

# Discussion FORUM

December 2007

Number 32

## Unleashing Energy Efficiency

Washington-area professionals gathered on December 5th for the thirty-second IRG Discussion Forum, "Unleashing Energy Efficiency via the Internet," at which IRG presented its proprietary Energy Information Systems (EIS) technology, Nextep-online, and its application to the Long Beach Aquarium of the Pacific (AOP). Although AOP is only nine years old and highly sophisticated in its operations and utility management, the IRG Nextep team, working in tandem with the Siemens facility management system and staff, identified more than 15% cost savings at very attractive financial payback periods. Actual results far exceeded this estimate, with most recent measures indicating more than 30% savings for 2007. Senior IRG and AOP personnel shared their experiences with this project at the Forum.

### Nextep-online

With concerns about the sustainability of scarce resources growing daily, private sector businesses, governments, and individuals are all looking for new technologies to not only provide alternative sources of energy, but to help them use existing sources more effectively. Energy Information Systems (EIS) allow facility managers to monitor their use of energy, water, and other metered resources from their own computers, anywhere and anytime, and to immediately determine the best means of reducing and managing utility costs.

Alain Streicher, IRG Vice President for Energy and Environmental Management, introduced IRG's new EIS technology, Nextep-online, a bundled hardware and software solution that transforms multiple pulsed inputs into a visual representation of the status of a utility system online, in real time.



Alain Streicher presents Nextep-online

---

*Energy Information Systems (EIS) allow facility managers to monitor their use of energy, water, and other metered resources from their own computers, anywhere and anytime, and to immediately determine the best means of reducing and managing utility costs.*

---

"Nextep-online delivers a full range of energy information functions, including measurement and verification, re-commissioning, tariff and investment analyses, system status and alarms," Mr. Streicher said, "at a low cost of around \$20,000 for a facility using \$250,000 to \$1 million of energy and water per year. Nextep-online identifies immediate cost

savings and operations and management improvements with a short pay-back period; it tests alternative tariffs and optimizes supply based on the detailed load profile it generates."

"Nextep applications include tariff optimization; real time valuation of excess demand and excess costs; monitoring of alarms; multi-site and multi-energy and water aggregation; daily, monthly and annual profiles of energy and water use and costs; and bill verification," Mr. Streicher added. "Because of today's continuously increasing energy costs, facilities managers are more open to engaging consultants to help keep those costs down. Nextep can provide an abundance of information with a minimum of



**Nextep-online:** <http://www.nextep-online.com/>  
**The Aquarium of the Pacific:** <http://www.aquariumofpacific.org/>  
**LEED Certification:** <http://www.usgbc.org/>  
**The California Climate Action Registry:** <http://www.climateactionregistry.org/>

consultant time, thus lowering the cost for such energy audits."

### A Nextep Application

The Aquarium of the Pacific (AOP) in Long Beach, California is the second most popular family destination in the greater Los Angeles area. A thriving, \$20 million a year business, the AOP has had a \$1.5 billion economic impact on Southern California since opening in 1998. Energy costs are the Aquarium's number two expense.

According to AOP CEO Jerry Schubel, the Aquarium seeks to "develop a regional model of sustainability," citing the environmental, economic, health, safety, and community benefits that result from AOP's green practices. "The Aquarium is the first museum in the United States to earn the status of a 'Climate Action Leader' by measuring, certifying and



Energy costs are the Aquarium's second largest expense

reporting our greenhouse gas emissions," Dr. Schubel said. In 2005, the AOP produced about 5,500 metric tons of CO<sub>2</sub>.

"Our future initiatives include a new watershed exhibit and classroom, an animal care center and a new front wing," he said. "All of these buildings will be certified by the Leadership in Energy and Environmental Design (LEED) Green Building Rating System." In 2006, in anticipation of these initiatives, the AOP contracted with IRG's Nextep-online to assist the Aquarium in minimizing its energy costs, improving its energy efficiency, and rationalizing its long-term energy planning and investment.

"IRG initially estimated that Nextep monitoring could result in a 15% energy savings; I said we would be happy with a 5% savings," Dr. Schubel said. "The actual result – as of this morning – is a whopping 30% savings. In 2006, the AOP's energy costs were over \$2 million; by the close of 2007, our costs are estimated to be only \$1.5 million. The total cost of the Nextep study was \$60,000. While not all of the savings are attributable to the Nextep analysis, a significant portion are."

Mr. Streicher agreed with Dr. Schubel, saying "The Nextep analysis encouraged AOP staff to further increase energy efficiency, in a kind of 'halo effect.'" He praised the AOP staff for "their



Children visit the Aquarium of the Pacific  
 Photo by Tim Adams

critical role in exceeding the expected savings."

### How It Was Done

Consultant Grayson Heffner explained how the IRG Nextep team accomplished this result. "The premise of any information system," he said, "is that you can't manage what you don't measure.

Energy is the fastest growing operating cost facility managers face, and they need sophisticated tools to address the growing complexity of the rates and service options and the new technologies available to them."

"Nextep tools help facility managers monitor processes and equipment to identify energy savings and demand reduction opportunities, configure facility loads for competitive suppliers or demand response, optimize the facility's performance for a given tariff or rate plan, compare and benchmark energy costs across facilities, and implement predictive maintenance," he explained.

"Although Nextep provides information in real time and at adjustable intervals, the cost is lower than either an Integrated Building System or an Enterprise Management System because it only works one-

way, providing monitoring only, and is easy to implement as a retrofit," Dr. Heffner said.

The Nextep team had found that, due to recurrent engine breakdowns on weekday afternoons, AOP's monthly electricity bills had been excessive during the summers of 2004 to 2006. "We determined that the AOP could reduce its exposure to high demand charges by improving cogen operations and through standby demand management measures in case of such breakdowns," Dr. Heffner said. Cogeneration – or cogen – is the process whereby an industrial facility utilizes its waste energy to produce electricity.

"The Nextep team also identified several energy efficiency measures that cost less than \$10,000 and would pay back within a year," he said. "These included the installation of air curtain doors at customer and service entrances, heat recovery wheels on return air handlers, upgrading heat recovery

*"The Nextep team identified several energy efficiency measures that cost less than \$10,000 and would pay back within a year," Dr. Heffner said.*

pumps, and optimizing electric chiller operation. Lighting retrofits and the installation of a double stage absorption chiller are higher cost measures that merit further study."

"Implementing the low cost measures would save the AOP over \$160,000 a year at a total cost, after rebates, of less than \$25,000," Dr. Heffner said. "The measures with longer payback periods could save almost \$125,000 a year, for an additional cost, after rebates, of about \$220,000. These savings add up to 15% of AOP's total energy costs."

To date, the Aquarium has adopted Nextep's recommendations to install cogen heat recovery pump impellers, optimize chiller operations, install air curtains at several entrances and adopt cogen operator incentives. The



*Pictured from left to right: Alain Streicher, IRG Vice President for Energy and Environmental Management, Jerry Schubel, President & CEO of the Aquarium of the Pacific, and Grayson Heffner, Project Manager*

recommendations to retrofit lighting, install a two-stage absorption chiller and participate in Southern California Edison demand response programs are being considered. As Dr. Schubel noted, the actual cost savings exceed initial estimates by far, with an expected 30% cost reduction for 2007, largely the result of the use of Nextep-online.

**Speakers**

An internationally recognized expert in energy efficiency and the private power industry, **Alain Streicher** is IRG's Vice President for Energy and Environmental Management. Previously, he was a senior partner at PA Consulting, Chief Operating Officer and a board member of Hagler, Bailly, Inc. and chairman of the International Power Forum, an organization of private US power companies active overseas. Mr. Streicher has an MS in Scientific Management from the Ecole des Mines, Paris, an MS in Physics and a BS in Economics from the University of Grenoble, and a BS in Physics and Chemistry from the University of Orleans, France.

**Grayson Heffner** is an authority on the design, management, and evaluation of clean energy policies and program, including energy efficiency, demand side management, and renewable energy. His 30 years of power sector consulting and project management experience includes assignments with the Pacific Gas and Electric Company, the Electric Power Research Institute, the Lawrence Berkeley National Laboratory, the World Bank, and IRG. Dr. Heffner has conducted studies and managed projects on power sector reform, electric power pricing and costing, energy efficiency, renewable energy, distribution loss reduction, and rural electrification. His publications on energy efficiency, power sector reform, and renewable energy have appeared in a number of trade journals. He is a senior member of the IEEE Power Engineering Society. His degrees in electrical and mechanical engineering are from the University of California at Berkely.

An accomplished administrator and scientist who has worked in the fields of biology and environmental studies for 25 years, **Jerry Schubel** is professor emeritus and former dean of Stony Brook University's Marine Sciences Research Center, president emeritus of the New England Aquarium in Boston, and president and CEO of the Aquarium of the Pacific in Long Beach, California. He has published 200 scientific papers and acted as writer, editor, or photographer for several books and academic journals. Dr. Schubel has a BS from Alma College, a PhD in Oceanography from Johns Hopkins University, and an honorary PhD from the Massachusetts Maritime Academy.

## Forum Feedback

The greatest impact of EIS technology results when the data it collects is transformed into information that allows and encourages employees to take individual actions to implement energy savings.

## IRG Speaks Out

President and CEO **Asif M. Shaikh** attended a consultative meeting with His Excellency Jocelyn B. Radifera, Ambassador of Madagascar, to discuss the creation of the Ambassador's "Friends of Madagascar Advisory Council" (FOMAC). Mr. Shaikh joined the Council, which will reinforce cooperative links between the United States and Madagascar, as a founding member. In a letter to Mr. Shaikh, Ambassador Radifera wrote, "I am deeply grateful for your expression of support and for your accepting to be among the founding members of FOMAC." On February 5th, IRG will host a visiting delegation in Washington, DC on the role of public-private partnerships in Madagascar.



On November 1st, **Robert Winterbottom**, Senior Manager, gave a presentation to the USAID Biodiversity and Forestry Extended Team Meeting. Mr. Winterbottom summarized the impacts and lessons learned from Community-based Natural Resources Management in Southern Africa, based on his experiences with the Namibia LIFE and FRAME projects.

### ABOUT THE IRG DISCUSSION FORUM

The IRG Discussion Forum is an event that addresses issues affecting international development. Each session is informal, with guest speakers and attendees participating in a personal capacity. For comments, questions, or information on the Discussion Forum, contact [discussionforum@irgltd.com](mailto:discussionforum@irgltd.com) or call IRG at 202.289.0100

International Resources Group (IRG) is an international professional services firm that helps governments, the private sector, communities, and households manage critical resources to build a cleaner, safer, and more prosperous world. Since 1978, IRG has completed over 750 contracts in more than 135 countries, delivering high-quality, cost effective services that promote positive economic growth, institutional and social change, and intelligent use of resources—human, physical, environmental and financial. IRG's international development staff include world-renowned specialists who have pioneered many of the analytical techniques employed in their fields. IRG's ability to provide management, economic, and technical advice is further enhanced by the diversity, cross-cultural experience, foreign language skills, and management capabilities of staff based in the Washington, DC headquarters, corporate offices in India and the Philippines, and project-dedicated offices around the world.

IRG is ISO 14001 Certified.



### INTERNATIONAL RESOURCES GROUP

1211 CONNECTICUT AVENUE, NW · SUITE 700 · WASHINGTON, DC · UNITED STATES  
TEL: 202.289.0100 · FAX: 202.289.7601 · WEB: [WWW.IRGLTD.COM](http://WWW.IRGLTD.COM)