IPRO 343 Fall 2006

Technical and Market Integration of Small Hydroelectric Energy

Objectives:

The purpose of IPRO 343 was to design a small hydroelectric power plant on an existing low head dam on Fox River and investigate and evaluate its technical and market integration issues.

Organization:

The IPRO 343 team was split into three groups for the semester. These included the Mechanical Design, Environmental, and Power Marketing teams. Other short term groups were created to work on the poster, the final report, sponsor presentation, IPRO presentations, and other specific research.

Accomplishments:

The team made significant accomplishments throughout the semester. The Mechanical Design Team was responsible for coming up with a design which was most efficient at two locations: Elgin Dam and Stolp Island East Dam. The Design Team came up with several hydro system designs with some three-dimensional models in order to find the most efficient design. One design for each site was chosen in which represent the most cost-efficient and environmental friendly design. Meanwhile, the Power Marketing Team assessed the financial feasibility of such hydro systems. Using RETScreen International Clean Energy Project Analysis Software they dealt with the data from IPRO 319 and other reliable sources in order to calculate relevant financial results. By using these resources, they were able to obtain estimates of the investment cost, annual cost, renewable production cost, among others. Finally, the Environmental Team explored the effects that the hydro systems would bring on the river, wildlife and local community. It was found that these designs will have a very low impact on the river and wild life, but the local community needs to be involved on this project.

Future Work:

The vendors of the technologies chosen for this project need to be contacted in order to have accurate data for the units. The development cost could be reduced, therefore the power house internal design must be finalized, penstock profile and power house external design with good aesthetics must be accomplished, and permits and other requirements for the construction need to be better explored. Reducing development cost is a crucial task to implement the hydro-electric power system. A study of the local power grid must be carried on in order to reduce Transmission Line and Substation costs. Dr. Tseng, the team sponsor, provided some contractors to provide a more accurate cost estimate. The vacuum pump system for siphon must be designed. Team must to communicate this idea to the local community.

Team Members		Advisors
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