

EnPRO 352 Final Report  
Spring 2011

# Increasing Alternative Transportation at IIT



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Sponsor: Office of Campus Energy and Sustainability

Executive Statement:

EnPro 352 focused on the issue of increasing bike ridership at IIT and the means by which to do so. The team first administered a survey to the IIT community and looked at other universities to see what steps they had taken to combat this problem. The survey revealed that storage options, incentives, and maps were the primary solutions that the IIT community wanted. The team then researched how they could address these issues and what resources we would need to solve them. The team developed financial models for these issues as well as ideas for a web portal and incentive method.

The team decided that a CycleSafe storage option with a Escort GPS option and a bike repair shop with the web portal for incentives would be the best option and solution for the problems that the survey found. The next step that will need to be addressed is researching methods to raise funding to subsidize the initial investments for the projects.

Purpose & Objectives:

The problems that EnPRO 352 faced included increasing awareness about the benefits of biking, continuing IIT's effort to be more environmentally friendly and sustainable, and creating a profitable business model.

Our sponsor, Joseph Clair, is head of the office of Campus Energy and Sustainability at IIT. His office would like to focus on bicycles as an alternative transportation method for both commuting and pleasure.

IIT campuses are located in areas that make the use of alternative transportation methods easy and affordable. However, approximately 90% of the faculty, staff and student population use their own vehicle to commute to and between campuses. Alternative transportation has many benefits; it promotes health awareness and creates an environmentally friendly and sustainable campus.

The EnPRO 352 team strives to create a business enterprise which will provide services in order to increase the use of bicycles on and around campus. The team investigated the possibilities of on campus storage options, bike rental and repair services, safety and awareness, and easy online access via IIT webportal.

Organization and Approach:

The team first sought to discover why the IIT community was not using bicycles and what incentives we could use to increase the usage of bikes among the IIT community. The team began with a survey as well as researching other universities to see what methods they have used to increase bike ridership including Saint Xavier University and Loyola University. We conducted an initial survey to assess both current bike usage and interest in various proposed services. It also asked participants to declare their IIT affiliation: student, faculty, or staff. It was distributed over facebook.com, IIT Today, and the IPRO email list. To encourage participation, three \$50 amazon.com gift cards were given to randomly selected participants. A question regarding the distance respondents live from campus was considered, but left out based on the assumption that

people living a certain arbitrary distance away would not ride to campus regardless of incentives and services. The proposed services included on the survey were “Merit Badges” (virtual award badges), discounts (on and off campus), rental bikes, improved storage, a repair and/or retail shop, route maps, bike tours/groups, riding lessons, and improved safety. There was also an open text box for additional comments. A total of 287 responses were received, 33 of which identified as faculty or staff.

Our sponsor also oversaw the implementation of B-Cycle rental into our campus through the organization, Gangreen. B-cycle is the first bicycle sharing system in the city of Chicago. Self-service bike rental stations (B-stations) exist along the Chicago lakefront and loop. Members can pick up a bike at any B-station and drop it off at any B-station. B-Cycle will be starting at IIT next semester.

From the survey and knowing that bike rental was not an option, the team sought to address the issues and problems that arose from the survey. The team decided that the major issues to research were bike storage and security, bike shop, incentives program, and a web portal.

To address the problems that our team faced, we divided into three defined groups: business, incentive, and marketing. The business team was in charge of assessing the financial viability of the business. They focused completing a business model. The incentive team was in charge of determining what incentives are needed to convince students to resort to alternative transportation. The marketing team presented the team's ideas to the campus and thought of marketing initiatives to help bring in students and promote the service. The division of our team is shown below:

Business Team	Marketing Team	Incentive Team
<b>Joe</b>	<b>Tom</b>	<b>Quintin</b>
Ray	Peter	Tiauna
Tryphaena	Tony	Trang
Max	Connor	Yijin
Danny		

### Analysis and Findings:

The survey was successful; a total of 250 students, 7 faculty members, and 26 staff members responded. The survey asked the responders to rank questions from definitely, likely, not sure, unlikely, and would not. The results are shown in Appendix A. The results showed that discounts, both on and off campus, were the clear favorite options. The highest demand for non-incentive items were better storage options and a repair/retail facility, both of which were very close behind discounts in popularity. Other options trended mostly towards positive reception, but had less impressive support. Riding groups/tours was almost totally neutral in response. Riding lessons and “Merit Badges” were the only options that were most disfavored. The results of this survey, including the comments, helped guide future project efforts.

From these results, the EnPro was focused on storage, incentives, and security. The team then

reached out to such resources as BikeConnect, CycleSafe, GPS companies and various IIT offices to determine a way to address these issues and determine a method to find a solution for them.

From these resources, the team implemented these resources into future financial models. The financial models for CycleSafe and BikeConnect are shown in Appendix B. These results show that CycleSafe is the better option due to the fact that there is no annual fee for its use. The payback period of this investment would be only 4 years, if there was no additional initial investment. This option also offered more bike storage than the BikeConnect system.

A lower-cost alternative to the secure bike storage units could be obtained through partnership with a company such as MSSmedia. MSSmedia is the leading provider of free, customizable bus shelters, bike shelters, information kiosks, wall displays, and transit advertising solutions for college and university campuses throughout the United States. They offer a free covered bike rack solution that is paid for by displaying advertising on the sides of the enclosure. While their offering provides some protection against the elements, it is not a secure access storage facility.

Another option that arose was GPS rental. After analyzing our GPS options, it becomes obvious that the only financially feasible options are either the Zoombak Universal A-GPS Locator or the Escort Entourage. The calculations are shown in Appendix C. The breakeven point of these two options are 26 months for Zoombak and 12 months for Escort. Thus, the Escort option seemed to be the smarter option if GPS rental is used.

The final financial model was the on-campus bike shop, which would sell parts to the students and offer repair services. The results are shown in Appendix D. The break-even point would be twelve months and the analysis of this option shows that it is viable and the initial investment would not be too expensive. Another alternative would be to contract with a local bike-shop to implement an outsource model where the bike shop would supply the equipment and parts and employ an IIT student(s) to operate an on-campus satellite shop in space provided by the University.

The following is a list of potential spaces for an on-campus bike shop. The availability is in either Tech South or Tech Central

Room numbers:

Tech Central:

BA 1-1, 2-1, 3-1, 3-2,6-2, 7-1, 7-2, 8-1, 9-1

BB 1-1, 2-1, 3-1, 4-1, 5-1, 5-2, 7-1

BBB 1, 2, & 3

BC 1-1, 5-1, 5-2, 6-1, 7-1, 8-2,

1A 7-2,

1B 3-1, 4-1, 4-2

Tech South:

BA 1-1A, 3-1, 4-1

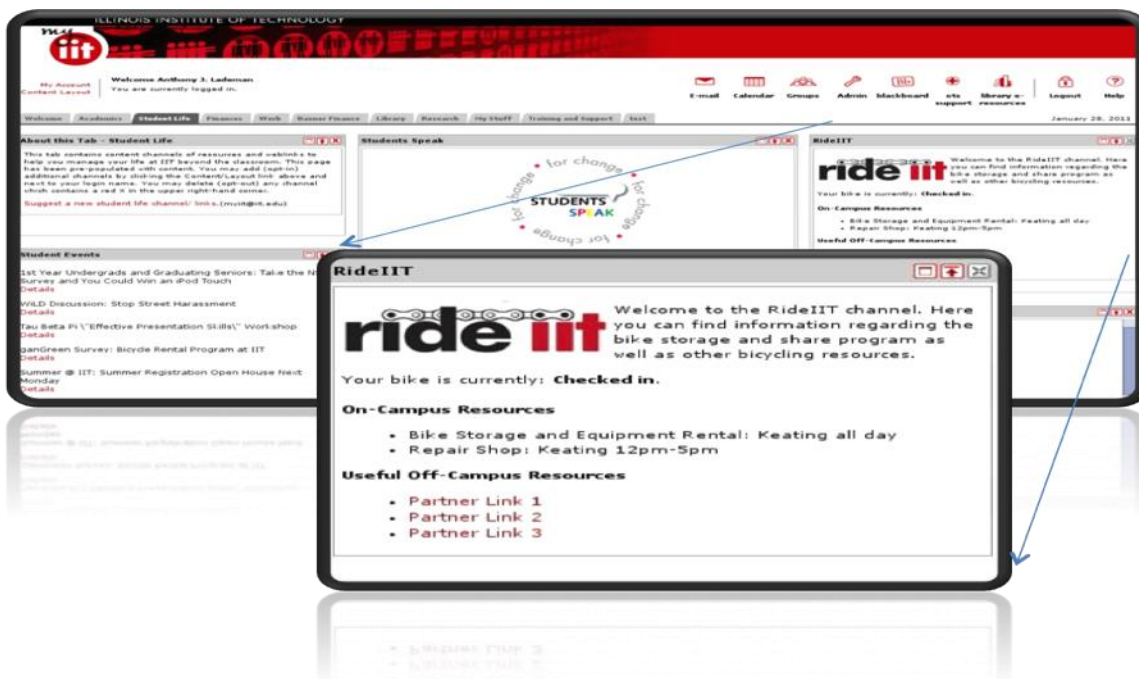
BB 4-1, 7-1,9-1

BC 1-1, 3-2, 5-1, 6-1, 6-2, 7-1, 7-2,8-1, 9-1

- 1A3-1, 5-1,5-3,7-1, 9-1,9-2
- 1B6-1, 6-2, 7-4, 8-4, 9-1
- 1C3-1, 3-2, 4-1, 4-2

The selected and best room for the Bike Shop location is 1B 3-1 in Tech Central.

For convenience and ease of access, a web portal was developed. The Ride IIT web portal would make it easy for any student who is signed up with the program to log into their My IIT account and instantly have access to the Ride IIT membership incentives and news about biking in the Chicago area. This will all be located under the “Student Life” tab in My IIT. Through this portal students will be able to apply the credits they earn from riding towards discounts on Jimmy John’s and other local vendors signed up with the program. Also, credits can be applied directly to a student’s tech cash account making tech cash even easier to use. Along with having the ability to apply credits to different places students will also be able to have quick access links to maps and news about biking in the Chicago area, and organizing rides. Important nationwide biking events will also be posted. The web portal makes it really easy for any members of the Ride IIT program to access the information they need. If secure bike storage facilities are implemented, IIT IDs could be used to not only gain access to the facilities, but also used to track usage and assign points for incentives.



**Conclusions and Recommendations:**

IIT needs to make a change to how it is currently encouraging its students and faculty to commute to and from campus. There are many faculty, staff and students, along with some of our own IPRO 352 members, that would commute to campus, but they are discouraged due to the lack of proper and convenient security. Instituting secure bike storage along with other incentive programs should help to encourage more of the IIT community to ride. The programs will initially require a decent investment along with some grants and SAF funding, but over time (i.e. about 3-4 years depending on the package) it will turn a profit and prove its worth in more ways than just financially. Probably a more feasible solution, to quickly implementing secure bike storage facilities, would be to partner with an outside company that specializes in outdoor advertising and could either cover the full cost of the equipment and install or substantially subsidize the cost.

With our new bike storage program, IIT will be reducing its carbon footprint, providing better campus security, encouraging more members of the IIT community to ride their bikes, and setting an example for other college campuses to follow. IPRO 352's new plan for on campus bike storage is a great step in the right direction for IIT and its community.

Additional initiatives IIT could consider to raise awareness and promote bike usage are as follows:

**Education Programs****Proposed Outreach**

- Provide information tables during Bike-to-Work Day
- Cycle Day during Student Welcome Week that would include bike demos from various bike manufacturers
- Bicycle safety information at new student orientations.
- Provide bicycling information tables at special events throughout the year
- Promote the use of bicycle safety equipment: headlights, flashing rear lights, and helmets
- Provide bicycle repair classes
- Work with local bicycle advocacy groups, shops and clubs to help educate cyclists
- Develop a Bicycle Ambassador program to educate cyclists on the rules of the road and bicycle security issues.

**Proposed Educational Materials**

The purpose of bicycle-specific educational materials is to increase awareness of bicycling issues, bicycle theft prevention measures, and the campus bicycle programs. Materials would be posted on-campus and within residential living communities such as dormitories, fraternity houses.

The materials could include:

- Create a campus bike guide reference brochure that includes information on campus bicycle riding policies, bike-parking locations, bike route map for on and around campus, etc.
- Periodic articles in campus news- papers.
- Write articles and pitch stories to local newspapers on bicycling safety and services
- Find and distribute an existing "How to Ride Your Bike" film clip
- Advertise bicycling messages on campus shuttles and at transit stops.

**Bicycle Friendly University Designation**

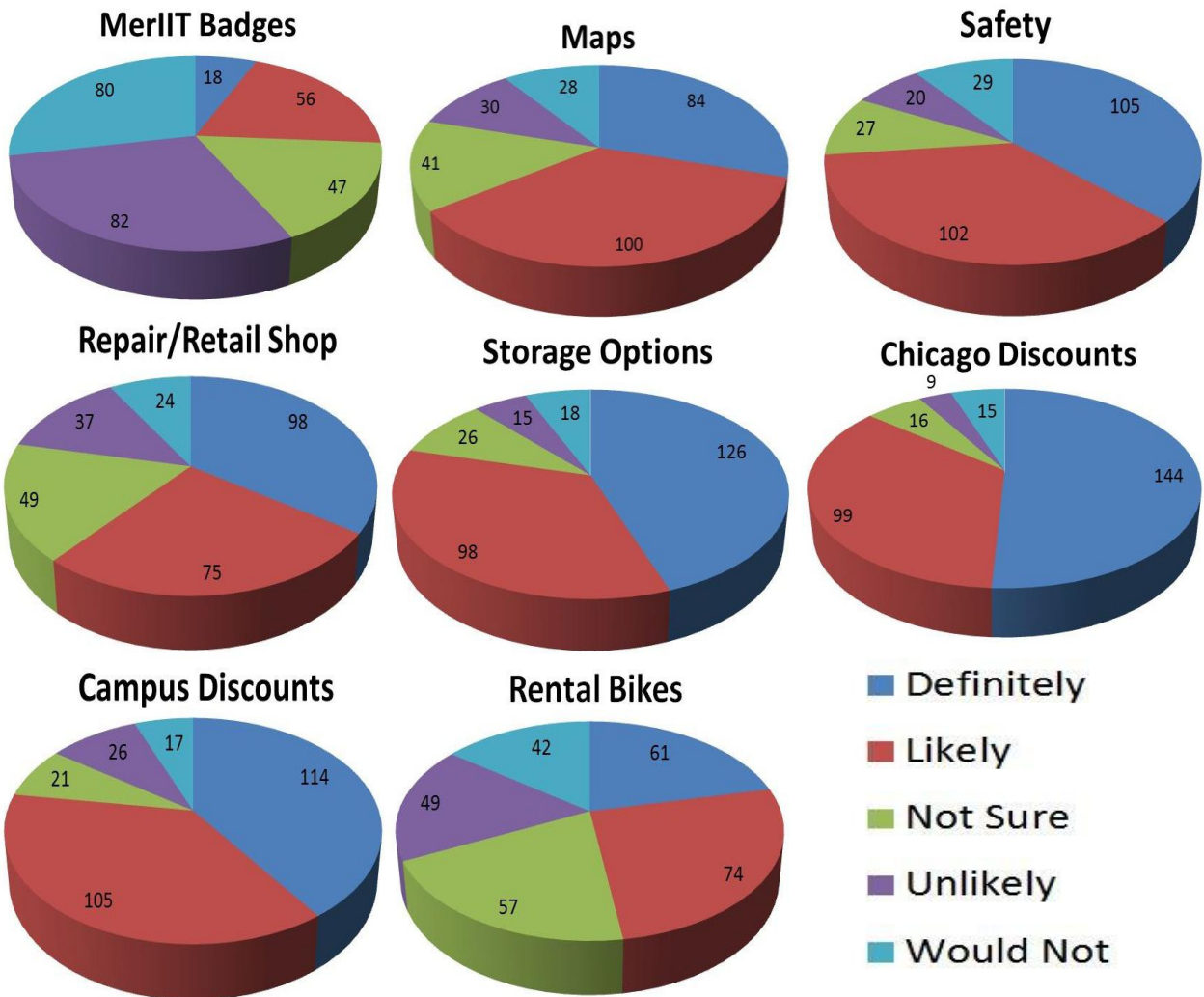
The Bicycle Friendly University (BFU) program recognizes institutions of higher education for promoting and providing a more bicycle-friendly campus for students, staff and visitors. The BFU program provides the roadmap and technical assistance to create great campuses for cycling.

The Bicycle Friendly University application consists of 94 questions.

Applicant colleges and universities are judged in five categories often referred to as the Five Es. These are Engineering, Education, Encouragement, Enforcement, and Evaluation & Planning. A college or university must demonstrate achievements in each of the five categories in order to be considered for an award. Institutions with more significant achievements in these areas receive superior awards. Filling out the BFU application is educational in itself, as schools are able see where they are lacking in each of these categories.

The future of this project is uncertain. The greatest obstacle in the way of this project currently is the overwhelming financial burden. Overcoming this burden is key to the development of the project. The team will have to find a method to raise funds to offset the initial costs of the project which may include pre-selling memberships for secure bike storage, annual fundraiser, ongoing bike-theme events like ice-cream rides, work with foundations and seek sponsorships.

Appendices:  
Appendix A: Survey Results





Appendix B:  
Storage Financial Models

BikeConnect

	Standard	Platinum		Standard Cash Flow	Platinum Cash Flow
Initial Investment	-\$77,670.00	-\$77,670.00	1 <sup>st</sup> Year	-\$54,830.00	-\$63,330.00
Annual Fee	-\$13,200.00	-\$19,800.00	2 <sup>nd</sup> Year	-\$30,390.00	-\$45,490.00
Setup Fee	-\$1,600.00	-\$3,500.00	3 <sup>rd</sup> Year	-\$5,950.00	-\$27,650.00
Student Salaries	-\$6,120.00	-\$6,120.00	4 <sup>th</sup> Year	\$18,490.00	-\$9,810.00
Total Startup Costs	<u>-\$98,590.00</u>	<u>-\$107,090.00</u>	5 <sup>th</sup> Year	\$42,930.00	\$8,030.00
SAF funding	\$5,000.00	\$5,000.00			
Grants	?	?			
Advertising	\$15,000.00	\$15,000.00			
Membership fees	\$23,760.00	\$23,760.00			
Total Revenue	<u>\$43,760.00</u>	<u>\$43,760.00</u>			

CycleSafe

	Standard		Standard Cash Flow
Initial Investment	-\$120,000.00	1 <sup>st</sup> Year	-\$79,720.00
Annual Fee	\$0.00	2 <sup>nd</sup> Year	-\$42,080.00
Setup Fee	\$0.00	3 <sup>rd</sup> Year	-\$4,440.00
Student Salaries	-\$6,120.00	4 <sup>th</sup> Year	\$33,200.00
Total Startup Costs	<u>-\$126,120.00</u>	5 <sup>th</sup> Year	\$70,840.00
SAF funding	\$5,000.00		
Grants	?		
Advertising	\$15,000.00		
Membership fees	\$26,400.00		
Total Revenue	<u>\$46,400.00</u>		

Appendix C:  
GPS Rental

The options are either the Zoombak Universal A-GPS Locator or the Escort Entouragewhich (for a lifetime contract) would either cost us \$25,000 for the first option or \$11,500 for the second device. Rental was assumed at 2 hours at \$12 for 2 hours and the average number of rental a month was estimated at 80.

The break even points for both devices are shown below:

Zoombak:  $-25,000 + (60 \cdot 12)X = 0 \Rightarrow X = 26.04$ , which means that it will take roughly 26 months to break even, representing  $26/8 = 3.25$  Chicago bicycle riding seasons, assuming that you can conveniently ride a bike here for at least 8 months of the year.

That is very realistic, since some people even ride all year round.

Escort:  $-11,500 + (60 \times 12)X = 0 \Rightarrow X = 11.98$ , which means it would not even take 2 years to break even with this device.

Appendix D:  
Bike Shop

Initial Investment (Equipment/Tools)		(\$10,000)		
Student Worker	\$10/hr		1 worker	10
Rent		\$0.00		
Average Number of Customers per Month		60		
Average Customer Bill		\$30		
Average Gross Revenue Per Month		\$1,800		
Average Minutes Spent Per Customer		30		
Average Labor Cost Per Customer		\$5.00		
Average Labor Cost Per Month		\$300		
Average Cost of Parts Per Customer		\$10		
Average Cost of Parts Per Month		\$600		

Note: Financial Model takes into account not paying rent, and no taxes

Net Profit of Month One		(\$9,100)		
Net Profit of Month Two		(\$8,200)		
Net Profit of Month Three		(\$7,300)		
Net Profit of Month Four		(\$6,400)		
Net Profit of Month Five		(\$5,500)		
Net Profit of Month Six		(\$4,600)		
Net Profit of Month Seven		(\$3,700)		
Net Profit of Month Eight		(\$2,800)		
Net Profit of Month Nine		(\$1,900)		
Net Profit of Month Ten		(\$1,000)		
Net Profit of Month Eleven		(\$100)		
Net Profit of Month Twelve		\$800	Break Even Point	