Green Class Community

Project Plan:

I. Team Charter

1. Team Information

a. Team Roster

- Beck, Steve sbeck@codallc.net
- Snyder, Mark snyder@iit.edu
- Eshleman, Justin jeshlema@iit.edu
- Krebs, Byron bkrebs1@iit.edu
- Nguyen, Trang tnguye18@iit.edu
- Oraziman, Indira iorazima@iit.edu
- Qi, Tianshu tqi2@iit.edu
- Shehada, Hazem hshehada@iit.edu
- Skopek, Paul pskopek@iit.edu
- Varghese, Danny dvarghes@iit.edu
- Warnes, Michael mwarnes@iit.edu
- Cho, Moses mcho5@iit.edu

2. Team Purpose and Objectives

a. Purpose

- Our purpose is to seek a union between living comfortably and living sustainably at an affordable price. Our design, for the community of Evanston, will 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 affordable sustainable planning, design, and living. It will also be an attractive marketable solution to the current home buyers within our given demographic.

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 two separate living conditions.
- Arrange these two models into communities of six or more.
- Test our solution by comparing its energy consumption/costs with the average home of today
- Present our solution clearly and truthfully as a housing solution that is both ecologically and economically benifiting

Green Class Community

3. **Background**
    a. Customer / Sponsor
        - This IPRO is a continuation of IPRO 323 (Zero CommunIITy). Currently we do not have an official sponsor, However, we will continue with our project plan regardless of this fact. The site location being consider is in the City of Evanston, and for this reason we will consider them our Customers for the duration of this project.
        - We plan on presenting our research and ideas to individuals in the Planning Department of Evanston in hopes of influencing their approach to community planning and development.
        - We will highlight to the City of Evanston the superiority of our design through its cost, efficiency and overall aesthetics.
    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. Minimizing the cost while maximizing efficiency of the model appears to be the main issue of the project. 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 a 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 the current quality of life.
    d. Historical precedents
        - There are several communities which have been designed to be environmentally-friendly. The previous iPro 323 created a model that worked very well to create the net zero community but, being theoretical, did not delve deep enough into the financial aspect of today's housing market.We will use their platform and continue their research while also looking at completed communities such as Dockside Green in Victoria, British Columbia, Canada as well as a new development, Geos Neighborhood, currently in the design and marketing stage in between Denver and Boulder Colorado.
    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.
- By adding additional housing, we will be creating more traffic in the area and noise, which may disturb residents. Also construction traffic and noise may be an issue to the residents.

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. The government has been to able to provide credits to homeowners willing to go green and this is an added incentive to the buyer we are targeting. Still, it can be a considerable investment, but this will pay off in the long run and the customers can expect to 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 village of Evanston in hopes that they will be influenced to implement our community or 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 the previous semester's work and 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 and analyzed about the average Evanston 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.

- Potential solutions should be analyzed for viability in regards to budget, environmental impact, marketability, and legality (or conformation to codes and regulations).
- Solutions will be implemented in the design of a cost effective, energy efficient community.
- 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: Bryon Krebs
- 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.
    - Opportunity Assessment: Danny Varghese
    - Building Systems: Indira Oraziman
    - Construction Methods: Justin Eshleman
    - Planning (Design): Michael Warnes

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 Green Class Community.

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

Green Class Community

- 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.
- We will target buyers who prefer to purchase sustainable buildings as their homes since we have an actual site in Chicago to work on.

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
   - A marketable and sustainable solution to medium density housing.

e. Deliverables
   - Develop a series of prototype housing units to compose a small community
   - Feedback from interested clients in Evanston, IL
   - CAD drawing of the living space and any systems implemented in the project
   - Develop detailed design of an energy-efficient building envelope
   - Generate construction cost estimate of the project and create a marketing guide for the future
   - 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. In addition, marketing is also a big challenge for us, since majority people are not quite familiar with those sustainable technologies. Questions such as how to operate and maintain will be raised for long-term consideration. The marketing challenge will be to convince the buyers that our sustainable building is worth to own and it saves both energy and money.
   - 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 to 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. In addition, the damages of mechanical system caused by misuse will result in a relatively high maintenance cost and should be considered as a risk. The system should be designed as straightforward as possible to use.

- 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. We believe most of the people would love to live a sustainable life to save energy and money in a long-term consideration. 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 estimated budget is approximately $460. With this money we hope to be able to continue our research on green technologies at the Chicago Center for Green Technology, also continue our correspondence with the village of Evanston both in telecommunication and physical visits. The majority of our proposed funds will be used on construction of models both of our individual solutions, the community as a whole and some of the more complex systems incorporated into our project.
4. **Designation of Roles**
    - **Minute Taker: Tianshu Qi**
    - **Time Keeper: Danny Varghese**
    - **iGroups Moderator: Bryon Krebs**