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Delivering Proven Results in Energy-Efficiency Engineering

Lincus, Inc., delivers energy-engineering consulting services that maximize the value of your utility company's assets while improving end-use client's mechanical building systems design, construction, and operation. Since 1984, Lincus professionals have been servicing utility giants, major corporations, city planners, and medical institutions with proven results.

- ▶ ELECTRICITY CONSUMPTION, GENERATION, AND PRICING

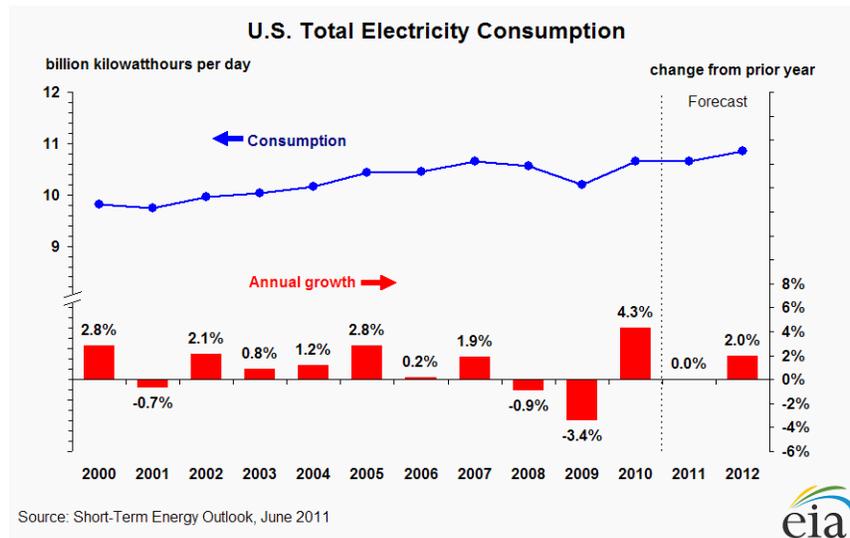
A BRIGHT OUTLOOK ON THE RISE FOR ENERGY EFFICIENCY

The political climate in the United States and Europe has continued to move in favor of energy efficiency over forms of heavily subsidized clean-energy sources. Much of this can be attributed to a new political climate that is more worried about budget deficits than carbon emission legislation. Many countries have also begun to realize the benefits of energy efficiency in providing not only reductions in energy use, but also inexpensive carbon reduction mechanisms. The majority of energy-efficiency measures offer a payback of five years or less, whereas renewable technologies involve significant amounts of capital investment and/or government-backed subsidies which could take the better part of a decade to pay back. Financial institutions such as HSBC are predicting that the global revenue for energy-efficiency companies will expand 13% per year through 2020, versus 8.6% for wind, solar, and nuclear power providers. According to a Business Week article published on February 3, 2011, "The bottom line: Stocks of companies aiding energy efficiency are set to outperform clean energy stocks, which carry higher political risk."

The following information provides a summary of the short-term energy outlook from the U.S. Energy Information Administration (EIA) regarding recent trends in U.S. electricity consumption and the U.S. retail electricity prices:

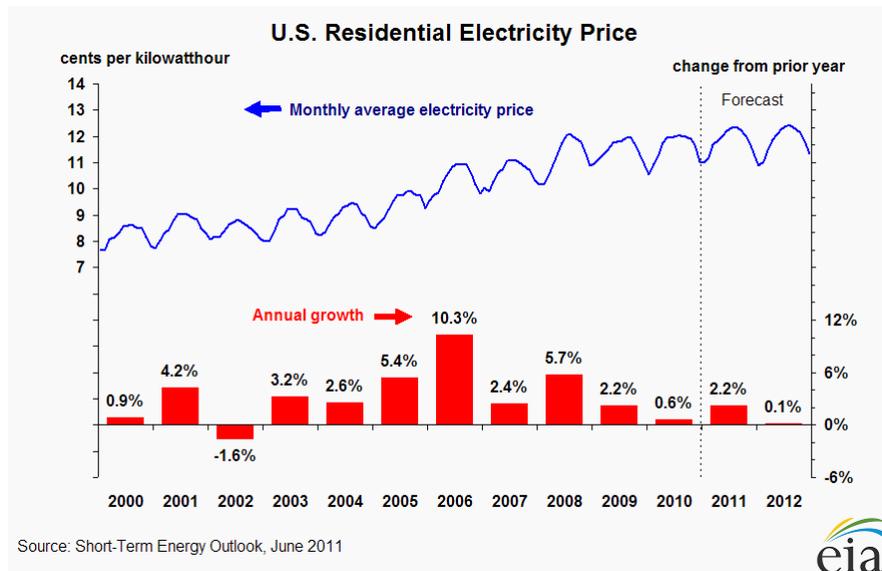
U.S. Electricity Consumption

The U.S. EIA expects total U.S. electricity consumption to remain unchanged from 2010. Cooling degree-days during 2011 are forecast to be 14% lower than last year, driving a projected 2.5% decline in retail electricity sales to the residential sector. The Agency also expects that improved economic conditions should lead to a 3.6% increase in sales to the industrial sector, while commercial-sector electricity sales show little change in 2011. During 2012, total U.S. electricity consumption is predicted to grow by 2.0%.



U.S. Electricity Retail Prices

The U.S. EIA expects the average U.S. residential electricity price to rise from \$0.1158 per kWh in 2010 to \$0.1183 per kWh in 2011 — an increase of 2.2%. The cost of coal and natural gas to the electric power sector is expected to stay flat, which should level-out retail electricity prices next year due to regulatory lags in the pass-through of generation costs to retail prices.



At Lincus, we find ways to design and implement energy-efficiency programs for utilities and assist commercial and industrial customers with identifying opportunities to economically save energy and demand. Based on the latest American Council for Energy Efficient Economy (ACEEE) study on the results of energy-efficiency programs in 14 states across the U.S., the average cost of an energy-efficiency program ranges from \$0.016 to \$0.033 per kWh, with an average cost of \$0.025 per kWh. Whether the utility is self-implementing its energy-efficiency programs or hiring third-party providers to manage programs, our goal is to assist the utility with improving kWh yield in its programs at the lowest cost of saved energy. One of the ways we can improve productivity of each existing or new program is based on the data analysis of current program performance and comparing that with the results of alternate programs, technologies and implementation methods such as prescriptive, custom, direct install and turnkey programs.

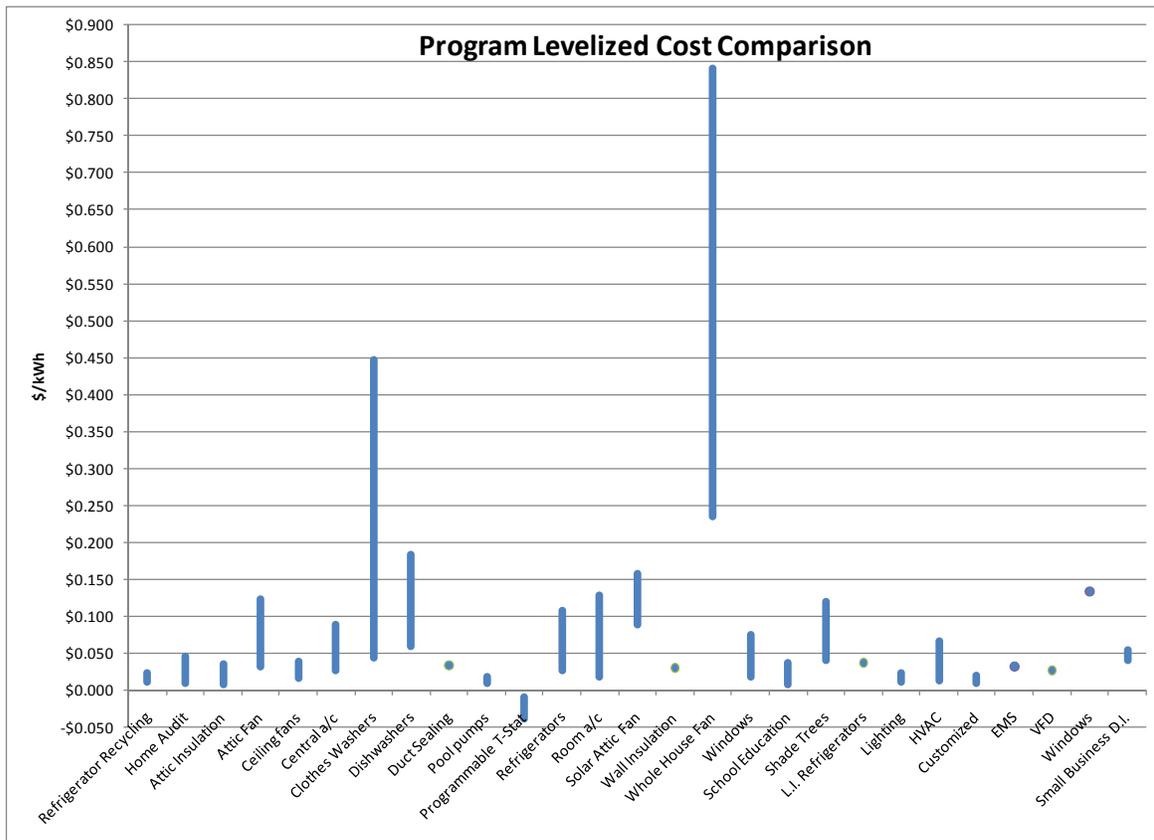
▶ CUSTOMIZED ENERGY SOLUTIONS

EVALUATION, MEASUREMENT AND VERIFICATION

As a part of Lincus' Evaluation, Measurement, and Verification (EM&V) services for a group of five utilities, our consultants documented and measured the effects of each program's impact. These impacts included determining the success of their DSM programs, based on kWh and kW reduction goals, as well as identifying program successes and challenges, which provide ways to improve program performance. With these objectives, our consultants provide:

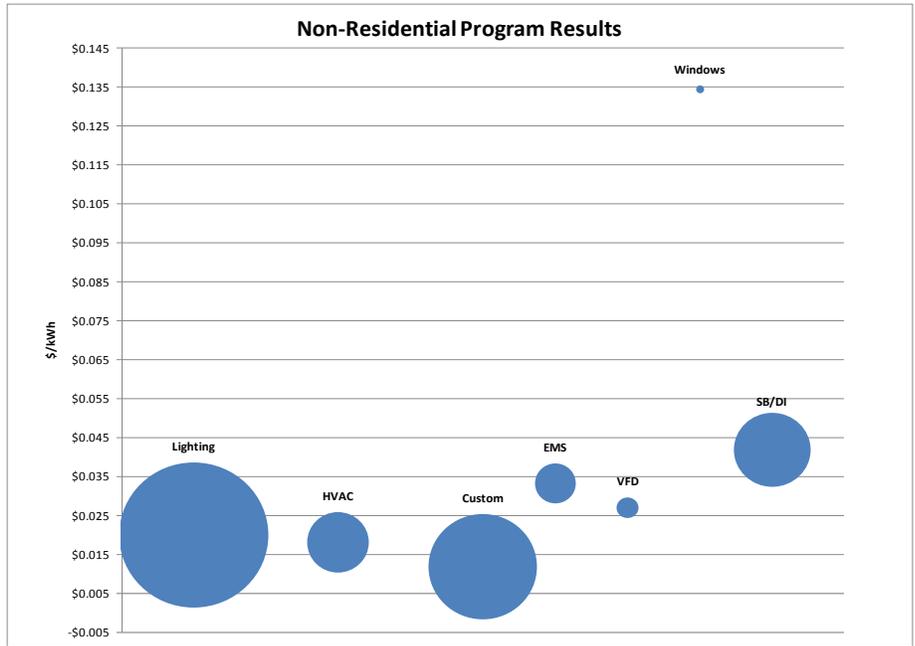
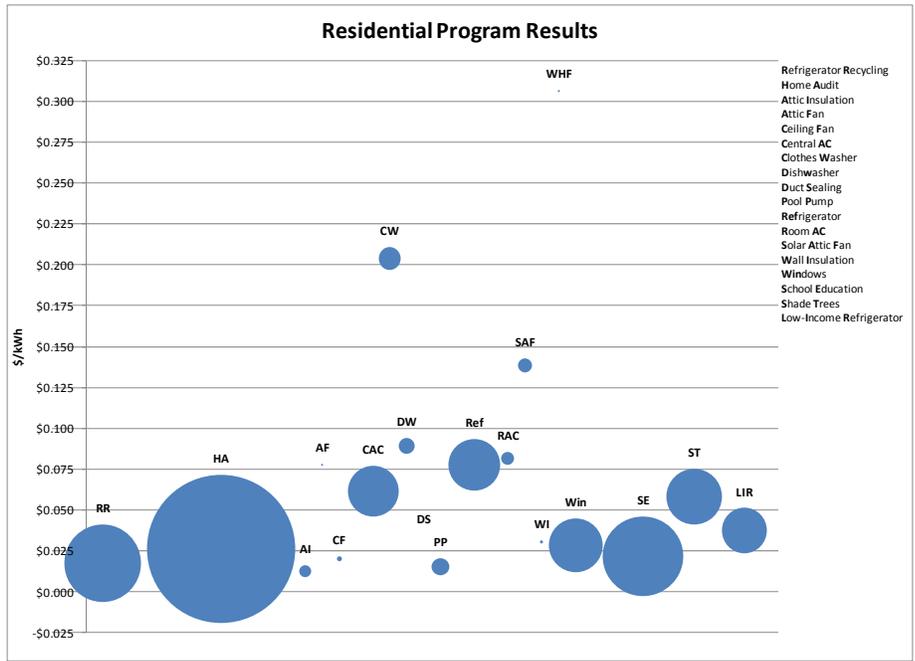
- ▶ **Impact Evaluations** to determine the impacts (usually energy and demand savings) and co-benefits (such as avoided emissions health benefits, job creation, and water savings) that result directly from a program.
- ▶ **Process Evaluations** to assess how efficiently a program was or is being implemented, with respect to its stated objectives and potential improvements for future programs.
- ▶ **Market Effects Evaluations** to estimate a program's influence on encouraging future energy-efficiency projects because of changes in the marketplace.
- ▶ **Market Potential and Characterization Studies** to determine the size and the nature of the existing market segment including stakeholders, market penetration, barriers, and potential for programs and technologies.

Since early 2005, Lincus consultants have provided EM&V services to various investor-owned and municipal utilities. These projects typically consist of program-process and impact evaluations along with recommendations on ways to reduce costs and increase savings. A detailed report is ultimately prepared that describes all recommended program improvements and a comparison of the program's effectiveness as illustrated in the following graph:



The **Program Levelized Cost Comparison** graph above shows the lifetime, levelized cost range by measure for five utilities. As illustrated, the average levelized cost for most measures is within \$0.00-\$0.15/kWh. However, some measures displayed a larger range. The Whole House Fan measure is noticeably higher than all other measures due to the a relatively low-net savings and high utility costs (Incentive, Overhead, and Direct Install). The Clothes Washer measure displays a similar pattern for similar reasons. In these instances, we recommended that the utilities reduce utility cost (incentives, marketing, and/or administrative costs) to increase program performance.

The average levelized costs in these studies were \$0.035/kWh for residential programs and \$0.021/kWh for non-residential programs. These are typically what we would expect to see in levelized costs of similar programs. The bubble graphs below illustrate how each measure is weighted by its results and its overall budget. The diameter of the bubble represents the total kWh savings, while the respective \$/kWh is displays a weighted average of all five utilities.



PREMIUM EFFICIENCY MOTORS

NEMA Premium™ efficiency motors have become the new baseline for energy-efficiency motors in the U.S. due to new Energy Independence and Security Act of 2007 (EISA 2007). This means that all motors manufactured in the U.S. or imported into the U.S. on or after December 19, 2010, must meet or exceed the rated NEMA Nominal Efficiency to meet the Premium Efficiency Standard. Typically this means an efficiency increase of 2%-3% in motors 10 hp or less and 0.8%-1.5% in motors larger than 10 hp up to 500 hp.

The adoption of NEMA Premium™ efficiency as the new standard makes the previous minimum efficiency ratings obsolete. Since motor-driven systems make up about 60% of the electrical energy use in commercial and industrial sectors in the U.S., this new baseline will likely translate to substantial energy and cost savings. Taking into account a useful life of 10-15 years for most motors makes this a very attractive measure for energy-efficiency programs. Where motors have high operating hours, Lincus strongly recommends considering premium-efficiency motors due to the low incremental cost of the upgrade.

EISA 2007: http://www1.eere.energy.gov/buildings/appliance_standards/pdfs/74fr12058.pdf

NEMA Premium™ Tables: <http://www.nema.org/stds/complimentary-docs/upload/MG1premium.pdf>

U.S. Department of Energy's Motor Challenge Program: http://www1.eere.energy.gov/industry/bestpractices/motor_challenge_national_strategy.html

THE ENERGY EXPERT'S BLOG

Lincus recently introduced an “Ask The Energy Expert” blog on our website — Lincusenergy.com. This blog will be used to share best practices between energy experts in all areas of energy efficiency and demand reduction. Our commitment is to review and post our answers to your questions within 24 hours. We ask that you relate your question to one of the following categories: market analysis, evaluation, monitoring and verification of programs, all energy-efficiency measures, new technology evaluations, energy program design, implementation, and costs. We are also open to broader discussion related to specific energy-efficiency measures or program-related software products.

In this issue of our newsletter, we have selected the following question and answer from our blog for your review. To review other questions and answers please feel free to visit the blog at www.Lincusenergy.com.

Q: We are trying to figure out if and why we should look at pumps and blowers as a part of our energy-efficiency program offering. What potential do you see for pumps and blowers in a program?

A: Extensive research of existing water pumping inventory in California indicates that an average irrigation pump efficiency is approximately 53% (rather than 75-78%) as in the original design condition. Agricultural/irrigation customers account for 7% of total statewide electricity use. Out of this total, 80% is used by pumping systems. When you consider that the average irrigation pump size is 75 hp (varying between 15 to 750 hp), along with the number of pumps within a water utility, municipal distribution system, or agricultural irrigation pumps, your utility's potential in energy savings could be substantial.

From the technical perspective, efficiency losses may come from motors, bearing, and electrical losses (9%), column and shaft losses (5%), and impeller and bowl assembly losses (31%). As per the California study, average energy savings per pump is about 34,000 kWh per year.

In addition to the pump-efficiency improvements, a utility program may evaluate the use of variable speed drives (VSD) if the flow is or may be made variable based on the water demand. Please note that VSD applications are more complex and should be evaluated based on operating parameters. Energy savings for properly commissioned VSDs should be approximately 20-30%.

From the program design perspective, you'll need three main ingredients:

1. Selection and training of pump testers
2. Pre-qualification of pumps based on certain factors that will help you reach a benefit cost ratio greater than 1.0
3. A comprehensive Marketing and Outreach Campaign to ensure that your program will reach its savings and demand reduction goals

Also, pumps are a great source for demand response, and should be considered if you already have a demand response program in place or if you are considering starting one. Similar opportunities are also available for blower systems used in wastewater treatment. At Lincus, we have designed and currently implement pump and blower testing programs for three investor-owned utilities. If you would like further information on these program details, please contact us directly.