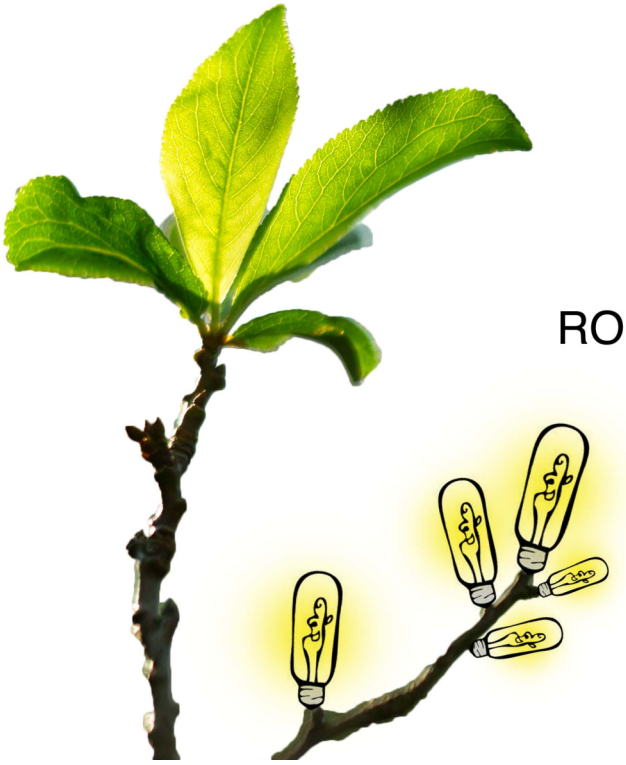

ROBBINS COMMUNITY POWER

the spark bringing green to energy

IPRO 347

Faculty Advisor: Blake Davis

Yoona Ahn

Abdalmohsen Alhassan

Ashleigh Johnson

Nomair Khan

Carolyn Kois

Matthew Munoz

Robert Toy

Julieann Young

Table of Contents

I. Abstract

IPRO 347 is a continuation of an IPRO, which previously explored ways to utilize waste heat and CO2 from Robbins Community Power Plant. The concluding thought from that project was that the plant would need to select a source of greenwood to burn. The goal of IPRO 347 is to establish a plan for the Robbins Community Power Plant to gather and utilize the green waste of urban lumber.

The main task is to research opportunities for RCP to gather a supply of greenwood. The items being researched are estimated expenses and profits, whom will be participating, the availability of our raw good—greenwood—and potential buyers.

This project plan outlines our goals, our thought processes of how we will accomplish those goals, and assesses our group members' skill sets and expectations. It explores the surrounding conditions of the Robbins Community Power plant and urban lumber, and how the two combine into the opportunity that IPRO 347 is exploring. Project management is also demonstrated in the breakdown of tasks and a timeline.

II. Team Information

Team Purpose

To develop a process which supplies the Robbins Community Power plant with a large portion of the wood that it needs, and resells useable green wood from landscaping companies. This would include solid research on suppliers, purchasers, the facility and equipment, the costs and potential profits, the employees needed, and the financing.

Team Objectives

- To find the cheapest and most profitable way to deliver the wood chips to the company and what is the backup plan if we have leftover wood.
- To gain real “working world” experience while creating a project of our own.
- To research all of the aspects necessary to determine whether this venture is feasible, and if it is, to determine how to secure money in order to implement this venture.
- Encourage the environmental energy production

III. Background

History

Robbins Community Power LLC (RCP) is currently retrofitting municipal solid waste electric generation to wood biomass renewable electric generation. The Facility is located on the crux of several major transportation systems, such as the CN Railroad, I-294, I-57, and the Cal Sag Channel that allows access to the Mississippi River. It spans 22 acres in Robbins, Illinois.

Current Issues

To produce an optimal amount of energy, RCP will use approximately 1,200 tons of wood biomass per day at an assumed utilization rate of 95%. RCP will accept C&D wood and greenwood. Green wood collection would be gathered from outer sources, such as tree and land clearing companies within a 40 mile radius.

Firstly, it must be determined if such amount of wood biomass is available and profitable to use. The cost of transportation to the power plant must not outweigh the profit it will generate in the form of energy. There is the question of finding willing landscaping companies who would participate in this program—is it profitable for those companies to transport and sell their goods at this location?

There is also the issue of seasons. RCP plans to operate 347 days per year. There will not be as much green waste in the winter as there will be in the summer. The lack of wood in the cold season must be taken into account and weighed against the surplus of wood gathered in the warmer months. A possible solution would be to arrange the drying of the sellable hardwoods during the cold season—however, this means that there would be a nonexistent cash flow for that period.

The green waste collected by would need to be gathered at a central location. The wood would need to be graded. Depending on what form they are received in—a bole versus one-foot segments—they could be more profitable as dimensioned lumber.

Landscaping companies generally transport their waste in the form of smaller segments because they do not have the means to transport large but potentially valuable boles.

Technological and Historical Considerations

The boilers envisioned for use at RCP would be burning a combination of C&D wood and greenwood. C&D wood tends to be drier, only at 5% wood humidity, because it has been standing longer. Whereas greenwood ranges from 60% to 80% wood humidity, depending on the season in which it is cut. When the two are burned together, the greenwood's extra moisture helps to saturate the C&D wood, so that they come out to having the efficient wood humidity level of 20%.

The available greenwood in Chicago is yet to be determined. However, out of the 3.6 million trees in Chicago, there are 360,000 ash trees. Within the next few years, these ash trees will fall to the invasive ash beetle. The trees will need to be removed, and the waste will need to be disposed of. Thus, we can expect an influx of ash trees relatively soon.

Of the urban trees, 60% of them are below 6" DBH, which would be converted to chips; 20% of them are greater than 20" DBH, which means they are potential candidates to become dimensioned lumber. What is left to be determined is who is cutting the trees.

Ethical and Societal Considerations

The Robbins community has been struggling through the economy and initially may see the project as a waste of money. They may skeptically view alternative sustainable resources as a dump for their taxes while they are financially challenged. In the long run, it will provide jobs and revenue streams to improve the cash flow as well as offer scholarships, enriching the community in the end. People must envision the end goal in order to get through the early struggles.

A second ethical issue is the purchasing of what was formerly waste material. Because it previously had no market, the producers are willing to sell the chips for little

or no cost. However, as the demand for the waste product grows, the price will surely go up. There is the issue of building incentives to form a relationship with the suppliers. Homeowners with a potentially valuable tree in their yard are also ignorant of possible profit. They may feel as if they should be pay less to remove a tree of black walnut than a poplar tree.

The concerning issue would be that people may see their trees more valuable to themselves as harvested wood than living trees. Offering money for urban lumber may lead to over harvesting. To address this issue, a tree-replanting program is being organized to ensure that RCP is truly sustainable.

IV. Team Values Statement

Desired Behavior

- Work efficiently as a team.
- Respect one another.
- Actively participate in group meetings and work.
- Have a high level of quality communication.

Conflict Resolution

Should a conflict pertaining to the team arise, it will be brought up to the entire team. If it is personal, it will be handled personally without the entire group dragged in to feel unnecessarily hostile toward an individual. After it is brought up, the problem will be defined. With the information clearly laid out, each person will have his or her say to determine what is right for the group. If no solution can be agreed upon, the IPRO instructor will act as a mediator.

V. Work Breakdown Structure

Problem Solving Process

To accomplish our goals, we have devised a schedule to meet twice a week to discuss our individual findings and collaborate for our next steps. During our off days, we individually research our assigned issues, which are decided at our group meetings on Tuesdays and Thursdays. Immediate findings of significance are relayed through email.

Major Tasks

- Develop a Process to Gather Greenwood
    - Research how other saw mills operate
    - Network with tree and land clearing companies and determine interest
    - Find companies to supply the 125,000 tons of greenwood necessary for this venture
    - Find equipment costs
        - Tub grinder
        - Scale
        - Bobcat
        - Kilns
        - Sawmill
        - Forklift
        - Pellet Maker (?)
    - Site placement and design

Since time and manpower are limited, this IPRO will focus mainly on developing the process of gathering greenwood. However, some of the tasks for setting up the actual venture can happen concurrently with this. Because certain tasks rely upon each other, the two categories will overlap.

Team Structure

Because we are a small IPRO group, we found it unnecessary to appoint a leader or sub teams, as the teams would end up consisting of one person in each.

Instead, we play to our individual strengths, dividing work at each meeting based on interest and skill. The workflow so far has been smooth. However, if we do encounter problems, we are willing to reform into a more organized structure if necessary.

Gantt Chart

Project: Robbins Community Power

Weeks Tasks	06/07 to 06/14	06/14 to 06/21	06/21 to 06/28	06/28 to 07/05	07/05 to 07/12	07/12 to 07/19	07/19 to 07/26
Project Plan							
Midterm							
IPRO Final							
Exhibit Poster							
Abstract							
Brochure							
Facebook Page							
Youtube Video							
Business Plan							
Site Visit							
Equipment Pricing							
Gather List of Potential Suppliers							
Contact Real Estate Developers to Determine Site							
Research Other Sawmill Business Models							
Morton Arboretum Wood Grading Program							
Tasks Weeks	06/07 to 06/14	06/14 to 06/21	06/21 to 06/28	06/28 to 07/05	07/05 to 07/12	07/12 to 07/19	07/19 to 07/26

VI. Expected Results

The ultimate goal of this company is to set up and establish a way for RCP to gather green wood to convert into chips for alternative energy. Within the period of the summer, we aim to devise a feasible plan to present. In order to put the plan together, we must research similar businesses, the companies that would potentially supply us with wood, the demand for our product, the necessary expenses, and projected sales.

Plan Deliverables

- Plan completed and financing secured.
- Wood suppliers identified.
- Contracting system (for equipment, workers, buyers, sellers) established.
- Workflow of our sawmill model established.

Potential Obstacles to Project Success

As there is the potential for many victories, there is also the potential for many disasters. Because we are currently not organized into a structured team with roles—we simply are playing to our strengths and interests—we may not focus on the big picture but get caught in the details. Communication will be key, as the weekly meetings are devoted to the sharing of found information.

VII. Budget

Activity	Cost	Description
Transportation	$125	Trips to the site, trips to dealers,
Team Building Activity	$50	Refreshments

VIII. Designation of Roles

Since our team structure is so fluid, we do not have specific roles. Each responsibility is brought up as it arises and is taken care of by a volunteer whose interest or skill can recommend them for the task. However, we have decided to rotate roles, so

that no one person is burdened with all of the work, such as the person who presents for the midterm will not have to present for the final.

IX. Appendix A

Roster

Name	Contact Information
Yoona Ahn	Phone: [redacted] Email: yahn2@iit.edu
Abdalmohsen Alhassan	Phone: [redacted] Email: aalhassan@gmail.com
Ashleigh Johnson	Phone: N/A Email: ajohns15@iit.edu
Nomair Khan	Phone: [redacted] Email: nkhan12@iit.edu
Carolyn Kois	Phone: [redacted] Email: ckois@iit.edu
Matthew Munoz	Phone: [redacted] Email: mmunoz5@iit.edu
Robert Toy	Phone: [redacted] Email: rtoy@iit.edu
Julieann Young	Phone: [redacted] Email: jyoung16@iit.edu

X. Appendix B

Skills and Expectations

Yoona Ahn

Strengths: Logical thinking and Ppocess, graphic works via computer for good communication, and collaborative attitude.
Weaknesses: Understanding of technical ideas into conceptual ideas.
Knowledge/Skills to Develop: Not defined.
Overall Expectations: A great practical project that has potential for future use.

Abdalmohsen Alhassan

Strengths: Modeling anything that deals with the environment and chemical reaction; programs: MATLAB, HYSYS, and Power point.
Weaknesses: Writing, presenting
Knowledge/Skills to Develop: Not defined.
Overall Expectations: I think we will end up with a good result for this project.

Ashleigh Johnson

Strengths: Not defined.
Weaknesses: Not defined.
Knowledge/Skills to Develop: Not defined.
Overall Expectations: Not defined.

Nomair Khan

Strengths: Hard work, Problem solving.
Weaknesses: Public speech, Writing.
Knowledge/Skills to Develop: I need to improve my writing skills.
Overall Expectations: My expectations are to come up a solid plan for forestry business.

Carolyn Kois

Strengths: Knowledge of civil engineering and math, and strong research abilities.
Weaknesses: Not defined.
Knowledge/Skills to Develop: I would like to develop a better understanding of the process of starting a business.
Overall Expectations: I expect to use my civil engineering knowledge to help develop a potential site layout for the facility, and to work on a business plan that clearly outlines this business as well as several possible scenarios for the financial projections of the costs and income that this business could generate.

Matthew Munoz

Strengths: Leadership, organization, and knowledge of IPRO.

Weaknesses: Not defined.
Knowledge/Skills to Develop: Not defined.
Overall Expectations: Compile a feasible business plan.

Robert Toy

Strengths: Quick learner, disciplined, leading, and organizing.
Weaknesses: Sometimes sharing responsibilities is difficult when I have a specific idea for a task.
Knowledge/Skills to Develop: Relying on teammates.
Overall Expectations: To learn how a business is started and to see how a team is used to accomplish this.

Julieann Young

Strengths: Presenting, compiling presentation boards and materials, landscaping, and urban planning; experienced with Adobe Photoshop and Illustrator, AutoCAD, Rhino, Grasshopper, and GIS Mapping software.
Weaknesses: Not familiar with the workings of a sawmill and all the things required to make this business venture successful.
Knowledge/Skills to Develop: To strengthen project management and organizational skills, exposure to the business management side of the world.
Overall Expectations: To take part in a real world project and develop a strong network of contacts in the professional word.