REPORT FOR THE NCERA-101 MEETING, March 20-23, 2010

Faculty: A.J. Both*, Harry Janes**
Staff: Jeff Akers, Logan Logendra, Tom Manning, David Specca
*BioEnvironmental Engineering, Department of Environmental Sciences
http://aesop.rutgers.edu/~horteng
**Department of Plant Biology and Pathology

1. New Facilities and Equipment
   None

2. Unique Plant Responses
   None

3. Accomplishment Summaries
   We continue to work through operating and maintenance challenges associated with our 250 kW microturbine installation at the NJ EcoComplex. The system has been operational intermittently. A graduate student has started the development process for an operational decision support system. Growth chamber experiments were conducted using FCW plus INC as well as LED lamps for tomato growth and development. Chamber maintenance challenges have caused delays and have indicated the need for additional experimentation to validate previous results.

4. Impact Statements
   Nationwide, Extension personnel and commercial greenhouse growers have been exposed to research and outreach efforts through presentations, various publications and evaluation tools. It is estimated that this information has led to proper greenhouse designs and updated operational strategies that saved an average sized (one acre) greenhouse business a total of $20,000 in operating and maintenance costs annually.

   Greenhouse energy conservation presentations and written materials have been prepared and delivered to local, regional, and national audiences. Growers who implemented the information resulting from our research and outreach materials have been able to realize energy savings between 5 and 30%.

5. Published Written Works

Both, A.J., T.O. Manning, A. Martin, D.R. Specca, and E. Reiss. 20xx. Operating a 250 kW landfill gas fired microturbine at a 0.4 hectare research and demonstration greenhouse. Acta Horticulturae. *Under review.*

Both, A.J. 2010. Using landfill gas to generate electricity and heat (Abstract). Proceedings of the 55th Atlantic Coast Ag Convention and Trade Show. January 12-14. Atlantic City, NJ. pp. 124-125.

Mears, D.R., A.J. Both, L. Okushima, S. Sase, M. Ishii, and H. Moriyama. 2009. Some alternatives to burning fuels for greenhouse heating (*in Japanese*). Journal of Agricultural Meteorology. 65(3):303-308.

Both, A.J. 2009. How does sustainability fit into your plan? Greenhouse Management and Production (GMPro). May issue. pp. 26, 28-29.

Brumfield, R.G., A.J. Both, and G. Wulster. 2009. How are greenhouse growers coping with rising energy costs? Southern Nursery Association Research Conference Proceedings. Georgia World Congress Center, Atlanta, GA. February 12-13, 2009. pp. 304-307. Available at: http://www.sna.org/content/Economics and marketing 2009_1.pdf

6. Scientific and Outreach Oral Presentations

Both, A.J. 2010. Greenhouse heating; Greenhouse cooling; Greenhouse technology developments (three separate presentations). 20th Annual Greenhouse Tomato Short Course. Raymond, MS. March 9-10.

Both, A.J. 2010. Using landfill gas to generate electricity and heat. 55th Atlantic Coast Ag Convention and Trade Show. Atlantic City, NJ. January 13.

Both, A.J. 2009. Understanding basic energy principles. Agricultural Energy Training Seminar. EcoComplex, Columbus, NJ. December 15.

Both, A.J. 2009. Controlled environment agriculture. Global Eco-Innovation Forum on Sustainable Development of Hot Deserts. Columbia University, New York, NY. October 31.

Both, A.J. 2009. Landfill gas to energy project. SEBS Discovery Tour at the NJ EcoComplex. Columbus, NJ. September 21.

Brumfield, R.G., A.J. Both, and G. Wulster. 2009. How are energy costs affecting greenhouse growers? 5th National Small Farm Conference. Springfield, IL. Sept. 15-17, 2009. Available at: http://www.conferences.uiuc.edu/conferences/conferenceviewer2/view.cfm?conf=20033&page=20192&theme=&palette=

Both, A.J. 2009. Alternative energy applications; Floating hydroponic lettuce (two separate presentations). 9th Annual Greenhouse Crop Production and Engineering Design Short Course. Tucson, AZ. April 27-28

7. Other Relevant Accomplishments and Activities

International Committee for Controlled Environment Guidelines: A.J. Both, Chair
(started organizing the development of the new Guidelines for Monitoring and Reporting Environmental Parameters for Experiments in Greenhouses)

Associate editor Transactions of the ASABE/Applied Engineering in Agriculture: A.J. Both (since 2003)

Member of the executive committee for an NSF funded IGERT (Renewable and sustainable fuel solutions for the 21st century): A.J. Both