IPRO 317 Project Plan
Fall 2009

# Net Zero:

## Zero Energy Home
## 1114 W Roscoe Ave

Advisor: Nancy Governale-Hamill
Sponcer: Jimmy Eng

## I. Team Charter

1. Team Information
    A. Team Roster, Strengths, and Expectations

| NAME | CONTACT INFO | YEAR, MAJOR | INDIVIDUAL STRENGTHS TO CONTRIBUTE | NEW KNOWLEDGE/SKILLS TO DEVELOP | OVERALL EXPECTATIONS ABOUT THE PROJECT |
|---|---|---|---|---|---|
| Bhat, Adnan | abhat6@iit.edu | 4th year Mechanical Engineering | research materials regarding mechanical systems | practical knowledge of HVAC systems | have a good coordination within the group, keep track of deadlines, and try to get work done efficiently |
| Campbell, Brittanie | bcampbe3@iit.edu | 5th year Architectural Engineering | knowledge in designing HVAC and plumbing systems. General knowledge of LEED initiatives | geothermal designing technology. Green building net zero, zero carbon emissions, technology as it has to do with HVAC | to be able to design with in our group successfully a net zero/ 0 carbon emissions green home |
| Cink, Jefferey | cinkjef@iit.edu | 4th year Psychology | Group dynamics, and team building techniques | the technical side of Architecture projects | maintain effective group/team cohesion of communication in order to meet all the deadlines and deliver a quality product to our sponsor |
| Gutstein, Yehuda | gutsyeh@iit.edu | 5th year Architecture | Architectural design, and sustainable design ideas | a better knowledge of green materials and ways to push the limits on sustainable design | work as a team to capitalize/design a zero energy/zero carbon emission home using all of our combined knowledge and skills |

| NAME | CONTACT INFO | YEAR, MAJOR | INDIVIDUAL STRENGTHS TO CONTRIBUTE | NEW KNOWLEDGE/SKILLS TO DEVELOP | OVERALL EXPECTATIONS ABOUT THE PROJECT |
|---|---|---|---|---|---|
| Hadi, Shuaib | shadi3@iit.edu | 5th year Civil and Structural Engineering | Design engineering experience with good problem solving skills | gain knowledge on green building and get a better understanding of green technologies | work efficiently as a tem and come up with an effective green home design |
| Hafdi, Kamal | khafdi@iit.edu | 4th year Civil Engineering | Internet research, and MathCAD | work on a team, gain experience and hands on practice | structural analysis |
| Hasan, Hasan | hhasan1@iit.edu | 4th year Mechanical Engineering | Microsoft office skills, AutoCAD, ProE, 3dmodeling, HVAC | to get better in team work, and gain more knowledge in green homes | HVAC experience, marketing experience, sales, customer service |
| Kenig, Elezar | ekenig@iit.edu | 4th year Aerospace Engineering | Microsoft office skills, mat lab, research, and management | design of affordable green homes | full scale team project experience |
| Lipski, Brian | blipski@iit.edu | 5th year Architecture | AutoCAD, Photoshop, 3ds max | get more ideas for how to design a affordable green house | to create a house design that meats the goals of the group |
| Lollino, Luca | llollino@iit.edu | 5th year Civil and Structural Engineering | Structural analysis for design, FEM software- SAP | develop structural engineering skills for residential buildings, green construction | to design an energy efficient and durable home |
| Margolis, Jordan | jmargo1@iit.edu | 5th year Architecture | Microsoft Office, 3d models, physical models, AutoCAD, Photoshop, project budget management | improve team work skills and communication skills, to improve knowledge in affordable and green housing technologies | to create a design of a ultra-green home that is more affordable, efficient, durable as a standard but comparable building |
| Nigamatzyanov, Tagir | tnigamat@iit.edu | 5th year Architectureal Engineering | management skills, construction, financial and cost estimating | learn about sustainability, net zero energy, energy modeling | sustainable modeling |

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|---|---|---|---|---|---|
| Patel, Hiren | hpatel89@iit.edu | 5th year Architecture | Design skills, 3d modeling, Photoshop, illustrator, AutoCAD, 3d max | looking at creating an affordable green homes, looking at all aspects from architecture and engineering | to create an affordable zero energy home in an urban environment |
| Patel, Neal | npate31@iit.edu | 5th year Architecture | construction knowledge and materials, design skills for passive techniques, experience with architecture firms | working on a net zero building working on a large group on one project | to design a building concept for a net zero energy building |
| Shehada, Hazem | hshehada@iit.edu | 4th year Civil Engineering | construction knowledge, AutoCAD, SAP, middle east construction | designing and structural knowledge could be improved | to design an net zero energy building |
| Toops, Melissa | mtoops@iit.edu | 5th year Architecture and Landscape Architecture | presentation skills, 3dmodels, AutoCAD, Photoshop, Illustrator, 3dmax, Rivet | active sustainable solutions cost effective "sustainable" solutions integrating map and architecture solutions | to create a viable zero energy home in a Chicago climate and standard size lot |
| Trauner, Crystal | ctrauner@iit.edu | 3rd year Aerospace and Mechanical Engineering | construction knowledge, thermodynamics, and basic CAD, Labview, and leadership skills | build up a project plan to develop a high efficiency green home | to help our sponsor by presenting the best and most realistic design under our constraints |
| Zgourdah, Mourad | mzgourda@iit.edu | 4th year Civil Engineering | AutoCAD, MathCAD, Engineering systems | develop time management and working with a team skills | to create a zero energy home |
| Zgourdah, Mourad | mzgourda@iit.edu | 4th year Civil Engineering | AutoCAD, MathCAD, Engineering systems | develop time management and working with a team skills | to create a zero energy home |

B. Team Identity
   a. Name: **Net Zero**
   b. Logo:


   c. Motto: Design based in Green Philosophy for a better future.

2. Team Purpose and Objectives

A. Team purpose:
- Design of a sustainable net zero energy building with zero carbon emission at a traditional construction cost.
- Promote the use of this design as a template for other homes in the future.

B. Team objectives:
- Working together as a team in a limited time frame.
- Collaborating between various backgrounds and majors throughout the project phases
- Materials used in construction have to be selected based on their higher R value, and durability.
- The building cost needs to meet standard costs in the Chicago area.
- The building layout needs to absorb as much energy as possible and prevent heat flow onto the outside.
- Maintain air circulation via mechanical ventilation in order to circulate toxic air, prevent mold and assure comfort inside the building.
- The building should be environmental friendly by means of local recycling, renewable resources of energy such as using solar panels and wind turbines.

3. Background

   A. IPRO 317 is sponsored by Mr. Jimmy Eng. Mr. Eng is a Realtor in the city of Chicago. He is an alumnus of the Illinois Institute of Technology.

   B. Mr. Eng has presented the group with a very interesting problem of designing a net zero energy, zero carbon emission, high efficiency green home at a competitive cost of neighboring units. The goal is to have a minimum durability of 300+ years.

   C. Equest (Energy Modeling Software) will be used to estimate and analyze the overall Energy usage of the Building. Ret Screen International will be used to evaluate the energy production and savings, costs, emission reductions, financial viability and risk for various types of Renewable-energy and Energy-efficient Technologies (RETs). MathCAD will assist in any Structural calculations that need to be done. AutoCAD is also utilized to draw out all elements of the structure, which include architectural and structural components. Rivet will also be used for 3D modeling and Architectural problem solving

   D. IPRO 317 will design the home, which will be acceptable by the Chicago Building Code. Other codes accepted by the city of Chicago might be used in our design. The use of these codes will ensure safety of the Public.

   E. IPRO 317 will develop a design that will be the structural and architectural shell for a coherent environmentally friendly system.

   F. IPRO 317 has been split into multiple subgroups. All groups will work together under leaders to accomplish set goals.

   G. Research from existing green technologies, literature, and journals pertaining to strength of materials, and other relevant design information available will be used. Each team will consult with experts in the fields when needed.

   H. Pictures of the existing Building are attached as Appendix A.

4. Team Values Statement

   A. Code of Conduct:
      - All members shall be courteous to each other.
      - Communication shall be open, respectful and focused.
      - Information shall not be withheld from the group.

- Criticism shall always be constructive.
- Deadlines shall be met.
- All work shall be properly prepared and reviewed before submission.
- Conflicts shall be addressed immediately.

B. If there is a problem or conflict within a group, the involved parties must address it by being constructive and find a solution to the problem. The method of communication is up to the involved parties. If the conflict is not yet resolved, and it is apparent third party perspective is needed, then the parties involved should address it with the team leader. If there is a need to further address the conflict, then the parties shall seek out the advisor. As the last resort, the IPRO office shall be contacted.

## II. Project Methodology

5. Work Breakdown Structure

The problem assigned to our IPRO group will be a continuous flow of collaboration between group members and our sponsor, Jimmy Eng. It will be a four-phase process beginning with the research phase, which will proceed to the project development phase, design plan, and finally to the final presentation. During the first two phases the IPRO 317 team will be broken down into four subgroups with the last two phases, which will be divided into five and three subgroups. These groups and the timelines of expected due dates of each sub-project can be found in the attached Excel file. The team structure is outlined in Appendix B.

Through research the team will look into all possible routes for the project to take. Once the research is complete, all work will be compiled and narrowed down to specific solutions. Each solution will be researched more thoroughly and will be weighed for cost benefit over time, et cetera. Through each phase of the project the data will be narrowed until a comprehensive and realistic design is finalized for proposal to the sponsor. In the end our goal is completely feasible given our workload and timeline. The size of our group has offered us a great deal of advantage for dividing the workload.

6. Expected Results

If we are to accomplish our goal of developing a design for an affordable net zero energy and carbon emission sustainable building, it is apparent that we must break into smaller groups to work on different parts of the project in order to maximize efficiency. We plan on researching different components that would go into the design of the sustainable structure. This includes, but is not limited to: materials, structure, previously built projects, and technology. Using the information from research, we can then start going through a

cost benefit analysis so that we can then start the design phase using the best possible components to achieve the final goal: a fully realized architectural design for a sustainable and durable net zero energy and carbon emissions building at an affordable price in addition to compiling information on various 'green' building materials.

7. Project Budget

PROJECT BUDGET

Final Presentation Materials.....$200
- Includes samples of 'Green' Materials
- Posters, display boards and misc. items creating poster.

Model.....$200
- Includes all resources and material used for creating model

Midterm Presentation Materials.....$100

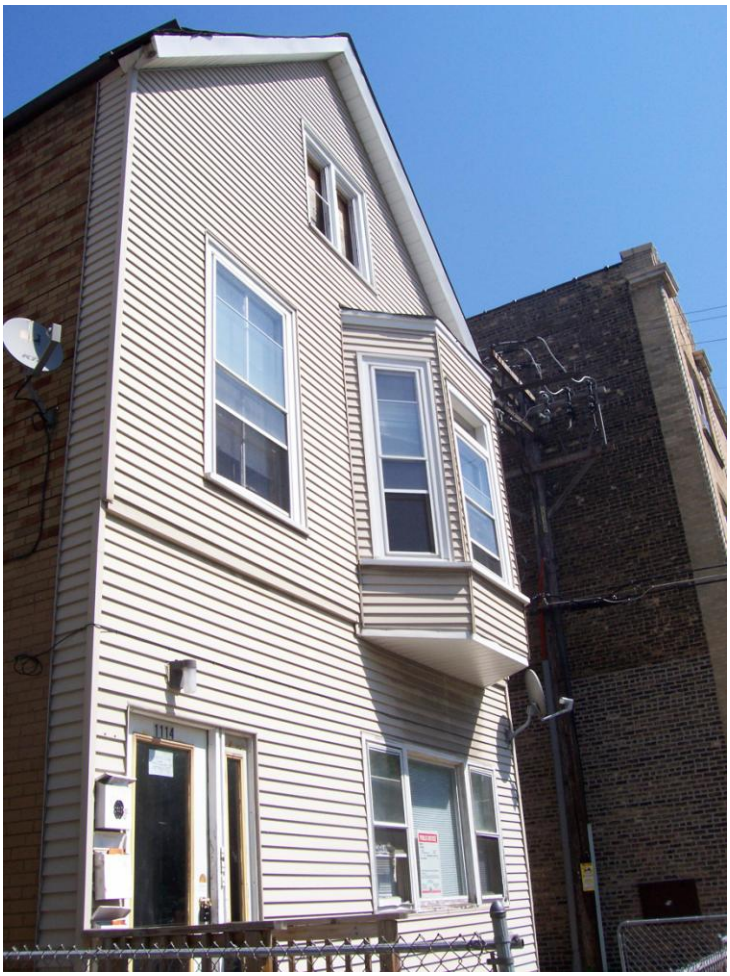
TOTAL $500

Note: Specific itemization is not available as it is not possible untill after research phase and planning phase is complete.

8. Designation of roles
   Minute Master – Elezar Kenig
   Agenda Maker – Jeffery Cink
   Time Keeper and iGroup Moderator – Crystal Trauner

# Appendix A

Below are pictures taken by Crystal Trauner and Elezar Kenig of the current site



Photos A-1and A-2 are of the front of the current unit at 1114 W Roscoe Ave; Chicago, IL.

Photo A-1

Photo A-2

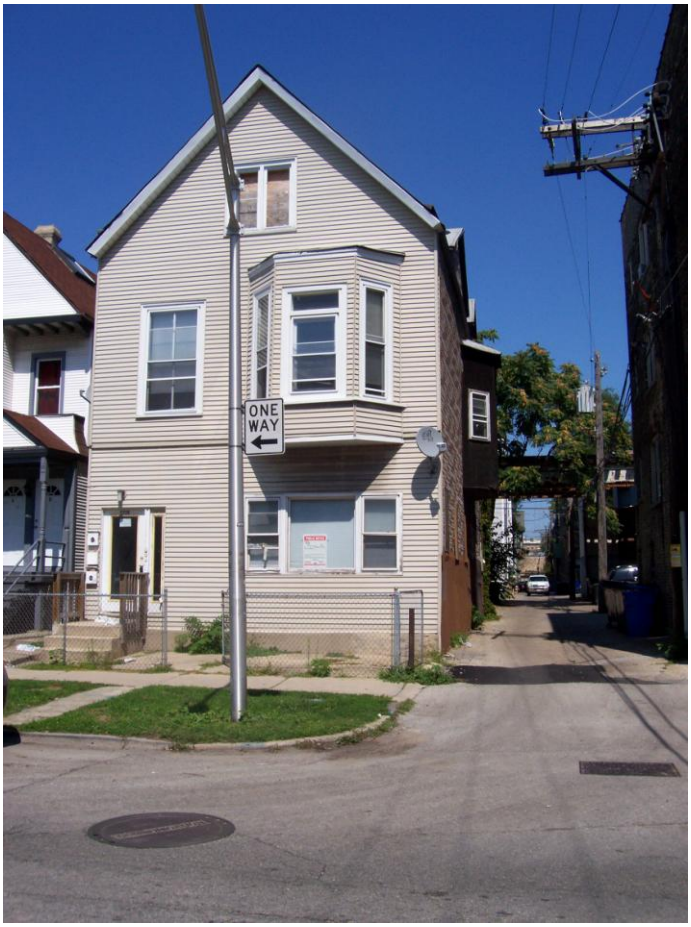



Photo A-2

Photos A-3 and A-4 are of the existing structure back and east side views.

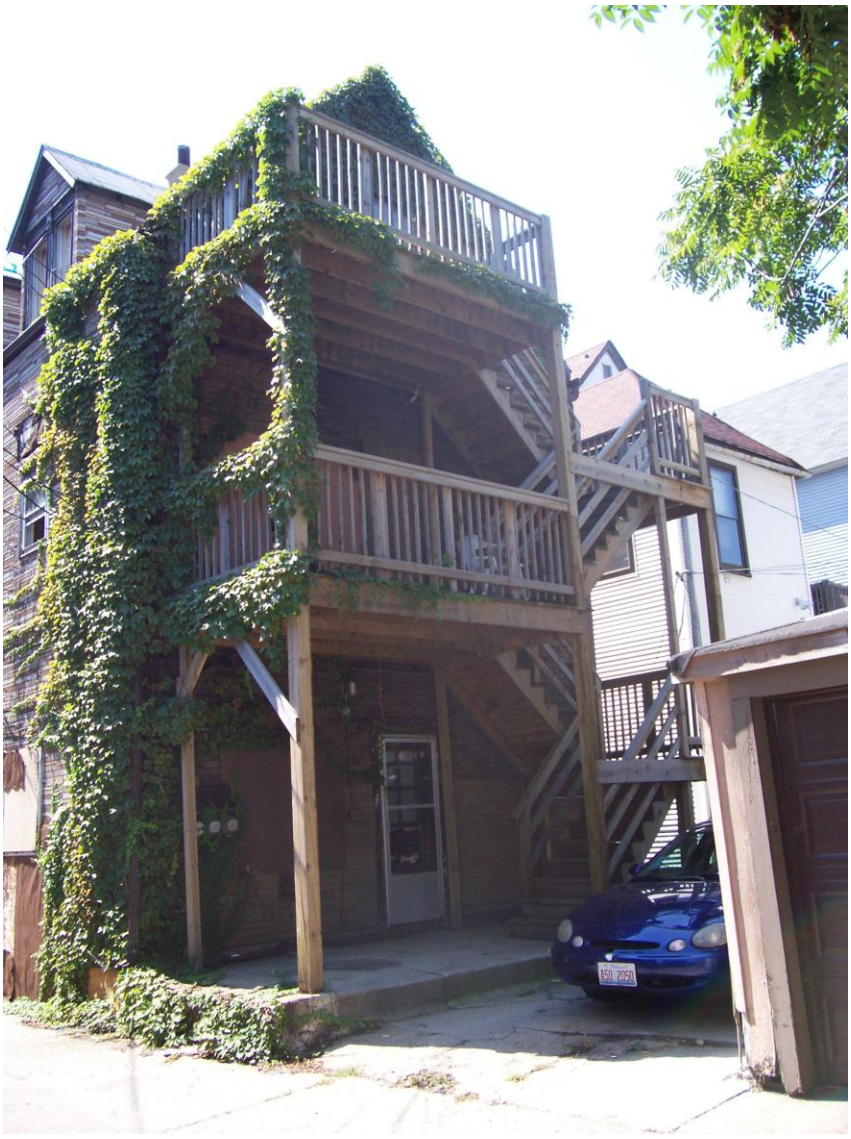
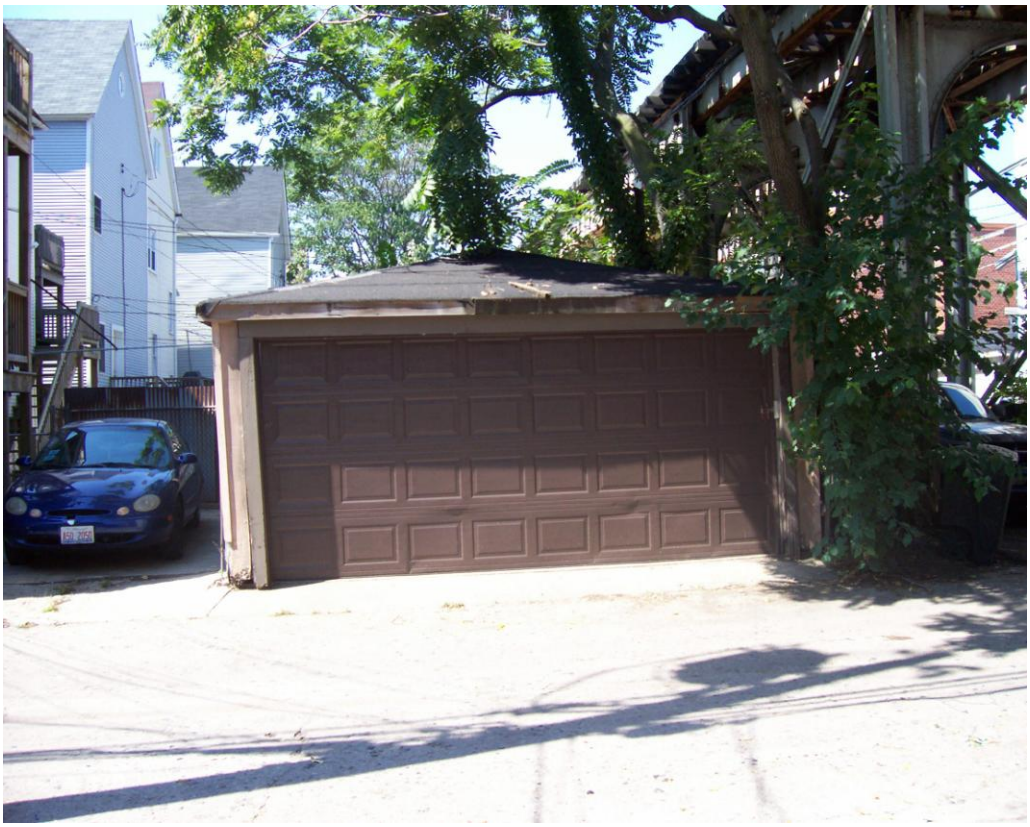


Photo A-3

Photo A-4



Photos A-5 and A-6 show the small 'yard' and garage area and the proximity of the unit to the CTA Brown Line Tracks

Photo A-5

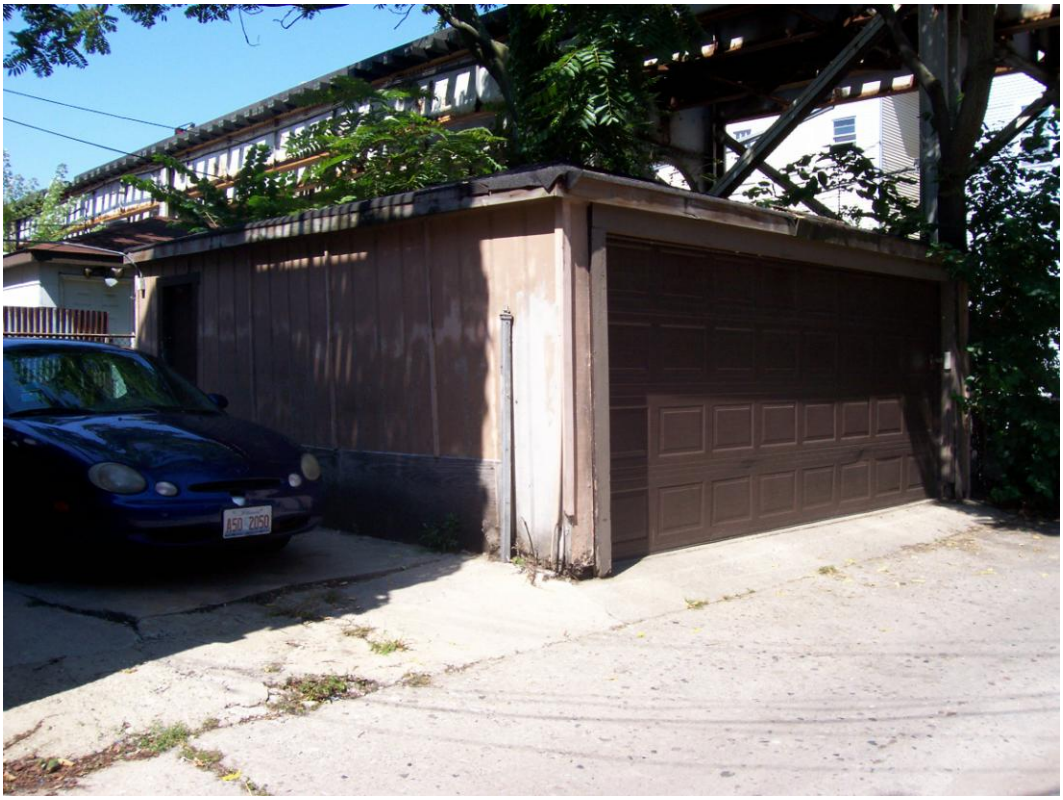


Photo A-6

# Appendix B

A. Team Structure

a. We do not have designated team leaders due to the abundance of leadership potential in our IPRO group and the ability of the members to recognize time constraints and the scope of the project. Throughout each phase of the project there will be different leaders of the evolving sub-teams.

b. There is a subgroup of team members that are designated for collecting data to be presented to the group and to manage the keeping of the timetable. These members include Crystal Trauner, Melissa Toops, Elezar Kenig, and Jeffery Cink.

c. The group members above will also be responsible for communication with our sponsor, Jimmy Eng. This group will also be responsible for ensuring all deadlines are met.

d. The remainder of the team will be responsible for completing all major and minor tasks (as found in the attached Excel File) in the timeline set.