

Executive Summary

Energy Benchmarking Survey—Interim Results

by E. Lander Medlin

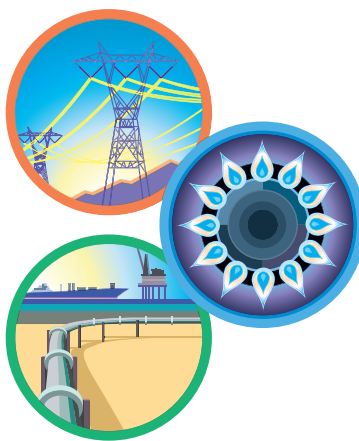
APPA, in association with Sebesta Blomberg & Associates, Inc., began an initiative to study, evaluate, and develop an energy benchmarking tool to integrate into both the EPA's Energy Star Portfolio Manager for higher education and APPA's annual Facilities Core Data Survey. Our goal is to create a campus energy performance database for effective benchmarking, which is sorely needed since:

- goal-setting for energy consumption is blind without benchmark reference;
- energy costs are becoming a greater portion of campus operating costs;
- institutions are missing substantial potential energy-reduction opportunities;
- no reliable peer-to-peer utility consumption profiles for campus settings exists; and
- energy conservation needs analysis, is time- and cost-prohibitive.

In the past, benchmarks for energy consumption did not incorporate the fluctuations that occur on college campuses or allow facilities professionals to compare statistically reliable campus energy consumption profiles with their peers. APPA has been working with Sebesta Blomberg for more than a year on the initial data-gathering phase and benchmarking study process necessary to create a statistically reliable and repeatable program.

Data Collection Process & Timing

During the summer and fall of 2006, an initial solicitation was distributed, a survey questionnaire was completed, several data requests were posted to the



membership, and a webcast was conducted to provide further information and clarification on the process, program, and expected results. The initial data request was closed in late November and the resulting information has been assembled and evaluated. Data collection from the Phase I survey generated data from approximately 125 institutions, consisting of nearly 600 million square feet, for approximately 14,300 buildings throughout the United States and Canada. This information has been extracted and assembled in a variety of databases so the statistical modeling processes could begin to evaluate the data and develop trends and relationships in energy consumption profiles.

Preliminary Results

Some interesting trends are beginning to emerge as we compare our preliminary findings with information from the 1976 ACE/APPA/NACUBO *Energy Cost and Consumption Report*. Initial highlights include:

- Total energy consumption on college and university campuses is comparable without regard to heating and cooling degree days. When comparing campuses based on latitude of the city location, the degree days are essentially equal. Further comparison indicates a slight difference in the

consumption of electricity versus heating fuel. However, when combined to total energy consumption, the differences are negligible. As a result of this finding, the APPA Facilities Core Data Survey will no longer require weather information for energy profile comparisons.

- Energy consumption for four-year+ research institutions is higher than other types of institutions by approximately 20 percent.
- Total energy consumption by function/space type varies dramatically among the sample size submitted.

When we extracted information from the 1976 energy report for the same campuses that submitted information for this survey, and the energy consumption compared at these campuses today, findings show:

- Campuses have grown in square footage significantly since 1976. The median growth per campus is approximately 96 percent with ranges from 29 percent to more than 340 percent.
- Energy consumption trends per square foot are down, though the difference in building functions vary.

Results from this broader, Phase I survey will be published (with institutional confidentiality and anonymity) in mid-February.

For the final tool to be credible, it must be based on detailed, robust data that appropriately characterizes the range of facilities found on college and university campuses. This underlines the importance of the Phase II consortium portion of the data collection effort and the incorporation of this type of ongoing data collection within APPA's annual Facilities Core Data Survey.

Lander Medlin is APPA's executive vice president and can be reached at lander@appa.org.

Next Steps

Our next steps consist of finalization of the Phase II consortium members and development of the detailed benchmarking database for those participants. Site visits, evaluation of information, configuration of the database analysis tools, and testing of the models will be required before a true benchmarking analysis can be achieved. Deliverables for the Phase II consortium members include: 1) a visit by a Sebesta Blomberg team to validate and normalize data, document building system and function profiles; 2) a summary report by the team to document observations and identify opportunities for utility savings on the campus; 3) a customized report that provides an energy and utility audit for the specific campus and benchmarks the institution's energy performance by individual building, building function, and campus totals; and 4) an energy

profile and benchmark by building normalized with the consortium peer group.

Annual energy costs nationally range from \$2 to more than \$10 per square foot for higher education campuses. If one-half of one percent of the average energy consumption is saved in documenting and analyzing data and implementing implications, the return on investment for consortium participation is less than six months. If you are able to participate at the consortium level, we urge you to do so—the potential savings are significant.

Outcomes

A reliable database for benchmarking campus energy consumption can ultimately be used to:

- set realistic energy conservation goals, prioritizing buildings by function, system type and energy consumption;
- forecast energy consumption profiles

- for renovated and new buildings;
- allow peer-to-peer comparison for developing support for energy and environmental emission reduction programs for the campus;
- help define impacts to energy use of proposed mechanical system configurations; and
- budget and plan in pre-design phases of future projects.

Integration of this information into APPA's Facilities Core Data Survey database and forms will streamline the energy profiling modules and improve the output of the program.

This detailed survey tool will contribute greatly toward the final database development, information collection, and validation process ultimately required by the EPA Energy Star staff as it further develops its Energy Star Rating Tool and online Portfolio Manager for more effective use by colleges and universities. 🏢

Buried under an avalanche of **energy** data?



The *first step* towards energy efficiency begins with getting a handle on your energy information!

- One system handles *all* of your energy and utilities information
- Chargebacks, rebillings, splits, submeter readings
- Accounting interface for A/P and A/R
- Audits, accruals, rate/tariff calculations, budgets, forecasts
- Measurement & verification of cost avoidance
- Hundreds of reports, charts, graphs
- Integrated tracking of both billing data and interval data
- Client/server for large universities
- New Desktop Campus version and OnLine web service for smaller institutions

**FREE
DEGREE DAY
charts!**

See how the weather affects your building energy use.

www.EnergyCAP.com

THE BEST-SELLING ENERGY EFFICIENCY SOFTWARE SINCE 1980.