Investment Grade Energy Audits

Shirley J. Hansen, Ph.D.
Executive VP, Kiona International
CEO, Hansen Associates

The traditional energy audit is just not good enough for today's energy projects. Investors or those insisting on guaranteed results demand more.

Having helped give birth to the energy audit borne in the late 70's, I'm proud of what we accomplished back then; and for the most part, it has served us well. Unfortunately, it is no longer good enough. The traditional energy audit has been a "snap shot" approach that typically assumes all current conditions will remain static for the projected payback time of the measures. But buildings seldom, if ever, are static. They are typically dynamic places with changing functions. What's more, they are populated by people who simply will not behave in predictable, consistent ways.

We have historically skirted the implications of the human element in energy auditing. As early as 1983, an evaluation of the first eight cycles of the U.S. Department of Energy's Institutional Conservation Program revealed that up to 80 percent of the savings in an effective energy management program could be attributed to the energy efficient practices of the O&M personnel.

In other words, as little as 20 percent of the savings will be attributed to the actual hardware, but we have continued to make calculations like a piece of hardware was going to always operate in the same fashion under vastly differing conditions.

We are a little better about assessing the impact existing energy related equipment will have on newly installed equipment; but, for the most part, it's still in the back-of-an-envelope stage. More hunch than science.

Over the years, experience has taught those of us in the performance contracting industry that guarantees require more precise calculations of conditions which surround newly installed energy efficient equipment and the unpredictable element people bring to the equation. Today, those who wish to predict savings with any degree of confidence must turn to an *investment grade audit.*

THE INVESTMENT GRADE AUDIT

An investment grade audit (IGA) incorporates the nameplate data, run hours, etc. that go into a traditional audit. Then, a risk assessment component is applied, which assesses conditions in a specific building, and most importantly, looks at the human aspect.

"Paybacks" have historically been assigned to certain measures in varied applications when we knew full well they would not perform in exactly the same manner under differing conditions. The challenge is to determine how the proposed measures will really behave *over time* given the probable future conditions in a given facility, and to predict the probable system degradation for the life of the equipment; thus, varying the projected payback.

At this point, the audit goes beyond science and becomes an art. The human factor must not only be assessed, but paired with potential energy measures to ascertain the impact occupants, management, maintenance and operational behavior will have on the energy efficiency measures.

For example, measures which are practically people impervious, such as insulation, can be looked on more favorably, especially in facilities where the human factor receives a relatively low score. While measures, such as controls—particularly if overrides are readily accessible—carry a greater risk and the payback and predicted savings results must be tempered accordingly.

An IGA is far more demanding, requires more experience and greater skills, and necessitates some subjective judgment. The auditor must weigh many key factors, including:

- management and its commitment to energy efficiency;
- the resultant occupant behavior based largely on management's

visible commitment;

- the manpower, skill and training needs of operators;
- the maintenance skill, manpower and training needs;
- the equipment constraints imposed by O&M staff limitations;
- the condition of energy-related mechanical equipment;
- repairs and replacement budget provisions; and
- the attitude of O&M personnel towards the energy program.

Once these issues and human factors are weighed, an IGA requires that they be converted to risks *with price tags*. The whole financial structure of an energy project, especially those with savings guarantees, must quantify these risks in dollars and adjust the project's economic viability accordingly.

Overlaying these financial considerations is the actual cost of money and net present value calculations. All these financial aspects must be part of an IGA. It's part of what *puts investment* in the IGA.

General facility upgrades and needed equipment replacement often drive projects. Energy efficiency benefits from these changes are becoming a carefully calculated part of the investment package. The measures must yield the anticipated benefits if the package is to be economically sound. Assumptions that things will stay the same just won't cut it anymore.

FINDING IGA AUDITORS

Engineers who can perform an IGA are in short supply and in increasing demand. Energy service companies (ESCOs) are always searching for auditors who can perform quality IGAs, thereby reducing the ESCOs' risks. In fact, many ESCOs now charge owners a premium for an investment grade audit if the project does not go forward.

This scarcity is being compounded by growth in the performance contracting industry. Mark Ginsberg, Acting Deputy Assistant Secretary at the U.S. Department of Energy, has declared performance contracting is the only growth area in the energy efficiency business. The investor

owned utilities in the United States alone now boast more than 80 ESCOs. This growth has put added pressure on the limited supply of investment grade auditors.

It is no secret among quality ESCOs that the "snapshot" energy audit weakens a project. Those in the ESCO industry who understand the worth of the IGA, however, have not been particularly vocal about the IGA's value. Clearly, they have no desire to create an outside demand for skills their industry has in short supply.

As those who want the quality of a performance contract without the ESCO guarantees and fees begin to appreciate what an IGA can offer, the demand will grow. The IGA is destined to become increasingly popular among more knowledgeable energy efficient consumers, but it will take some time before it is a standard in the industry. Owners who want this quality audit to guide their investments today, have difficulty finding those capable of performing IGAs outside the ESCO industry.

Demand in time creates supply. Engineers who have gradually modified audits to reflect the human element and other risk components are becoming more deliberate in their efforts to do so. More engineering firms are incorporating risk assessment procedures in their auditing protocol.

OWNER'S NEEDS

Historically, the auditor's involvement ended with delivering a report to the owner and collecting a fee. The engineer's fee seldom carried any accountability qualifications for predictive consistency. With an IGA, the owner should insist upon, *and get*, cost and energy savings projections which the auditor will stand behind.

Owners who ask for the level of accountability associated with an IGA, are more apt to find it. An owner, seeking a quality IGA, can screen potential analysts by comparing the auditor's predictions with achieved results for previous projects. When one finds engineers ready to stand by their cost and savings projections, owners should expect the audit to take slightly longer and to cost more. In addition, owners should recognize the need to make management and staff available to the auditors as they assess the risks associated with a given facility.

The watch words are: predictive consistency. The engineer who routinely comes in at 99 to 100% is doing solid work. Be careful of those

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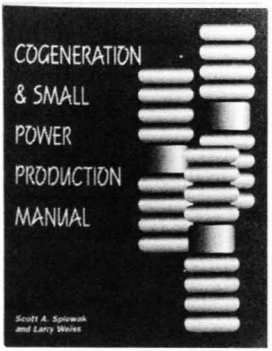

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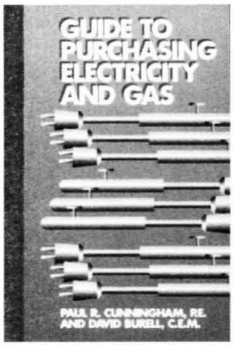

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who brag about excess savings (130+% above predictions). They are too cautious and are leaving money on the table.

THE FUTURE

We haven't got the process as well refined as we'd like. The good engineers know what is needed and use some "gut instinct" to temper their calculation. Those instincts need to evolve into a systematic protocol. What is still missing, even within the ESCO ranks, is something similar to the insurance industry's actuarial tables.

To achieve greater predictive consistency we need to develop a procedure to identify and assess the major variables which impact on each measure's savings potential. Ideally, these criteria could be included in a software program for a palm corder and the engineering judgment on site could be recorded.

Our simplest example: lighting will need to include the traditional manufacturing information, but also factor in ballast concerns, fixture condition, maintenance, replace/relamp, and *real* operating hours. The Portable Data Logger (PDL) is a real "magic black box" that takes the guess work out of operating hours. Simple devices, such as the PDL, can be worth their weight in gold. (Avoiding lawyer's fees for arguing the baseline hours and current operating hours will often more than pay for such devices.)

Using the palm corder, the IGA auditor could input all the necessary information for each measure and get a much more realistic appraisal of how a given measure would perform in the surveyed site. Such technology would increase the scientific precision in the "art" of risk assessment and truly fulfill the potential of an *investment grade* approach.

An IGA is increasingly at the heart of a "bankable project." Hence the term, "investment grade" audit. Anything less no longer adequately serves the owner, the contractor, or the investor.

ABOUT THE AUTHOR

Shirley Hansen is increasingly active in the international ESCO world, having now worked in 22 countries in the past six years. But she finds time to keep tabs on ESCO activities in the U.S. and is particularly

intrigued by the "rereg" scene and its impact on ESCOs. Shirley is executive vice president of Kiona International while she keeps her ties to Hansen Associates as CEO. Both firms specialize in all facts of performance contracting.

Shirley J. Hansen, Ph.D.; Executive Vice President; Kiona International; 8506 Shawnee Place, N.E., Gig Harbor, WA 98335; (253) 265-3150; fax 3152; kionaintl@aol.com