

IPRO 328



Faculty & Advisors: Vince Cushing and Jim Braband

Team Leader: Saagar Patel (ArchE and CE)

Student Members: Patrick Bauer (AE), Emily Chen (Arch), Shaun Doran (EE), Max Morgenthaler (ArchE), Beth Nielsen (ArchE), Jongpil Park (Arch), Priyanka Patel (Arch), Dennis Radtke (Arch), Phillip Soderling (CPE)

Church and School Energy Efficiency Program

The Problem Private schools and religious institutions often overlook money saving opportunities for energy matters. Many of these facilities are in energy inefficient older buildings. Our plan is to help these institutions save money on their energy bill.

Objectives Under the guidance and support of Clean Urban Energy with Vince Cushing, IPRO 328 developed several goals:

- To develop an interactive website and database that:
 - Enables energy professionals to point out changes that schools and churches can make to improve their energy efficiency. This is accomplished by providing the necessary data and calculations for this analysis.
 - Educates users on energy efficiency, especially ideas that are low in cost and effort but offer high rewards.
 - Guides users concerning available and appropriate funding options.
- Study Old St. Mary's church/school complex as a prototype for other church/school complexes.
 - Gives the team a trial location to both investigate the logistics of installing an energy monitoring system, as well as observe how the system could be utilized to reduce the energy consumption of the facilities.
 - 12 monitors were installed in the church and school which allowed us to monitor the individual energy consumption from the various heating and air conditioning systems, lighting, and gas usage, as well as outdoor temperature.
- Investigate the intracting scheme and evaluate its practicality.
- Research past attempts to save energy and target our findings toward the current project, Old St. Mary's.
- Create a metric that can be used to determine possible candidates for the system that is developed.
- Address and connect with the many stakeholders involved in the project.

Basic Organization and Tasks To achieve our goals, IPRO 328 organized into six corresponding sub-teams:

- Precedence
- Marketing
- Website
- Data collection
- Stakeholders
- Architecture

Accomplishments

- IPRO 328 with collaboration from IPRO 320 created a functional and interactive website that:
 - Incorporates gas and electric usage from recently installed monitors at Old St. Mary's Church and School with helpful graphing capabilities.
 - Contains an extensive list of other local school and churches that can benefit from the program.
 - Displays a concise yet informative collection of tips for energy efficiency improvement.
- IPRO 328 also explored funding options for schools and churches.
 - Intracting was found to be a feasible option for schools and churches. It allows people to invest in energy-cost saving projects. Money saved as a result of the new efficiency initiative is paid back to the investor with profit and savings beyond that returns to the church or school.
 - In addition to the intracting scheme, research was done regarding other funding options such as grants.
- Taking into account the current state of Old St. Mary's, IPRO 328's architectural sub team created ideal situations for Old St. Mary's composing of detailed plans and drawings.
- Furthermore, IPRO 328 accomplished tasks along the way that weren't foreseen in the beginning of the year.
 - Addressed and connected with the many stakeholders involved in the project.
 - Developed a plan for a future IPRO team that tackles the long-term aspect of the program. This well thought out plan calls for training of the IPRO team members to give energy audits.

Critical barriers and obstacles

IPRO 328 encountered several barriers and obstacles.

- The most critical obstacle was the unforeseen delay in the installation of the new gas and electric monitors at Old St. Mary's.
- None of the team members had ever designed a website.
- Finding examples of intracting was extremely difficult.
- The team had very little past examples to work with, so we had to develop our own methods for several parts of the project

Conclusion Considering that this was a new IPRO, there were many aspects that needed to be determined and continuously reevaluated. The team handled it well and developed comprehensive steps for the continuation of this IPRO in the summer and/or fall semesters at IIT.

Next steps

- A program to train the IPRO members to conduct energy audits as needed.
- Establishing intracting as a viable funding source.
- The website can be utilized for multiple purposes.