in Higher Education (AASHE) and the US Green Building Council (USGBC) have developed systems by which institutions can document and rate their performance relative to measures of sustainability that the industry accepts as relevant. The Illinois Institute of Technology includes these systems in the portfolio of tools used to measure performance against the sustainability metrics.

As the Green Building commitment notes, the Leadership in Energy and Environmental Design (LEED) Green Building Rating System (www.usgbc.org/leed) will form the foundation of the metric for determining the quality of built environment on campus. The system, developed by a consensus-based process within the member institutions of the USGBC (of which IIT is one), has versions that apply both to new building construction, interior space renovation, neighborhood development and ongoing operations and maintenance. IIT will use all of the tools available in the portfolio of the rating system to determine progress against individual performance measures within the broad spectrum of green building.

IIT understands that the road to true sustainability requires more than the ten years covered by this plan. In order to determine how IIT's efforts compare with those of other institutions, and to truly measure progress against the vision of IIT becoming "the most sustainable urban university campus in the United States", the university needs a platform against which others can objectively evaluate its level of commitment. The recently formed AASHE has developed such a platform in its Sustainability Tracking and Reporting System (STARS) (www.aashe.org/stars). This self-reporting, tracking system provides universities a tool by which to evaluate planning and progress, while also making that progress transparent to the public at large for scrutiny. The strength of the tool lies in its ability to provide a framework for discussion, while giving universities the freedom to establish their own priorities.

Within both of these external systems of evaluation, the university has flexibility to determine which areas of practice IIT should pursue. While each system consists of a series of "credits" (individual performance measures), neither has the goal of one hundred percent compliance with all of these credits. Universities receive recognition for pursuing a predominance of them, understanding that in many cases the pursuit of one measure prohibits the pursuit of another. IIT retains the ability to set priorities, and adjust them to meet the core mission of the institution.

Process for Amending or Varying from the Campus Sustainability Plan

IIT intends the Campus Sustainability Plan to adjust to changes in priorities, both externally and internally, while maintaining a strong framework for allocating resources and measuring progress. From time to time, variations – both temporary and permanent – will arise, and in order for the plan to represent the university properly, IIT establishes the following process for temporary variations (variances) and permanent variations (amendments) to the Campus Sustainability Plan.

1. All variations must initiate from a Dean or Vice President, and fall into one of two categories:

    a. Reduced Performance Variance: The unit not complying with a policy or procedure established in accordance with the plan does not have the resources to comply in full and progress will be less than targeted by the plan. (ie. Less than desired forward progress)

    b. Setback Variance: The unit requesting variance with a policy or procedure established in accordance with the plan does not have the resources to comply and the action of the unit will result in a measurable setback from a target established by the plan. (ie. Increase in the work to be done to meet the target)

2. Variances proceed to the Office of Campus Energy and Sustainability, where the Director will evaluate the level of variance and provide a report to the Vice President of Business and Operations.

3. The Vice President of Business and Operations will receive the report and proceed as follows based upon the evaluation of the Director of Campus Energy and Sustainability:

    a. For Reduced Performance Variances, the Vice President of Business and Operations can approve or reject the request and report it as part of the regular reporting to the administration.

    b. For Setback Variances, the Vice President of Business and Operations must confer with the Provost and, at either of their discretion, the President, to determine the impact of stepping backward.

4. The Director of Campus Energy and Sustainability will record the request and the determination and include this in the annual reporting to the students, faculty and staff of the university.