Department of Mechanical and Materials Engineering

# SENIOR DESIGN ORGANIZATION PROJECT DESCRIPTIONS
# Fall 2011

## RENEWABLE ENERGY MODULE FOR EMERGENCIES AND REMOTE LOCATIONS

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For years renewable energy has been implemented, but it still has not reached its intended customer base, households and most needed rural communities around the world. Multiple systems exist today and many corporations sell system components, but not many have tried to integrate those systems to overcome individual deficiencies. The team believes by combining multiple renewable energy sources, a more robust system will emerge capable of accomplishing the needed crossing from prototype study to implementation.

This project will integrate multiple renewable energy sources into a modular system. An initial version of this module will include two solar panels with a capacity of 210 watts each, two wind towers with a capacity of 400 watts each, an inverter, and four batteries of 12 volts each. The proposed module will have a combined power capability of 1210 watts of instantaneous power. Wind and solar characteristics of the area for the operation of this module will ultimately determine the final capabilities of the proposed system. The team will use the Florida International University area to test the prototype. South Florida, average wind speed is 7.5 mph and maximum output from solar panels is 4.8 hours/day. Whit these metrics sun panels can produce about 1kw per panel per day. The wind towers operating in 12.5 mph wind will produce approximately 35 watts, this represents on average 840 watts per tower per day, a combined ready to use power of approximately 2 kw per day. These numbers are averages and depend entirely on weather characteristics.

Existing renewable energy system components will be used for the module construction, in order to facilitate introduction of new emerging technologies. Components of this system will be enclosed, as permitted by its operational demands, in a cabinet type enclosure. The enclosure will be designed by the team; dimensions for this enclosure are related to batteries, charge controller and other components. Principal concern for the enclosure design will be given to its modularity, easy integration, weather conditions and other environmental factors.

Optimization of the design system will permit the team to study the viability of renewable systems in South Florida homes as well as other locations where energy is not readily available. The project also intends to study the cost related to a renewable system application and the possibility to sell the extra energy to the FPL Net Metering Program.