ElecTrek

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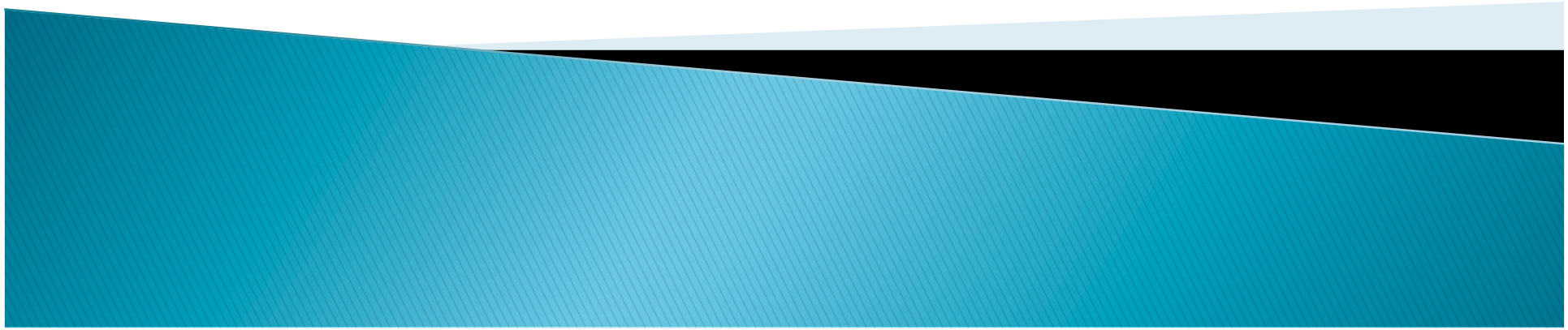


Outline

- Problem Description
- Proposed Solution
- Demonstrated Features
- Available Technologies
- Engineering Content
- Conclusion

Problem Description

- Customer: Outpost Sports in Mishawaka
- Owner wants to capture, store, and use energy created during cycling classes

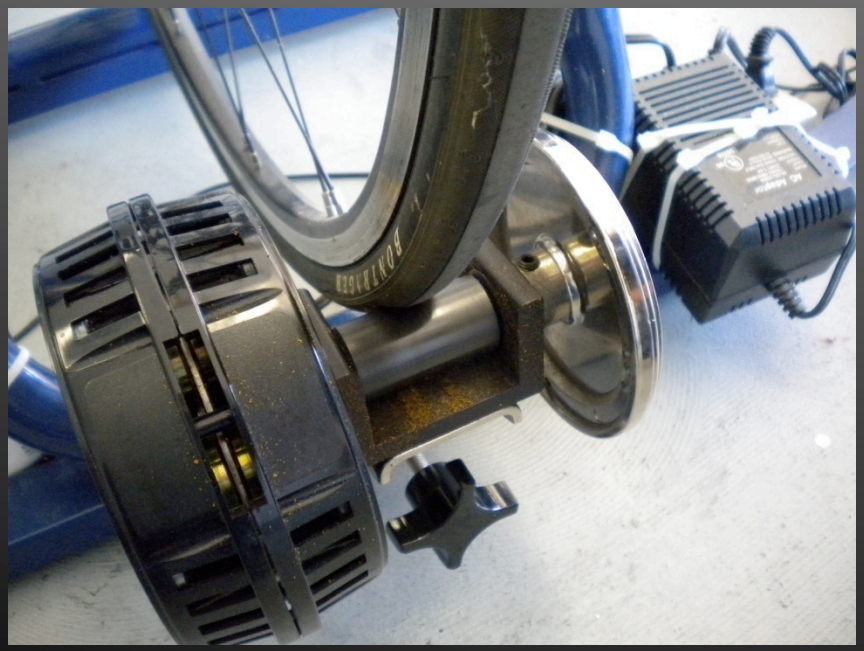
http://www.outpostsports.com/index.php/find-us/

Training Facility

- Cycling classes during winter for advanced cyclists
- Facility accommodates 8 riders per class
- Cyclists use own bike

CompuTrainer System

- Resistance controlled by computer software and device
- Currently energy lost as heat



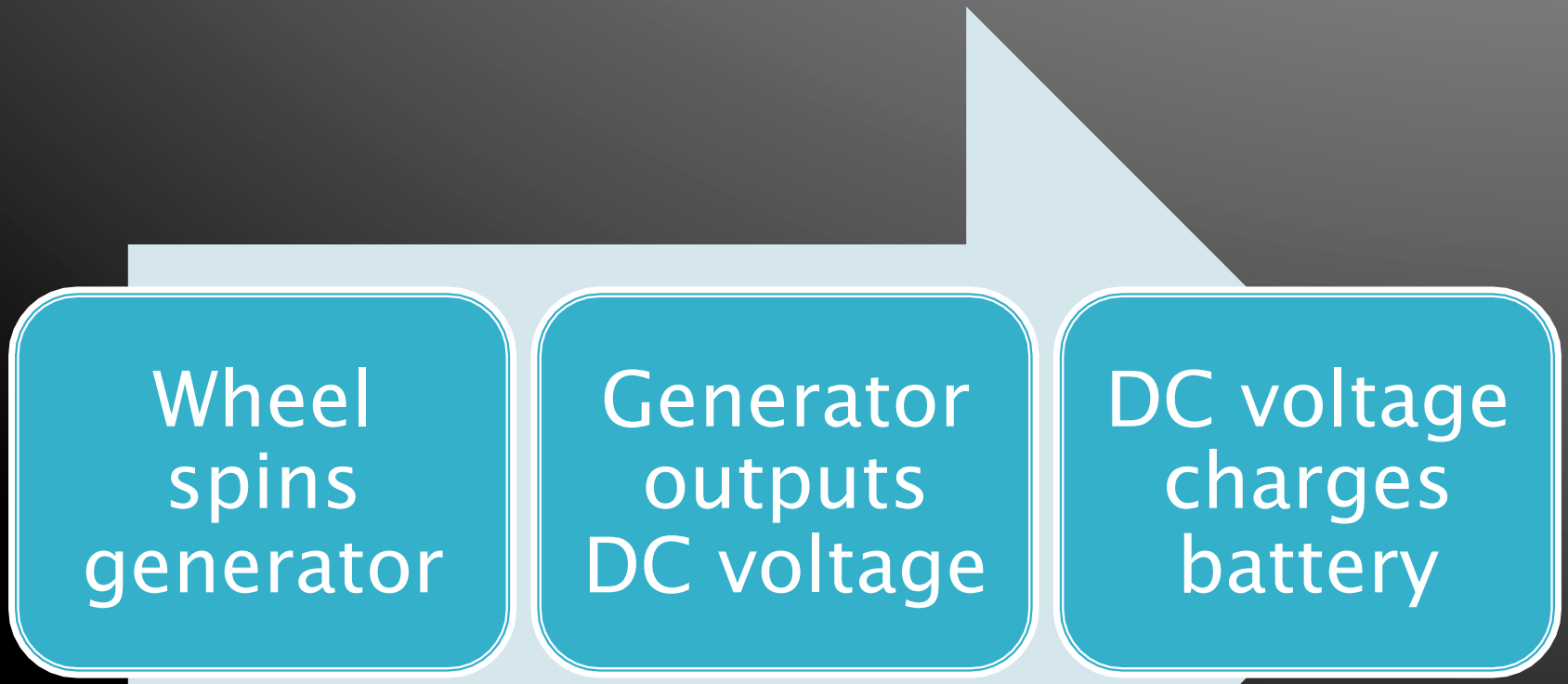
Project Benefits

- Energy stored in battery for use
  - Charge electronics (iPod, cell phone)
  - Power fans
  - Power lights
- Reduce electricity bill
- Reduce cooling costs

Proposed Solution

- Non-invasive
  - Do not alter commercial coding
  - Do not alter CompuTrainer resistance system
- Keep the riding experience comparable

Proposed Solution



Challenges

- Interface between bike and generator
- Interface between generator and battery
- Battery requirements: frequent deep cycling, size, cost, lifetime
- Safe disconnect of fully-charged battery

Demonstrated Features

- Conversion of mechanical energy to electrical energy
- Riders' training regimen will not be disturbed
- LCD displaying statistics of power generation and battery status
- Automatic disconnect of battery

Available Technologies: Generator

- Permanent Magnet DC Generator
  - No AC to DC conversion
  - Low rpm

Available Technologies: Battery

- Lead-Acid Deep Cycle Battery
  - Common in solar and wind projects
  - Large charging current
  - Inexpensive
  - Large capacity

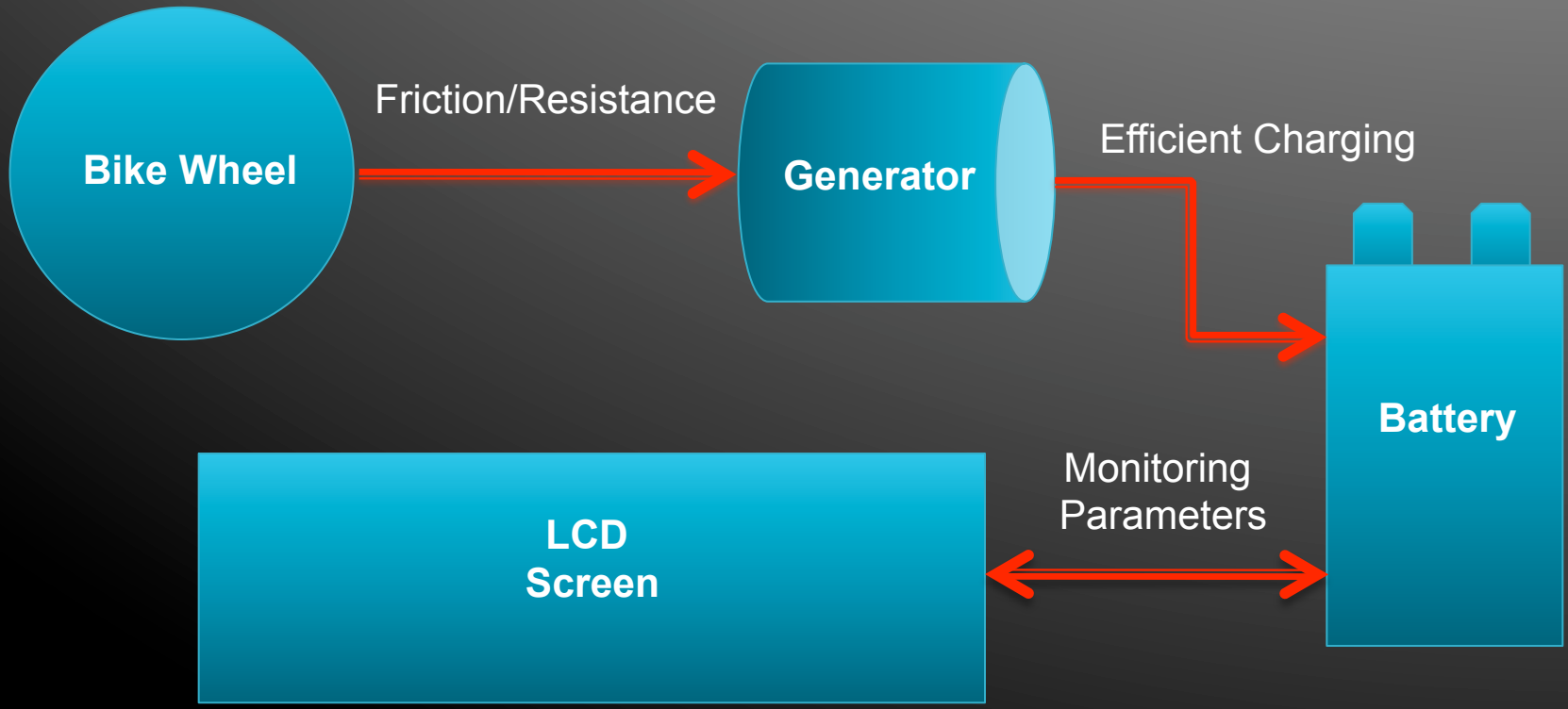
Engineering Content

- Bike wheel/generator interface
  - Rests on shaft (friction & resistance)
  - Stable bracket
- Generator/battery interface
  - Regulate current
- Battery
  - Deep-cycling
  - Energy density

Engineering Content (cont'd)

- Microcontroller:
  - Monitor generator current and power output, battery voltage
  - User-friendly LCD
- Power conversion
- Impact on pedaling resistance

Functional Blocks & Problem Areas



Conclusions

- Goal is to generate electricity from mechanical power
- Independent of CompuTrainer
  - Compatible with multiple bike training systems
- Alternative energy source
  - Ideal for individual use

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