

BACKGROUND

IPRO 337, The Zero Energy Lab, is an ongoing project located on the fourth floor of Machinery Hall. The larger goal of the IPRO is to create a lab space that will be improved to become an energy neutral space. The lab would be used to help IIT, other universities, and companies develop and test their energy conscious designs and find better energy saving products.

The fourth floor of Machinery Hall was previously used to store unused furniture and equipment. In its earlier days, the space was dedicated to metal smelting and processing. These past uses left the space with uneven concrete floors but a very usable open space. The roof currently has an array of photovoltaic panels. These panels have a 4-12V battery bank situated on the mezzanine level.

TEAM PURPOSE AND OBJECTIVES

The ultimate goal of the Zero Energy Lab is to get the fourth level of machinery hall off the electrical grid. The IPRO is moving towards transforming the space into a research space for future energy and lighting technologies. This team is a collaboration of students from a wide variety of majors to create a cohesive end product and stimulate interdisciplinary activity.

PREVIOUS IPRO 337 ACCOMPLISHMENTS

-Installed a 4000 watt PV array with an outback inverter system. Currently the PV power feeds the office space on the fourth floor of Machinery Hall.
 -There has been research and design accomplished for LED lighting systems as well as determination of LED lighting status in today's marketplace. The fourth floor of Machinery Hall has been used as a low wattage space for installations.

ACCOMPLISHMENTS (CONT'D)

-Room 400 of Machinery Hall, was converted from an old storage room to an office/conference area to support the Zero Energy Lab functions.
 -Sun studies have been conducted and evaluated for future solar thermal installations.
 -Research has been done on solar air conditioning with small scale absorption units for space tempering.
 -Researched and conceptualized passive HVAC designs for the fourth floor space in Machinery Hall. The previous operable windows would be restored to ventilate the space.
 -Converted a golf cart to a Mobile Energy cart utilizing research gathered on batteries and inverters.
 -IPRO 337 won a TGIF grant for the interconnection of the Mobile Energy cart to the PV battery bank. A framework was laid for learning modules for the PV/battery/inverter/energy systems.

SPECIAL THANKS

-Ray DeBoth, Retired Engineer
 -Gino Gargas, BS Electrical Engineering
 -Thomas Kearns, IIT Department of Architecture
 -Konrad Grabowski, IIT Facilities, Electrician
 -Manuel Garcia, IIT Facilities
 -Anderson Power Products, Sterling MA
 -Outback Power Systems, Arlington WA
 -Sun Xtender Batteries, West Covina CA
 -All the team members of IPRO 337

IPRO 337: ZERO ENERGY LAB

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TEAM MEMBERS

Electric Conversion Cart

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Fourth Floor Machinery Hall - Zero Energy Lab