Solar Powered Coffee Maker
School of Chemical, Biological, and Environmental Engineering

Motivation
- Low efficiency of solar cells with low conversion efficiency
- Limited fuel carrying capacity
- Requires fuel

Objective
- Develop and construct a portable prototype for coffee production
- Portable
- Limited purposes
- Simple to use

Design
- Specially shaped solar collector focuses light off center
- Adjustable collector mount allows for easily adjusted angle
- Tripod mount for coffee pot to allow for terrain adjustments
- Multiple purposes

Technology Comparison

Solar Collector
- Expensive
- Low efficiency
- Limited purposes
- Limited coffee pot design

Solar Panel
- Expensive
- Low efficiency
- Requires installation
- Multiple purposes
- User-friendly

Propane Stove
- Cheap
- Portable
- Easy to use
- Limited purposes
- Requires fuel

Experimental Results

Figure 1: A graph comparing no coating on the moka pot to Thermakote 250 coating. The coating allowed the water to change 60 °C in 8 minutes versus 55 °C change over 50 minutes.

Figure 2: A graph showing the change in incident solar radiation throughout the day and the time to make a pot of coffee at those times.

Portable Design

Umbrella Design
A umbrella will be constructed with a reflective inner lining to use as solar collector.

Kite Design
An oval reflective fabric with pouches on the backside for supportive rods which provide rigidity and curvature.

References

Image Sources
Parabolic Reflector: http://www.amadee.com
Solar Panels: http://solarisbothermal/files.wordpress.com
Propane Stove: http://www.sold.ca
Umbrella: http://sikepress.com

Acknowledgements: Dr. David Hackelman, Dr. Philip Harding, Andy Brickman, Nicolas Sitts, Rainwater Sterilization Team