

Project Plan:

I. Team Charter

1. Team Information

a. Team Roster

- | | |
|-----------------------|-------------------|
| • Beck, Steve | sbeck@codallc.net |
| • Bohac, Adam | abohac@iit.edu |
| • Brady, David | dbrady1@iit.edu |
| • Bueno, Juan | jbueno1@iit.edu |
| • Coughlin, Daniel | dcoughl1@iit.edu |
| • Depalma, Lowell | ldepalma@iit.edu |
| • Gonzalez, Juan | gonzjua1@iit.edu |
| • Gross, Josh | kgross2@iit.edu |
| • Hernandez, Carlos | chernan5@iit.edu |
| • Iversen, Jennifer | jiverse1@iit.edu |
| • McKinley, Keanen | kmckin1@iit.edu |
| • Mocer, Michael | mmoceri@iit.edu |
| • Modi, Nishant | nmodi5@iit.edu |
| • Wisniewski, Anthony | awisniew@iit.edu |
| • Zacharias, Bryan | bzachari@iit.edu |

2. Team Purpose and Objectives

a. Purpose

- Our purpose is to seek a union between living comfortably and living sustainably. We are to design for a future Chicago-area community, which first minimizes its energy consumption and then uses the most sustainable methods to fulfill the remaining needs of the inhabitants. Ideally we will design a model community which will challenge conventions within the fields of design, planning, engineering, and everyday living. This community will also serve as an example to Chicago-area municipalities about the benefits of sustainable planning, design, and living.

b. Objectives

- Research today's most sustainable methods for fulfilling the energy needs of a home in Chicago
- Implement the most effective and affordable methods and design several residential modules around the findings of our research
- Organize these modules into a larger community also around the findings of our research
- Test our solution by comparing its energy consumption/costs with the average home of today
- Present our solution clearly and truthfully as a catalyst for change in the way future communities are laid out

3. Background

a. Customer / Sponsor

- This is the first semester for the Zero CommunIITy iPro. At this time we do not have any official sponsors. However we do have a consultant from A. Epstein & Sons. Jeremy Poling, Senior Sustainability Analyst will be acting as an informational resource for the team throughout the semester.
- This IPRO grew from the interest of surrounding Chicago municipalities. Currently we have two municipalities we will use as potential customers for our project. These municipalities are the Village of Oak Park and Evanston, IL. We plan on presenting our research and ideas to individuals in the Planning Department of Oak Park and Evanston in hopes of influencing their approach to community planning and development.

b. User problems

- A large part of the struggle in the design of this model community will be trying to reduce the amount of energy and resources consumed not only in the construction of the community, but also in the daily life of the future residents. This may require pushing the envelope of commonly accepted ideas about the way communities are planned and inhabited, as well as challenging common ideas about life in an American suburban home.

c. Science and technology

- The technologies can be divided into two categories. The first is passive systems, which include designing around proper solar orientation, the use of cross ventilation, the use of sustainable materials, etc. The next category, active systems, involves the use of technologies such as geothermal heat pumps, solar collectors, etc. We would like to confront this project by implementing various sustainable technologies available to develop sustainable lifestyles while maintaining a similar quality of life as is current common.

d. Historical precedents

- There are several communities which have been designed to be environmentally-friendly. However, one in particular, stands out as exceptional: the Beddington Zero Energy Development. This 99 house scheme utilizes renewable on-site sources to generate its power. Additionally, the rooms were designed around proper solar orientation, windows are triple glazed, and walls have high thermal insulation to prevent heat loss. All in all, England's "bedzed" project represents a quality environmentally-friendly housing scheme which is actually built and performing as it should.

e. Ethical issues

- By designing a community, which is not dependent on the grid/conventional systems for its energy and comfort needs, we might hurt some public companies such as ComEd or General Electric. Achieving complete independence from the typical services a city applies might allow for too much power within individual communities.

f. Business or societal costs

- If our solution for an energy-conscious community were to be built, its members might have to invest in the initial costs for the systems it will be using. Though there is the presence of this investment, they will ultimately be compensated by the money they save as they opt for these systems over traditional ones.

g. Implementation outline for solutions

- Our findings and conclusions will be presented to communities in the Chicago-area in hopes that they will be influenced to change some of their design and planning practices for the betterment of the environment, both built and natural.

4. Team Values statement

a. Desired behaviors

- All members of the iPro group should be dedicated to the progress of the project and the part they play within the team. This means all team members should respect the need for punctuality, attendance, cooperation, and meeting deadlines. Innovation will also be required to solve the proposed problems.
- All requests, questions, or complaints should be directed properly through the hierarchy of the group's organizational system. That is to say beginning with sub-group leaders, when need be to multiple sub-groups leaders, and finally to the group leader.
- All research should be thoroughly documented and available for all members of the team.
- Sub-groups should regularly share information and act as 'consultants' for other sub-groups when needed; particularly the Planning sub-group.
- When information is needed a formal request should be made to the leader of the appropriate sub-group. The sub-group leader should then provide this information and/or assign this topic of research to one of his/her group-mates who will then provide this information when it is available.
- Sub-group leaders should be responsible for assigning tasks to its members, collecting and organizing data, making this data available to other groups, and coordinating their sub-groups efforts with the needs of the overall group. The team leader will facilitate this process.
- The team leader should remain informed about the actions of all sub-groups and regularly communicate with sub-group leaders. The group

leader will insure all sub-groups remain focused to the overall goals of the group and assist one another as much as possible.

b. Addressing problems

- Any concerns within a sub-group should be addressed with the sub-group leader.
- Any concerns involving multiple sub-groups should be addressed to the group leader.
- Any concerns involving the group leader should be addressed to the group leader directly, or if necessary to the Professor, who will then approach the group leader.
- Any personal conflicts should be kept as confidential as possible and should be mitigated by the appropriate party within the group hierarchy.
- Any concerns about the overall progress or function of the group (especially those involving members of multiple sub-groups) should be addressed in a meeting of all sub-group leaders, the group leader, and the Professor.

II. Project Methodology

1. Work Breakdown Structure

a. Problem Solving

- We will begin by studying existing sustainable communities and applying methods and technologies that have been proven successful. This will serve as a guideline for our own research and an example for available strategies.
- A data pool will be collected about the average Chicago-area household based on demographic information. This pool will establish the baseline from which we will determine where improvements can be made. We intend to determine and catalogue the needs of an average household, not only in resources and energy, but also space and comfort.
- Using this baseline data pool we will research technologies and methods to reduce the consumption of resources without infringing on the needs of future inhabitants. (i.e. How much energy can be saved on heating bills/natural gas consumed by using a better insulation?).
- After gathering information on effective technologies and methods we will determine which technologies are most effective and affordable by analyzing things such as the cost of the product, its life-span, the expected payback period (money saved over time), etc. This information will be catalogued and the best materials, methods, and technologies will be selected.
- These chosen materials, methods, and technologies will be recommended to the Planning sub-group for implementation.

- The research related sub-groups will act as expert ‘consultants’ to the Planning sub-group aiding in the implementation of specific information. This will be an ongoing and ever evolving process requiring constant critique, research, re-analyzing, and re-designing.
- Potential solutions should be analyzed for viability in regards to budget, environmental impact, marketability, and legality (or conformation to codes and regulations).
- A minute-keeper will document all items of discussion throughout the project so we can look back and study the exact path of logic.

b. Team Structure

- The team will have a group leader who is responsible for coordinating the efforts of the sub-groups.
 - Group Leader: Bryan Zacharias
- There shall be four initial sub-groups, which may change as the project warrants. Each sub-group will be focused to a specific area of research and development. The four initial sub-groups and their leaders are as follows.
 - Technology: Adam Bohac
 - Building Systems: Keanen McKinley
 - Construction Methods: Josh Gross
 - Planning (Design): Jennifer Iversen

c. Work Breakdown

- The research of various topics will be the responsibility of the corresponding sub-group. Each sub-group will be responsible for overseeing and advising in the implementation of their findings by the Planning sub-group.
- A master list will be composed including all baseline data regarding the average household that is to be improved. All technologies, methods, and materials will be included in this master list as well as their benefits, costs, etc. These technologies, methods, and materials will be chosen for their merits and the influence on the ‘baseline’ statistics will be catalogued for comparison purposes.
- The Planning sub-group will implement the research done by other sub-groups into a design for the Zero CommunIITy.

2. Expected Results

a. Expected Activities

- The project will require a great deal of research from all of the subgroups
- Collaboration amongst group members and sub-groups.

- Meeting with potential clients and discussing progress and future goals
- b. Expected Data
- We will catalogue the costs and benefits of all technologies, methods, and materials we research and compare the benefits of their implementation to the average household.
 - Reduce construction costs to maintain market viability.
- c. Potential Products
- We will be employing already existing technologies such as but not limited to solar arrays, geothermal heat pumps, and advanced building materials however we hope to implement these in novel ways.
- d. Potential Outputs
- A large array of highly useful data comparing existing sustainable technologies will be produced
- e. Deliverables
- Develop a series of prototype housing units to compose a small community
 - CAD drawing of our living space and any systems we choose to implement
 - Feedback from interested clients in Evanston and Oak Park
 - A small-scale model of the community
- f. Challenges, Risks, and Assumptions
- The primary challenge of this project will be to assemble enough useful data on existing sustainable technologies, methods, and materials to make informed decisions on which ones to implement and how. It will be extremely difficult to accurately calculate the impact of implementing our solutions. However we aim to create a solution that will be feasible and economically viable. If we can achieve this goal we will then be challenged with convincing Chicago-area municipalities to potentially re-consider some of their existing (often arbitrary) regulations and their ideas about what a housing community ought to be.
 - There is a substantial risk of the research phase being an incredibly involved and weighty experience. We must find ways to make progress while research is underway and to incorporate new research into our scheme without returning to the drawing board entirely. We also run the risk of making a scheme that is too challenging or daunting to our potential clients, so we must continually consult with potential clients to ensure we are not going so far as to alienate them.
 - We assume that there is a better way for homes to be built and for communities to be structured. We believe we can create a community

of homes that will be attractive and economically viable for potential consumers while pushing the envelope of existing sustainable practices to a new level. We believe there is room for many improvements in the way average communities are developed and that we can challenge the preconceptions of Chicago-area municipalities. These communities will, in turn, impose more informed and rigorous standards on future communities, and therefore cause a real change in the way we live

3. Project Budget

- a. Our budget will likely be small as we do not plan, at this time, to do any hands-on research or construction which would involve expensive equipment. Our expenses will most probably be limited to obtaining and printing research materials and producing presentation materials. We may also have transportation expenses if we visit outlying townships. There may be need to construct a moderately size scaled model of our proposal as part of a visual presentation or study. As previously stated, most of these costs would be moderate.

4. Designation of Roles

- **Minute Taker: Jennifer Iversen**
- **Agenda Maker: Bryan Zacharias**
- **Time Keeper: Anthony Wisniewski**
- **iGroups Moderator: Carlos Hernandez**