

## SESSION 4C

### THE GREENING OF AMERICA....TALES FROM THE FIELD

*Moderator: Rich Hackner, GDS Associates*

#### PAPERS:

##### **Field Performance Reviews of Green and Sustainable Buildings**

Catherine Turner, New Buildings Institute

##### **A Performance Evaluation Study of Photovoltaic Systems Installed through the Long Island Power Authority's Clean Energy Initiative Solar Pioneer Program**

Ann Clarke, Long Island Power Authority

Robb Aldrich, Steven Winter Associates, Inc.

Robert Allgor, Long Island Power Authority

David Hill, Vermont Energy Investment Corporation

Ralph Prael, Prael & Associates

##### **The Green, Green Grassroots of Home: Measuring Community-Based Clean Energy Market Development Initiatives in Connecticut**

Timothy Pettit, Nexus Market Research, Inc.

Robert Wall, Connecticut Innovations, Inc.

J. Gregory Clendenning, Nexus Market Research, Inc.

#### SESSION SUMMARY:

Sustainable building practices are being promoted by an ever broadening set of stakeholders. This session explores the efforts of three programs from across the United States that are helping promote green building development. Topics covered include; market acceptance, field performance, and community support that are creating interest in and furthering the development of green building program design.

The first paper, "*Field Performance Reviews of Green and Sustainable Buildings*" covers market research on barriers to performance evaluations, a protocol to address those barriers, and results from initial field measurements.

Green and sustainable building programs often estimate anticipated savings from energy efficiency measures, but actual results are rarely measured. This lack of post-occupancy evaluation limits the ability to gauge true progress and precludes feedback to owners, operators, and designers. Such feedback could hasten the achievement of improved efficiency. To address this situation, this paper covers three facets of the New Buildings Institute's efforts to expand the use of performance reviews: market research into evaluation methods and barriers to their wide use, a protocol to address those barriers, and results from initial field measurements.

Based on this research, a widely used building performance protocol must gather readily available performance data from multiple sources and focus on understandable, actionable interpretations. A staged approach can permit a low initial cost and gives an informed basis for a more targeted diagnostic effort when called for. Field tests of the measurement protocol were conducted on a varied group of buildings with a mixture of ages and sustainability features. Energy usage results are presented in relation to several alternative benchmarks, ranging from existing building averages to building-specific design elements. Occupant satisfaction results are shown in areas of temperature, acoustics, air quality, and light, to help distinguish between buildings with true efficiency gains and

those that merely save energy at the cost of occupant functional comfort. Consistent gathering of such information can facilitate owners' actions toward increased building efficiency as well as develop aggregate data for assessing both the energy and non-energy value of green building efforts.

The second paper, entitled, "A Performance Evaluation Study of Photovoltaic Systems Installed through the Long Island Power Authority's (LIPA) Clean Energy Initiative Solar Pioneer Program" documents the performance of the program over its initial six years. Introduced in 1999 as part of LIPA's Clean Energy Initiative, the Solar Pioneer Program promotes the installation of solar photovoltaic (PV) systems as an environmentally clean and viable alternative to electricity generated from fossil fuels. LIPA has committed to transforming the market for PV on Long Island by: increasing consumer awareness and market demand for PV systems; accelerating the development of a vibrant, self-sustaining local infrastructure for the delivery and maintenance of quality PV systems; reducing institutional barriers to streamlined system installations; and developing mechanisms to overcome financial barriers to purchasing PV systems. Although the original focus of the Solar Pioneer Program was on the residential market, in 2001 rebates were also made available to commercial customers. Key questions answered by the evaluation include: How does the expected output of PV systems compare with the actual output of rebated systems once they are installed? Does the performance persist over time? Are customer and planning expectations of performance consistent with in-field experience?

And, finally, the third paper, entitled, "*The Green, Green Grassroots of Home: Measuring Community-Based Clean Energy Market Development Initiatives in Connecticut*" details a community-based environmental program intended to engage and motivate a community's local government, businesses, organizations, and residents to adopt environmentally beneficial behaviors by raising community awareness and leveraging community pride. In Connecticut, such a community-based approach is being applied to a voluntary program in which ratepayers can elect to purchase clean energy through their current electric utility. This clean energy voluntary purchasing program (the CTCleanEnergyOptions<sup>sm</sup>) was launched in April 2005 by the Connecticut Department of Public Utility Control as enabled by Connecticut State Assembly Public Act 03-135. To develop this voluntary market demand for clean energy, the Connecticut Clean Energy Fund (CCEF) launched a series of community-based initiatives to accelerate the rate of subscription to this clean energy purchasing program by ratepayers across the state<sup>1</sup>. By September 2005, subscriptions exceeded total subscriptions to an earlier program that failed to deliver a sustainable subscription base for clean energy market development after 2.5 years from 2000 to 2003. The hypothesis is that the CCEF community-based initiatives jump-started the growth in subscriptions largely from the participating communities. A number of alternative hypotheses were developed to explain this rapid program startup and sustained growth. All alternative hypotheses were rejected in favor of the conclusion that the community-based initiatives had a powerful effect on jump-starting the market for clean energy in Connecticut, delivering clean energy subscriptions at nearly double the rate of nonparticipating communities, even as community participation and subscription rates continue to climb.

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<sup>1</sup> The CTCleanEnergyOptions program is available to all customers of the state's two large electric utility companies, The Connecticut Light & Power Company and United Illuminating Company, which provide service to all or parts of 166 of the 169 municipalities in Connecticut. The clean energy program is not, however, currently available in the handful of municipalities (3) served solely by a municipal electric utility.