Sustainabiliity

www.iit.edu/sustainability

ILLINOIS INSTITUTE OF TECHNOLOGY

CLIMATE ACTION PLAN

AUGUST, 2010

ACKNOWLEDGEMENTS PAGE

We would like to recognize and thank the following people and offices for their assistance in the production of this document.

- The President, John Anderson's Office
- Vice President of Business and Operation, John Collins' Office
- The City of Chicago
- IIT Office of Institutional Information and Research (OIIR)
- Terry Frigo, AVP and the facilities department at IIT
- Hamid Arastoopour and Peggy Murphy, WISER
- Frank FioRito, Director of Purchasing
- USGBC
- Amy Blaine
- Jennifer Kelly
- Olaoluwa Adeola
- Sean Daley
- Scott Terrence Beslow
- Aly El-Deen El-Tayeb
- Cindy D Gustafson
- Andy Conrad
- Emily A Bardsley
- Bryce R Swillum
- Kaitlyn Conley
- Kunlun Guo

LETTER FROM THE WISER DIRECTOR

One of the strategic planning priorities of Illinois Institute of Technology (IIT) is to increase the impact of IIT research and education by focusing on at least four interdisciplinary themes. One of the themes is energy and sustainability, which is anchored by the IIT Wanger Institute for Sustainable Research (WISER).

The vision of WISER is a world with energy security, sufficient and affordable sources of clean energy, and a sustainable climate to ensure quality of life, social and economic well-being, and the preservation of natural resources and the environment for future generations. The mission of WISER is to: become a major part of IIT academic activities by creating state-of-the-art research and education programs; and improve IIT's visibility and reputation. Additionally the WISER strategic plan includes partnership and close collaboration with the Office of Campus Energy and Sustainability in implementing the campus sustainability plan, helping to make IIT one of the most sustainable urban campuses in the nation, and making the IIT campus a living laboratory for education and research for both graduate and undergraduate students.

At IIT campus, we are committed to significantly reducing greenhouse gas emissions; focusing on creative strategies for improving energy performance in buildings; reducing the need for carbon-based fuels in the energy supply; and encouraging occupant behaviors that reduce the net environmental impact of the campus.

Hamid Arastoopour, Director, WISER

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This Illinois Institute of Technology (IIT) Climate Action Plan (CAP) demonstrates our commitment to the vision of "becoming the most sustainable urban university in the United States" through the specific environmental goal of emission reductions.

We define a fully sustainable urban campus as one in which the materials leaving campus do not exceed, in quantity or potency, that which the ecosystem can handle. By 2020, we 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.

Material Flows (Supply Chain/Waste Management): On a fully 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.

Stormwater and Landscape Management: 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.

Transportation: 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.

Green Buildings: 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 requirements needed to achieve the university's core mission.

Energy: 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.

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

INTRODUCTION AND BACKGROUND

The Illinois Institute of Technology (IIT) is committed to its vision of becoming "the most sustainable urban university in the United States". This sustainability vision has driven the development of several categories where change will be necessary in order to achieve our goal. These key areas are:

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

This document is intended to more fully explore the last category, emissions, and how each of the other categories contribute to the overall emissions picture. At IIT we believe that on a fully sustainable urban campus the materials leaving campus do not exceed, in quantity or potency, that which the ecosystem can handle. In pursuit of achieving this symbiosis between campus operations and the carrying capacity of our ecosystem we have committed that by 2020 we 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 for this reduction goal can be given in economic, environmental and social terms.

Economic:

Financial Sustainability – Regulation of carbon and associated emissions will increase budget uncertainty and will 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 the atmosphere 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.

DEFINITIONS

American College and University Presidents Climate Commitment (ACUPCC) – The American College & University Presidents' Climate Commitment (ACUPCC) is a high-visibility effort to address global climate disruption undertaken by a network of colleges and universities that have made institutional commitments to eliminate net greenhouse gas emissions from specified campus operations, and to promote the research and educational efforts of higher education to equip society to re-stabilize the earth's climate[i].

Association for the Advancement of Sustainability in Higher Education (AASHE) – AASHE is an association of colleges and universities that are working to create a sustainable future[ii].

Campus – The land on which IIT and related institutional buildings are situated. The major focus in this report is the main campus in the near south side of Chicago.

Carbon Dioxide Equivalent (CO_2e) – This is the concentration of CO_2 that would cause the same level of environmental effect as a given type and concentration of greenhouse gas.

Chicago Transit Authority (CTA) –This is the primary body providing public transportation in the Chicagoland area.

Clean Air Cool Planet (CACP) Calculator – This is a tool created by the Clean Air Cool Planet organization to help campuses calculate their carbon footprint as well as facilitate plans to make improvements. It is recommended by the ACUPCC as the best tool for campus carbon accounting.

Climate Action Plan (CAP) – A CAP is a set of strategies intended to guide community efforts for reducing greenhouse gas emissions.

Climate Change – The change in the statistical distribution of weather over periods of time that range from decades to millions of years[iii]. In this particular situation, it has been postulated that the change is happening over a much shorter time span as a result of human activity. With this plan, the university documents its path to reduction of such effects on the environment.

Direct Emissions – Direct emissions include all pollution from manufacturing, company owned vehicles and reimbursed travel, livestock and any other source that is directly controlled by the owner[iv].

Electricity Energy Mix – This refers to the amount of energy (primarily electric) provided by individual sources. For example, a campus could have an electricity energy mix of: 60% nuclear, and 40% hydro.

Emission Factor – This is the average emission rate of a given pollutant from a given source relative to the intensity of a specific activity; for example grams of carbon dioxide released per mega joule of energy produced.

Greenhouse Gas – Gases that trap heat in the atmosphere are often called greenhouse gases. These emissions are generated during combustion or decomposition. Examples include CO_2, CH_4, N_20 and more.

Greenhouse Gas Inventory – A greenhouse gas inventory is an accounting of the amount of greenhouse gases emitted to or removed from the atmosphere over a specific period of time[v].

Greenhouse Gas Program Manager – This is the person in charge of tracking greenhouse gas inventories.

Greenhouse Gas Offset – This is a financial instrument aimed at a reduction in greenhouse gas emissions. It is usually done in the act of purchasing or contributing to a sustainable effort or product. For example, paying to plant trees in a park district may be considered an offset.

Indirect Emissions – These include pollution that is generated as a result of the use or purchase of products and services.

Leadership in Energy and Environmental Design (LEED) – LEED is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies intended to improve performance in metrics such as energy savings, water efficiency, CO_2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts[vi].

Metric Ton – 1 metric ton = 1000 kilograms (2205 lbs.) Metric tons of carbon dioxide equivalent is the standard quantity used when measuring greenhouse gas emissions.

Renewable Energy Credits (REC) – These are tradable, non-tangible energy commodities in the United States that represent proof that 1 megawatt-hour (MW-h) of electricity was generated from an eligible renewable energy resource (renewable electricity).

Sustainability Tracking and Rating System (STARS) –STARS is a transparent, self-reporting framework for colleges and universities to gauge relative progress toward sustainability[vii].

United States Green Building Council (USGBC) – U.S. Green Building Council is a 501(c)(3) non-profit community of leaders working to make green buildings available to everyone within a generation[viii].

ABOUT IIT

Illinois Institute of Technology is a national, technological, Ph.D.-granting research university, with world-renowned programs in engineering, architecture, the sciences, humanities, psychology, business, law, and design. Founded in 1940 and tracing its roots back to the 1890s with the founding of Armour Institute of Technology and Lewis Institute, IIT brings a focused, interdisciplinary approach to education. With five campuses throughout the Chicago area and alumni around the world, IIT pairs the educational and cultural experiences of America's Second City with the small feel of an undergraduate population of just over 2,300 and total population of just over 7,400.

IIT has five campuses in the Chicago area.

- The 120-acre Main Campus, centered at 33rd and State Streets in Chicago, as well as many of its buildings, was designed by Ludwig Mies van der Rohe, who directed the architecture program at IIT from 1938 to 1958 and was one of the 20th century's most influential architects.
- The state-of-the-art, 10-story Downtown Campus at 565 West Adams Street houses Chicago-Kent College of Law, the Center for Financial Markets, the Master of Public Administration Program, and Stuart School of Business.
- The Institute of Design, an international leader in teaching systemic, human-centered design, is located at 350 N. LaSalle Street in Chicago's River North neighborhood.
- The 19-acre Daniel F. and Ada L. Rice Campus in west suburban Wheaton complements area community colleges, serving west suburban residents and employees in Illinois' high-tech corridor by offering graduate programs, upper-level undergraduate courses, and continuing professional education.
- The five-acre Moffett Campus in suburban Summit-Argo houses the National Center for Food Safety and Technology, a unique consortium of government, industry and academia that seeks to improve the quality and safety of the nation's food supply.

The master plan of the IIT Main Campus, designed by Mies in 1941, was one of the largest projects he ever conceived and the only one to come so close to achieving complete realization. The campus encompasses 20 of his buildings, the greatest concentration of Mies-designed buildings in the world. Thanks to the first chairman of its architecture department, IIT's campus is considered an architectural landmark of Chicago, and in 2005, the entire academic campus was placed on the National Register of Historic Places.[ix] It is important to implement plans which maintain the historical integrity of these buildings.

HISTORY OF THE OFFICE OF CAMPUS ENERGY AND SUSTAINABILITY

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

The IIT Office of Campus Energy and Sustainability (OCES) was created in 2008. A Director of the group was hired and several student workers were added in the fall of 2008. The group currently consists of the Director and approximately ten student workers.

SUSTAINABILITY VISION OF ILLINOIS INSTITUTE OF TECHNOLOGY

As a world-class institution of higher learning, IIT recognizes the critical importance of its 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"– moving our world toward a more sustainable path.

DEFINITION OF SUSTAINABILITY

IIT defines university sustainability as having effective resource management, continuous improvement of processes and reduction of waste and pollutants, toward a goal of zero waste, considering immediate and long-term benefits and consequences, and 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.

PROGRAMS

The Office of Campus Energy and Sustainability, in developing the IIT Campus Sustainability Plan, identified seven areas of campus sustainability. The program areas and commitments are:

Emissions: By 2020, we 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.

Material Flows (Supply Chain/Waste Management): By 2020, IIT will have a supply chain/waste management process that enables IIT to minimize resources, efficiently source, utilize, and dispose of supplies and waste for all IIT campuses, resulting in a 75% reduction of per capita waste.

Storm Water and Landscape Management: 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 storm water on campus.

Transportation: By 2020, IIT will develop a transportation plan and metrics to promote and track changes in walking, biking, public transit, carpooling and alternative fuel vehicle use patterns among students, faculty, and staff. The goal is a transition to 65% 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.

Green Buildings: By 2020, all new buildings and renovations will have achieved LEED Gold Certification (LEED-New Construction) and IIT will have renovated 75% of occupied existing buildings to meet LEED Gold Certification. All spaces will comply with, or be on a compliance path to meet, all ASHRAE and IEEE standards for indoor environmental quality.

Energy: By 2020, IIT will reduce primary energy waste by 90% compared with fiscal year 2010, and reduce secondary energy waste by 30% compared with fiscal year 2010.

Food: 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.

This Climate Action Plan will specifically address the university goals for the Emissions improvements. It will also document how each of the program areas contribute to overall carbon footprint of IIT.

MEASURING PROGRESS

Measuring every step of the way to meet our measurement criteria will continually give us an accurate understanding how we are performing. **Internally**, we will set goals for our programs and projects and evaluate our progress against these goals. **Externally**, we will benchmark ourselves using standard industry methodology.

It is the responsibility of the IIT OCES Metrics Program Manager to manage the data used in the creation of this report. The Program Manager will enforce data quality and ensure that reports are prepared consistently and within an appropriate time. The Program Manager will also work to evolve reporting procedures as necessary in order to minimize error. (See the IIT Campus Sustainability Metrics Program for more details)

UNIVERSITY VIEW ON CLIMATE CHANGE

President John Anderson, letter from the President 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 (WISER);

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."

INVENTORY METHODOLOGY

IIT employed the Clean Air Cool Planet (CACP) Campus Carbon Calculator to compute the emissions associated with university operations. The calculator applies appropriate emission factors to specific input data to determine the equivalent carbon dioxide emissions (CO_2e) associated with specific actions. In this section we provide the methodology for collecting data necessary when using the CACP tool.

ON COLLECTING GENERAL UNIVERSITY DATA

This section includes data received both through the university website and through special requests of IIT's Office of Institutional Information and Research (OIIR). OIIR collects and provides a variety of university information and data for institutional reporting and planning. In addition, OIIR coordinates IIT's reporting to federal and state agencies, responds to requests for information from within and outside the university, and maintains a website for profile data about IIT[x]. For the categories listed below initial, and in most cases final, data came from OIIR.

For the purposes of this document the information provided by OIIR includes building size and use data as well as faculty, staff and student counts. The office also provides information on local and permanent addresses of all personnel and students which is used to calculate commuter and international student travel miles. Students and staff are responsible for maintaining up to date address information; a small margin of error is introduced into the commuting calculations if the information is not properly maintained.

ON COLLECTING ENERGY DATA

The various types of energy data is collected from billing statements. The Director of the Office of Campus Energy and Sustainability handles the energy bills and as a result there is a good record of the university's energy consumption. Energy consumption at IIT falls under the following major categories;

1. Electricity
2. Natural Gas for Steam
3. Natural Gas for Processes
4. Electricity for Chilled Water
5. Natural Gas for Hot Water

The Energy Report (Appendix C) contains more information about the data collection process. In the coming years IIT will upgrade building meters to provide more reliable information.

ON COLLECTING MATERIAL FLOW DATA

Material flow data in this section covers properties like;

1. Recycling Data – Total Waste, Recycled Fiber, and Commingled
2. Water Consumption

In 2010, IIT participated in a nationwide competition called Recycle Mania. Recycle Mania is a friendly competition and benchmarking tool for college and university recycling programs to promote waste reduction activities to their campus communities. Over a 10-week period, schools report recycling and trash data which

are then ranked according to who collects the largest amount of recyclables per capita, the largest amount of total recyclables, the least amount of trash per capita, or have the highest recycling rate[xi]. IIT won first place in Illinois for 2010. The data for these 10 weeks was then extrapolated to estimate the yearly consumption. Going forward, proper data will be collected periodically to better represent the practices of the university.

The CACP calculator includes an option to input the fiber content of purchased paper products when calculating university emissions. IIT's calculations assume that all fiber is composed of uncoated fresh sheet with 0% recycled content. Without the means to properly track the information, and given the minute contribution to overall emissions, we chose to proceed with the worst case scenario knowing that several offices use paper with some percentage of recycled content.

At IIT, Facilities reports water consumption data through meters in individual buildings on campus. Without a more rigorous method for accurately tracking the path of water, this report assume that all water consumed on campus enter the sewer system and flows to the Metropolitan Water Reclamation District. This assumption introduces a small amount of error to the final results.

ON COLLECTING GASOLINE DATA

IIT has operational control over three departments that operate vehicles and consume gasoline on campus; Facilities, the Post Office, and Public Safety. For these departments BP gas cards are used to make purchases centralized and more efficient. This also allows IIT to easily and accurately track the gasoline consumption associated with university operations. BP compiles and submits monthly reports to the Purchasing Department. The reports show the price per gallon at time of purchase as well as the number of gallons of gasoline purchased. Purchasing will make these reports available going forward for use in updating the Climate Action Plan.

The university may also be responsible for gasoline consumption outside these departments. In this case university staff may request reimbursement for gasoline purchases. The Director of the Purchasing Department advises that there is a minute amount of gasoline consumed in this manner. As such, this report assumes emissions associated with these ancillary gasoline purchases are de minimis and will not include them in the analysis.

As part of university operations IIT employs a shuttle bus service to take students and faculty between campuses. At the time of this report gasoline consumption data from this source was unavailable due to a change in the operation of the shuttle. Although this data represents a small percentage of the overall impact of the university, we recognize the importance of including this information in future reports and intend to update our emissions baseline when the data becomes available.

ON CALCULATING INTERNATIONAL AIR MILES

At IIT, international travel may occur when students participate in a study abroad program or when international students travel between campus and their home country. The Study Abroad Coordinator at the International Center arranges travel for all study abroad programs. International students are responsible for arranging their own travel to and from IIT.

The International Center provides OCES with data on the number of students participating in study abroad and their travel destinations. From this information, mileage between Chicago and the corresponding international city was made using the 'How far is it?' tool on /www.findlocalweather.com/. This method ignores possible

flight layovers and the potential for multiple modes of transit. Mileage calculations in this report are based on one leg of the journey, assuming that the study abroad university holds equal responsibility for the travel. OCES will evaluate the accuracy of this procedure and update future revisions of this document as necessary

A similar method was adopted for calculating the mileage associated with international student travel. In this case, the Office of Institutional Information and Research provided information regarding the permanent address of international students. OCES identified the airport nearest to each hometown and then calculated the distance to Chicago. IIT assumes responsibility for one annual round trip; other trips will are solely the student's discretion. As before, there is room for error mileage calculations because the process does not account for flight layovers and multiple modes of transit.

ON CALCULATING DIRECTLY FINANCED TRAVEL

IIT directly finances staff and student travel which is in support of the university's mission. These travel arrangements may be made through the university's travel agency, though it is not required. The Purchasing Department maintains the travel data which is made through the travel agency and estimates their records account for approximately 20% of all university financed travel. For the initial draft of the CAP data from the Purchasing Department has been extrapolated to and used in the CACP calculator to compute emissions. In the future IIT will follow the methods outlined in the IIT Campus Sustainability Metrics Program to maintain more precise measurements of travel data.

EMISSIONS BREAKDOWN

This section quantifies IIT's emissions baseline which is used for future projections and plans. The data represents Fiscal Year 2008 (FY2008) unless otherwise noted. The Climate Action Plan follows the program areas from the Campus Sustainability Plan.

TOTAL EMISSIONS

Emission measurements are reported in metric tons of Carbon Dioxide equivalents ($MTCO_2e$). Emissions are classified under one of the following three categories;

Scope 1: Scope 1 emissions occur at sources that are owned or controlled by IIT including: on-campus stationary combustion of fossil fuels; mobile combustion of fossil fuels by institution owned/controlled vehicles; and "fugitive" emissions. Fugitive emissions result from intentional or unintentional releases of Greenhouse Gases[xii].

Scope 2: Scope 2 emissions result from the production of electricity and steam consumed by IIT[xiii].

Scope 3: Scope 3 emissions cover all other indirect emissions that are a consequence of the activities of the institution, but occur from sources not owned or controlled by IIT. This includes commuting; air travel for university activities; waste disposal; embodied emissions from extraction, production, and transportation of purchased goods; outsourced activities; contractor owned- vehicles; and line loss from electricity transmission and distribution[xiv].

	Emissions ($MTCO_2e$)
Scope 1*	186,988
Scope 2	151,959
Scope 3	52,329
Total	391,276

Table 1 - Energy Breakdown by Scope (IIT does not currently participate in offset programs)

*The CACP tool used to calculate emissions includes steam under the Scope 2 category by default. However IIT produces its own steam onsite at the COGEN plant, therefore it is accurate to include the associated emissions in the Scope 1 category.

ENERGY

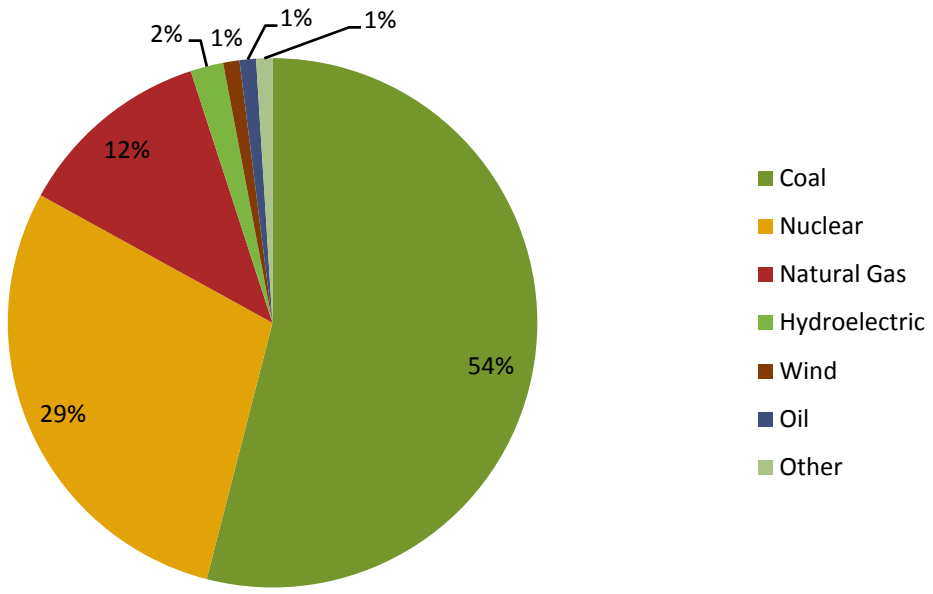
IIT generates some, but not all, of the energy used by the community onsite. Therefore our total energy related emissions is the sum of the Scope 1 and Scope 2 categories above. IIT's energy consumption currently is the largest contributor to the overall emissions footprint, comprising 87% of our total emissions.

	Emissions ($MTCO_2e$)	Of Energy Contribution	Of Total Emissions
Steam	166,914	49%	43%
Electricity	120,705	36%	31%
Natural Gas	36,190	11%	10%
Other*	15,138	4%	3%
Total	338,947	100%	87%

Table 2-Breakdown of Energy Consumption[xv]

*Other includes phantom loads which cannot be attributed to the more specific energy categories.

The 2008 electricity energy mix was:



MATERIAL FLOW

Material flow contributes directly to Scope 3 emissions. IIT tracks all waste material leaving campus through monthly reports from the waste management vendor.

Waste Type	Emissions ($MTCO_2e$)	Percentage (%)
Fiber	210	28
Commingled (Metals, Plastics, Glass)	50	7
Landfill*	486	65
Total	746	100

Table 3 - Waste Material Breakdown

* This may include recyclable and compostable material which is inadvertently placed in containers for landfill waste.

TRANSPORTATION

Transportation data proved difficult to properly collect due to the decentralized nature of university practices. Data could easily be collected for on campus housing and individual commuting distances. We assumed that students commute during an eight month cycle while faculty commutes over an eleven month cycle. We also assume that part-time students and staff commute with half the frequency of full-time students and staff. Future versions of this document will include improved transportation data where available.

	Staff Miles	Student Miles
CTA Bus Travel	3,725,440	10,069,528
Automobile Travel	10,431,233	33,565,095
CTA Rail	312,937	23,495,566
Commuter Rail	7,450,881	33,565,095
University Air Travel	1,027,685	-
Total Miles	22,948,176	100,695,284
Associated Emissions ($MTCO_2e$)	6,049	22,168

Table 4 - Transportation Breakdown for Annual Travel

GREEN BUILDINGS

The Green Building goal focuses on indoor environmental quality and the sourcing of materials. The university capital plan does not include any upcoming construction, however when construction occurs, the university will track and report any emissions under this heading.

STORMWATER/LANDSCAPE MANAGEMENT

Stormwater management primarily involves coordinating processes involved with the runoff experienced on the university's grounds. Landscape management has to do with maximizing the sustainable use of the university grounds. It also ties into proper stormwater managements as well as the botanical aspects of the university. Stormwater management currently contributes no direct emissions to the university; however consultation with the Metropolitan Water Reclamation District will determine the level of emissions associated with sending water off site.

REDUCING EMISSIONS: STRATEGIES & IMPLEMENTATION

IIT's carbon footprint is estimated to be 391,276MTCO$_2$e. Our goal is a fifty percent (50%) reduction in net emissions by the year 2020; a decrease of approximately 195,638 MTCO$_2$e. IIT must develop and implement strategies for all program areas in order to achieve our vision of becoming the most sustainable urban university in the United States. For the purpose of this report we choose to focus on Energy, recognizing that it has the greatest contribution to the university's total emissions.

ENERGY

In this section we more closely explore our current Energy related emissions and our potential emission reductions. We also address the variety of ways in which IIT intends to achieve their overall goal.

	Current Emissions (MTCO$_2$e)	Possible Reduction	Possible Emission Reduction (MTCO$_2$e)	Reduction Strategies
Steam	166,914	30%	50,074	Saving Energy, Other
Electricity	120,705	100%	120,705	Saving Energy, Sustainable Energy
Natural Gas	36,190	30%	10,857	Saving Energy, Other
Other	15,138	100%	15,138	Saving Energy, Sustainable Energy, Offsets, Other
Total	338,947		191,588	

Table 5 - Reducing Energy Emissions Breakdown

SAVING ENERGY

Saving energy takes two forms: infrastructure improvements or behavioral change. The university must follow both approaches simultaneously in order to reach the energy and emissions goals. Energy reductions improve environmental performance through emissions reduction, while also improving financial performance. Typical behavioral policies include:

- Turning off all lights when not in use
- Turning off plug in loads at night and other dormant periods
- Optimizing HVAC systems the reduce unnecessary heating/cooling
- Using Energy STAR rated appliances

In addition to the behavioral policies, the university must improve building envelopes, employ more efficient energy transfer systems, and utilize smart building technology to match energy use to building loads. (See the IIT Energy Policy for more details)

USING MORE SUSTAINABLE ENERGY

By using more sustainable energy, the university will reduce or eliminate the need for energy transfer methods that result in high carbon dioxide production. The university can avail itself of on-site resources, such as solar photovoltaic, solar thermal or geothermal, that rely on little or no carbon to satisfy building loads.

Also, through careful negotiation of electricity supply contracts, IIT can virtually eliminate the carbon associated with utility-scale energy production. IIT will employ both strategies.

CARBON OFFSETS

IIT recognizes that in order to meet the mission of the institution, our students, faculty and staff must travel and that there will be emissions associated with this travel that cannot be eliminated. We are committed to taking responsibility for the environmental impacts of non-commuting and will employ carbon offsets to achieve this goal.

We have a practical approach to carbon offsets: ensure that as much of the positive environmental impact of our efforts as possible enhances the campus or local ecosystem. One potential initiative is planting trees on campus or in Chicago parks and other nature areas. IIT, as a leader in technology and innovation, should also involve faculty in students in developing projects which serve to improve air quality and reduce climate change.

OTHER

IIT recognizes that over the next ten years, technologies and opportunities not yet in practice will contribute to the reduction of greenhouse gas emissions. In order for this plan to remain flexible, the university will report in this section any reductions not falling under a previous category.

OTHER PROGRAMS/INITIATIVES IMPACTING EMISSIONS

LEED PROGRAM

The LEED for Existing Buildings Rating System helps building owners and operator's measure operations, improvements and maintenance on a consistent scale, with the goal of maximizing operational efficiency while minimizing environmental impacts. LEED for Existing Buildings addresses whole-building cleaning and maintenance issues (including chemical use), recycling programs, exterior maintenance programs, and systems upgrades. It can be applied both to existing buildings seeking LEED certification for the first time and to projects previously certified under LEED for New Construction, Schools, or Core & Shell.

AASHE STARS PROGRAM

The Sustainability Tracking, Assessment & Rating System (STARS®) is a transparent, self-reporting framework for colleges and universities to gauge relative progress toward sustainability. STARS was developed by AASHE with broad participation from the higher education community.

STARS is designed to:

Provide a framework for understanding sustainability in all sectors of higher education.

- Enable meaningful comparisons over time and across institutions using a common set of measurements developed with broad participation from the campus sustainability community.

- Create incentives for continual improvement toward sustainability.
- Facilitate information sharing about higher education sustainability practices and performance.
- Build a stronger, more diverse campus sustainability community.

The STARS framework is intended to engage and recognize the full spectrum of colleges and universities in the United States and Canada – from community colleges to research universities, and from institutions just starting their sustainability programs to long-time campus sustainability leaders. STARS encompasses long-term sustainability goals for already high-achieving institutions as well as entry points of recognition for institutions that are taking first steps toward sustainability.

STARS 1.0, which launched on January 19, 2010, after a three-year development process, is the first version of STARS in which participants can earn a rating.

UNIVERSITY INITIATIVES

IIT recognizes the importance of exacting change in each of our sustainability program areas in order to reduce the university's overall emissions. In this section we will report any additional strategies being implemented by the university. Examples may include organic waste composting, stormwater management improvements, and incentivizing alternative transportation.

CONCLUSIONS

A university committed to innovation and excellence, must recognize the environmental impact of its operations and commit to making consistent improvement in its performance. The Illinois Institute of Technology has committed to reduce greenhouse gas emissions by fifty percent (50%) over the ten years of the Campus Sustainability Plan. Reaching this commitment will require a campus culture by which the environmental impact of actions will drive administrative decisions and personal choices. The Climate Action Plan recognizes that with unlimited resources, the university could change operations rapidly to meet the environmental goals, however the university does not have unlimited resources, and so must establish priorities. IIT will focus on creative strategies for improving energy performance in buildings, reducing the need for carbon-based fuels in the energy supply, and encourage occupant behaviors that reduce the net environmental impact of the campus. With the entrepreneurial and ingenious spirit that pervades the Illinois Institute of Technology, the university will reach and exceed its goals over the next ten years.

APPENDIX

A: COMMUTING STATISTICS

		Students	Staff
Total Miles		363,700 miles	45,157 miles
Within Biking Distance		344 People	204 People
Within Walking Distance		189 People	91 People
People Counts	Full Time	6,206 People	1,216 People
	Part Time	2,303 People	483 People

Total miles were calculated using representative zip code locations. The zip code of every individual at the university was paired with the main campus' zip code. Below is the list of assumptions and possible room for error in the calculations

1. A central representative location (longitude and latitude) was used for each zip code
2. Shortest distances (straight line) were calculated as opposed to actual road distances.
3. Locations within the same zip code were assumed as 0, as there was only one representative location.
4. Due to individuals not updating their addresses with the university, some people may not be properly represented in the calculations
5. Improper locations may have been entered. As a result, daily commutes of over 1000 miles were recorded for some people. These had to be either ignored, or adjusted.
6. Even though not all the people represented necessarily commuted to the main campus location, it was the single central location used.

B: CLEAN AIR COOL PLANET (CACP)

Following are excerpts from the CACP calculator used for calculations and estimations in this report.

Table B1: CACP Output Summary

MODULE	Summary		
WORKSHEET	Total Emissions in Metric Tonnes CO_2 Equivalents		
UNIVERSITY	Illinois Institute of Technology		
	Fiscal Year		2008
Scope 1	Co-gen Electricity	MT eCO_2	0.0
	Co-gen Steam	MT eCO_2	17,286.9
	Other On-Campus Stationary	MT eCO_2	19,914.6
	Direct Transportation	MT eCO_2	158.9
	Electric Fleet	MT eCO_2	-
	Refrigerants & Chemicals	MT eCO_2	-
	Agriculture	MT eCO_2	-
Scope 2	Purchased Electricity	MT eCO_2	32,344.0
	Purchased Steam / Chilled Water	MT eCO_2	269,242.1
Scope 3	Faculty / Staff Commuting	MT eCO_2	6,424.6
	Student Commuting	MT eCO_2	26,266.6
	Directly Financed Air Travel	MT eCO_2	797.9
	Other Directly Financed Travel	MT eCO_2	-
	Study Abroad Air Travel	MT eCO_2	113.7
	Solid Waste	MT eCO_2	573.2
	Wastewater		783.3
	Paper Purchasing		0.3
	Scope 2 T&D Losses	MT eCO_2	17,369.5
Offsets	Additional	MT eCO_2	-
	Non-Additional	MT eCO_2	-
	Total Scope 1	MT eCO_2	37,360.4
	Total Scope 2	MT eCO_2	301,586.1
	Total Scope 3	MT eCO_2	52,329.0
	Biogenic	MT eCO_2	-
	Total Offsets	MT eCO_2	-
	Total Emissions	MT eCO_2	391,275.5
	Net Emissions	MT eCO_2	391,275.5

Figure B2: Cost Fuel Mix Input

MODULE	Input	
WORKSHEET	Custom Fuel Mix	
UNIVERSITY	Illinois Institute of Technology	
Fiscal Year		2008
Total Electricity Purchased	(kWh)	55082608
Net Purchased	(%)	1
Coal	(%)	54
Natural Gas	(%)	12
Distillate Oil (#1-#4)	(%)	1
Residual Oil (#5-#6)	(%)	-
Nuclear	(%)	29
Waste to Energy	(%)	-
Hydro-Electric	(%)	2
Biomass	(%)	-
Renewable (wind, solar)	(%)	1
Total Percentage	(%)	100

Table B3: CACP Input (Institutional Data)

MODULE	Input			
WORKSHEET	Input: Enter emissions source activity and institutional data			
UNIVERSITY	Illinois Institute of Technology			
Institutional Data	Fiscal Year			2008
	Budget - Click here to enter data	Operating Budget	0.722	$ -
		Research Budget	0.722	$ -
		Energy Budget	0.722	$ -
	Population	Full Time Students	#	4,877
		Part-Time Students	#	1,778
		Summer School Students	#	2,106
		Faculty	#	447
		Staff	#	592
	Physical Size	Total Building Space	Square feet	2,903,616
		Total Research Building Space	Square feet	1,717,786

Table B4: CACP Inputs (Scope 1)

MODULE	Input				
WORKSHEET	Input: Enter emissions source activity and institutional data				
UNIVERSITY	Illinois Institute of Technology				
--- Scope 1 Emissions Sources ---	On-Campus Stationary Sources	On-Campus Cogeneration Plant(s)	Residual Oil (#5-6)	Gallons	
			Distillate Oil (#1-4)	Gallons	327
			Natural Gas	MMBtu	326,604
			LPG (Propane)	Gallons	
			Coal (Steam Coal)	Short Tons	
			Incinerated Waste	Short Tons	
			Wood Chips	Short Tons	
			Wood Pellets	Short Tons	
			Grass Pellets	Short Tons	
			Residual BioHeat	Gallons	
			Distillate BioHeat	Gallons	
			Other	MMBtu	
			Electric Output	kWh	0.01
			Steam Output	MMBtu	95,761,344
			Electric Efficiency	%	0.01
			Steam Efficiency	%	53.70%
		Other On-Campus Stationary Sources	Residual Oil (#5-6)	Gallons	
			Distillate Oil (#1-4)	Gallons	
			Natural Gas	MMBtu	376322.00
			LPG (Propane)	Gallons	
			Coal (Steam Coal)	Short Tons	
			Incinerated Waste	Short Tons	
			Wood Chips	Short Tons	
			Wood Pellets	Short Tons	
			Grass Pellets	Short Tons	
			Residual BioHeat	Gallons	
			Distillate BioHeat	Gallons	
			Other	MMBtu	

Table B4: CACP Inputs (Scope 1 Contd.)

MODULE	Input				
WORKSHEET	Input: Enter emissions source activity and institutional data				
UNIVERSITY	Illinois Institute of Technology				
--- Scope 1 Emissions Sources ---	Direct Transportation Sources	University Fleet	Gasoline Fleet	Gallons	17,796
			Diesel Fleet	Gallons	
			Natural Gas Fleet	MMBtu	
			E85 Fleet	Gallons	
			B5 Fleet	Gallons	
			B20 Fleet	Gallons	
			B100	Gallons	
			Hydrogen	MMBtu	
			Other Fleet Fuel	MMBtu	
			Electric Fleet	kWh	
	Refrigerants & Chemicals	Refrigerants & Chemicals	HFC-134a	Pounds	
			HFC-404a	Pounds	
			HCFC-22	Pounds	
			HCFE-235da2	Pounds	
			HG-10	Pounds	
			Other	Pounds	
	Agriculture Sources	Fertilizer Application	Synthetic	Pounds	
			% Nitrogen	%	
			Organic	Pounds	
			% Nitrogen	%	
		Animal Husbandry	Dairy Cows	#	
			Beef Cows	#	
			Swine	#	
			Goats	#	
			Sheep	#	
			Horses	#	
			Poultry	#	
			Other	#	

Table B5: CACP Inputs (Scope 2 and Scope 3)

MODULE	Input				
WORKSHEET	Input: Enter emissions source activity and institutional data				
UNIVERSITY	Illinois Institute of Technology				
--- Scope 2 Emissions Sources ---	Purchased Electricity, Steam, and Chilled Water	Electricity	CLICK TO SET eGRID SUBREGION	kWh	55,082,608
		Steam	CLICK TO SET FUEL MIX	MMBtu	3,569,657
		Chilled Water	CLICK TO SET FUEL MIX	MMBtu	
--- Scope 3 Emissions Sources ---	Commuting - click here to enter data	Faculty / Staff Commuting	Automobile	Miles	10,431,233
			Bus	Miles	3,725,440
			Light Rail	Miles	312,937
			Commuter Rail	Miles	7,450,881
		Student Commuting	Automobile	Miles	33,565,095
			Bus	Miles	10,069,528
			Light Rail	Miles	23,495,566
			Commuter Rail	Miles	33,565,095
	Directly Financed Outsourced Travel	Air Travel	Faculty / Staff	Miles	1,027,685
			Students	Miles	
		Other	Train	Miles	
			Taxi / Ferry / Rental Car	Miles	
			Bus	Miles	
			Alternative Fuel Bus	Miles	
			Personal Mileage Reimbursement	Miles	
	Study Abroad Travel		Air	Miles	146,392
	Solid Waste	Incinerated Waste (not used for on-campus power)	Mass Burn	Short Tons	
			Refuse Derived Fuel (RDF)	Short Tons	
		Landfilled Waste	No CH4 Recovery	Short Tons	486
			CH4 Recovery and Flaring	Short Tons	
			CH4 Recovery and Electric Generation	Short Tons	
	Wastewater	Septic System		Gallons	137,639,000
		Central Treatment System	Aerobic	Gallons	
			Anaerobic	Gallons	
			Anaerobic Digestion	Gallons	
	Paper	Uncoated Freesheet	0% Recycled	lbs	210
		Uncoated Freesheet	25% Recycled	lbs	
		Uncoated Freesheet	50% Recycled	lbs	
		Uncoated Freesheet	75% Recycled	lbs	
		Uncoated Freesheet	100% Recycled	lbs	

Table B5: CACP Input (Offsets)

MODULE	Input			
WORKSHEET	Input: Enter emissions source activity and institutional data			
UNIVERSITY	Illinois Institute of Technology			
--- Offsets ---	Offsets with Additionality	On-campus Composting	Short Tons Compost	-
		Forest Preservation	MT eCO_2	
		Retail Offsets (High End)	MT eCO_2	
		Retail Offsets (Low End)	MT eCO_2	
		Other	MT eCO_2	
	Non-Additional Renewable Energy Certificates (RECs)	Green Power Certificates	kWh	
		Retail Offsets (High End)	MT eCO_2	
		Retail Offsets (Low End)	MT eCO_2	
		Other	MT eCO_2	

C: ENERGY REPORT (OCTOBER, 2009)

(see Energy Report 2009…Need Joseph to include the final copy))

D: CAMPUS INFORMATION

(Energy breakdown from Joseph)

E: SUSTAINABIITY POLICIES

(Include sustainability policy below)

ENDNOTES

USGBC LEED for Existing Buildings Program - Credits with an Impact on Carbon Footprint

AASHE STARS Program - Credits with an Impact on Carbon Footprint

---

[i] http://www.presidentsclimatecommitment.org/about/mission-history
[ii] http://www.aashe.org/about
[iii] http://nsidc.org/arcticmet/glossary/climate_change.html
[iv] http://blog.oup.com/2006/11/carbon_neutral_/
[v] http://www.epa.gov/climatechange/emissions/index.html#ggo
[vi] http://www.usgbc.org/leed/
[vii] http://stars.aashe.org/pages/about/
[viii] http://www.usgbc.org/
[ix] http://www.iit.edu/about/index.html
[x] http://www.iit.edu/oiir/
[xi] http://recyclemania.org/
[xii] ACUPCC Implementation Guide p. 11
[xiii] ACUPCC Implementation Guide p. 11
[xiv] ACUPCC Implementation Guide p. 11-12
[xv] Numbers from Energy Report Audit Conducted in Summer 2009