## ****Sustainability and Alternative Energy****

**Project Type: Entrepreneurial**

**Problem Statement**

The push for sustainability includes alternative energy sources and energy storage / use. Examples of such power systems include:

* Wind power including wind turbines of various configurations
* Solar power including photovoltaic, thermoelectric, thermal, etc.
* Water power including water wheels, turbines, etc.
* Human or animal power to turn a shaft which is then used for other purposes

Sustainability engineering also includes both the design of new products and what happens to products at the end of their life cycle. At the end of use, a product may be recycled, shredded, dismantled into components of similar material, etc. The design and implementation of a process or device that improves the “end of use” disposition by making it easier / simpler / faster / cheaper would help with sustainability.

**Requirements / Specifications**

* Outdoor devices need to be designed to withstand the appropriate conditions, e.g. extreme hot/cold, humidity including rain & snow, wind, animal ‘proofing’, etc.
* The device should have minimal environmental impact
* If addressing life cycle ‘end of use’ scenarios, must include a sustainability analysis of the ‘before’ and ‘after’ situations

**Technology / Skills**

* Instrumentation / microcontrollers / LabVIEW
* Heat Transfer
* Control systems
* Aerodynamics
* Mechanical drive systems

**Example Project Ideas**

* Sustainable Remote Power Generation
* Sustainable Wind Power Generation
* Home Automation for Energy Efficiency
* Tracking Solar Collector (can be mechanically controlled)
* Solar powered cooking devices
* Household Water Purification
* Hydropower for driving mechanical equipment
* Recycling for Campus Residences
* Bicycle powered machinery
* Equipment to help separate / sort recycled materials