REPORT FOR THE NCERA-101 MEETING, September 9-12, 2012

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1. New Facilities and Equipment
   None

2. Unique Plant Responses
   None

3. Accomplishment Summary
   We continue to work through operating and maintenance challenges associated with our landfill gas fired microturbine installation at the 1-acre NJ EcoComplex Research and Demonstration Greenhouse. A doctoral student is developing an operational decision support system to manage the electricity generated: use onsite (supplemental lighting for greenhouse tomatoes), export to the utility grid (additional income), or a combination of the two.

4. Impact Statement
   Nationwide, Extension personnel and commercial greenhouse growers have been exposed to research and outreach efforts through presentations, 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 (1-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
   Blanchard, M.G., E.S. Runkle, A.J. Both, and H. Shimizu. 2012. Greenhouse energy curtains influence shoot-tip temperature of new guinea impatiens. HortScience 47(4):483-488.
   Both, A.J., R. Hansen, and M. Kacira. 2012. Hydroponics give growers control. Article is part of the Water Wisely series in Greenhouse Grower Magazine. May issue.
   Mitchell, C.A., A.J. Both, C.M. Bourget, J.F. Burr, C. Kubota, R.G. Lopez, R.C. Morrow, and E.S. Runkle. 2012. LEDs: The future of greenhouse lighting! (feature article) Chronica Horticulturae 52(1):6-12.
   Runkle, E. and A.J. Both. 2011. Greenhouse energy conservation strategies. MSU Extension Bulletin E-3160.
   Both, A.J. 2011. Horticultural engineering. In 'Encyclopedia of Life Support Systems', Developed under the auspices of the UNESCO, Eolss Publishers, Oxford ,UK, [http://www.eolss.net].
   Zinati, G.M., J. Dighton, and A.J. Both. 2011. Fertilizer, irrigation and natural ericaceous root and soil inoculum (NERS): Effects on container-grown ericaceous nursery crop biomass, tissue nutrient concentration, and leachate nutrient quality. HortScience 46(5):799-807.
   Both, A.J., T.O. Manning, A. Martin, D.R. Specca, and E. Reiss. 2011. Operating a 250 kW landfill gas fired microturbine at a 0.4 hectare research and demonstration greenhouse. Acta Horticulturae. 893:397-404.

6. Scientific and Outreach Oral Presentations

Both, A.J. 2011. Efficient use of natural resources in greenhouses. Keynote speech at the GreenSys2011 symposium, June 5-10, Halkidiki, Greece.

7. Other Relevant Accomplishments and Activities

International Committee for Controlled Environment Guidelines: A.J. Both, Chair (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)

Sabbatical leave: A.J. Both (August 2011-July 2012; Wageningen University)