

12

The professional's role in energy management

Design professionals must educate, motivate, and enlist others in the cause of energy conservation.

Engineers in private practice are considered professionals in somewhat the same manner that a physician or attorney is considered a professional. There is a difference, however, between the professional in private practice and his counterpart in a business structured toward the manufacture or sale of a product or other goods of commerce. This does not infer that this counterpart is any less ethical, moral, or dedicated.

It is helpful to develop a clear definition of the professional as he exists in the private practice of selling his services in the field in which he practices. One suggested definition of a professional in this context is: "A professional is a person whose primary obligation in all endeavors is to represent the interests of his client with integrity, and as rigorously as if they were his own."

If this brief definition is accepted as stated, it becomes evident that the problems of operating a professional "business" are different than those encountered in product-oriented ventures. Furthermore, no financial constraint is included in this definition. It might then be said, that as professionals, consulting engineers make or lose money when they negotiate the contract with the client. Once the contract is executed, the client's interests become paramount.

Why energy retrofit?

How does this relate to the topic of this chapter—the professional's responsibility in energy management? Why would a potential client want to undertake a retrofit program to reduce his energy or power consumption? The two fundamental reasons are cost and availability of energy. The last two decades have seen unprecedented growth in the building industry in the United States. Unfortunately, not only were energy and power requirements not considered as a design parameter during that time, but the prevailing economic forces were counterproductive to the concept of energy conservation.

Suddenly, previous, seemingly plentiful and inexpensive energy and power sources have taken an upward swing in cost, and in many instances, there have been curtailments in available supply.

Unfortunately, the American psychology finds it difficult to address this problem. This psychological difficulty is manifested in the "pass-through" cost concept, and more subtly in the cost-of-living index.

The pass-through cost problem is seen when one is operating a commercial building (leasing space to generate profits). If the energy costs go up, the tenant pays the excess. This same business scheme is utilized by product manufacturers, private or public institutions, and energy supply utilities (the latter in the form of "fuel adjustments" or "purchased gas adjustments").

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The more subtle aspect applies at the level of the homemaker. When the cost of consumer products rises as a result of the multiplicity of energy cost pass-through—on every commodity from food to automobiles to widgets to utility energy—the cost of living is assumed to have gone up, and bargaining for a higher wage to cover the difference is initiated. Higher wages, in turn, stimulate another round of pass-through cost increases and the inflationary spiral soars upward.

Thus, in the vast majority of cases, the pure economic motivation does not stimulate adequate interest in energy conservation to lead a building owner to invest time, interest, or money in modifications or other efforts aimed at energy conservation.

Consider energy availability

Consider the other motivating force—availability of energy. Whether it be a production industry, an institution, a commercial building, or a homemaker—when the source of energy is curtailed or ceases to be available in needed quantities, the consumer reacts. This form of reaction can be described as panic, and the resulting corrective action is at best a meat-axe approach to a surgical need. Given a lack of proper understanding of the energy problem, when the temporary curtailment expires following adequate financial or energy source adjustments, the panic ceases and the user returns to business as usual until the next reaction is required.

As a result, there appears to be little reason why the potential client would want to undertake an energy retrofit program. The void, or lack of motivation, is filled either by the energy supplier who must stabilize his business to the consumer, or by the government (federal, state, or local) who feels the mandate to protect the public welfare, or by the product manufacturer who skillfully advertises “cure-all” products.

For the professional to simply react to the motivation stimulated by the energy suppliers, governmental agencies or product manufacturers, is to abort his first responsibility. Engineers are, or should be, totally aware of the complex nature of the energy problem and

should assume the leadership role in educating the public. If, as a profession, engineers had exercised this role of leadership in the previous two decades of astronomical growth in the energy-intensive building market, there would be less of an energy problem today.

The need for education

Educating the public, means everyone—including the professional’s immediate client, others in the profession (both practitioners and students), product manufacturers, and even the homemaker.

Examine the implication of this concept. If engineers first accept the proposed definition of the professional and combine this “primary obligation” with a comprehensive understanding of energy conversion systems, then true “professionals” cannot refuse the role of leadership. How can design professionals cope with this overwhelming obligation to educate society when the vast majority have never considered themselves educators?

They must start by first educating themselves. There are reams of materials available in technical journals, daily newspapers, magazines, etc. There is no presupposing that all this information is valid or legitimate—contrarily, much of it comes close to propaganda, meant to lead the public or professional in a direction advantageous to the author’s interests. Thus, this self-education must be undertaken with the attitude of a critic; the professional should challenge what he reads and generate his own beliefs. After embarking upon this exercise, most arrive at the conclusion that the energy and power requirements of our buildings and building systems have been extremely wasteful and excessive. Furthermore, regardless of whether the professional is personally convinced that ample supplies will be available in the immediate future, energy sources are depletable; that is, they are not infinite. Thus, any use today will deprive a future generation.

After reaching an understanding of this problem, the engineer can start directing his efforts toward the education of others. In the professional’s design efforts, and in discussions with clients, it becomes easy to motivate

his staff and clients in the belief of energy conservation. Most building managers and developers do not realize that the professional consultant or designer has substantial control over future operating costs.

To strengthen the professional's own understanding, and that of his peers, he should assume as active a role as his time will allow in the technical and professional societies such as ASHRAE, the Consulting Engineers Council, the Society of Professional Engineers, etc. Nowhere can he get so much and give so much with so little time devoted.

Community involvement may be more difficult, but the opportunities are endless and there is a place for just about any individual or personality. Examples include service clubs (such as Kiwanis, Rotary, Lions, etc.), local code committees, state energy advisory committees, guest lecturing in local schools, and working with building management and investor organizations.

Cost benefits should be goal

Some professionals become annoyed when they hear consulting engineer groups talk about "cashing in" on the energy retrofit market potential—competing with such forces as product manufacturers, energy suppliers, or "free assistance" offers by government agencies.

The fact is, *no* single product, device, or gadget can envelop the complex problem of energy conservation in *all* buildings, or even in a small sampling of them. Yet, virtually all energy conservation products have the ability to produce energy-conservation savings when properly applied.

The energy supplier attempting to simultaneously effect more productive use of his capital and labor investment and assist his client, informs his customer of those features of the available rates that will be mutually beneficial.

The governmental agency, usually adequately funded by some method of federal grant, offers tax incentives, a free-of-charge walk-through audit, or a handbook of energy conservation ideas.

But only the professional, who possesses the

motivation and has the unbiased interest of the building owner or operator, coupled with a thorough understanding of the dynamics of building energy systems, can determine both objectively and quantitatively the true benefit of investing in product X, the modifications needed to take advantage of rate Y, or the actual significance of accepting governmental inducement Z. Only the professional has no motivating interest in either the sale of a product or the sale of energy. He is, or should be, intimately concerned with the cost-benefit implications of his recommendations and with client satisfaction with his involvement.

Energy management after audit

The question might be asked, "How do professionals inform potential clients of the benefits of employing professionals to direct their energy retrofit programs?"

Energy retrofit efforts are one small component of the overall problem. Furthermore, many successful energy conservation programs will require *no* retrofit at all! This is one of the determinations the professional must make.

The professional's entree into the project should be based on establishing an energy management program. Then, as with any effective management program, the first step is to establish the facts. This is accomplished through a detailed energy audit. This process entails identifying all operable energy systems in the facility, evaluating what each has contributed to the total energy demand (power), and determining what portion of the total consumption is assignable to each. (See Section IV.)

After developing these profiles and components of consumption (which must be verified for accuracy by comparison with energy bills), the professional can start on the sorting program. The sorting program separates energy consumptions into various categories—product energy, control energy, parasitic burdens, management burdens, maintenance burdens, etc.

Reduction of product energy, parasitic burdens, and control energy can sometimes lead to retrofit efforts requiring capital ex-

penditures. A sound quantitative program, however, identifies for each expenditure the annual energy savings; then through rate calculations and forecasts of escalation, provides the anticipated annual cost reductions. The business executive or manager can then apply his own return-on-investment formula in selecting which options to elect.

The management and maintenance burdens are often found to be the greatest areas of energy waste. Examples include operating machinery when it is not needed, burning lights in unoccupied rooms, or using outdoor dampers that do not function properly. These losses can sometimes be significantly reduced by simply paying attention to the problem. Other problems may require capital investment in such things as a planned maintenance program, the installation of timing devices, or computerized management aids.

However, as with the retrofit expenditures, a good analysis will reveal the reduction in the energy consumption and resulting monetary benefit of each expenditure.

The professional's role

If the professional has done an effective job of educating himself and others, there is little doubt that responsible management agencies will seek him out. On a more active basis, however, he could simply ask his clients for a copy of their last year's energy bills. With some experience and judgment, and knowledge of the building and its energy system, the professional could tell whether there are any energy conservation opportunities and he is on his way.

The "sale" is the easiest part of the job. The hard part is developing a staff and technique capable of executing the comprehensive effort

required in energy management. The staff requirement is considerably different than that needed for the production of system design documents. Energy management requires a combination of top talents in building materials and structures, systems analysis, management, maintenance, system testing, utility rates, report writing, and (minimal) drafting. Individuals of the staff or team may possess more than one of these varied skills, but they are all necessary. This is an entirely different inventory of skills than is usually found in the consulting engineer's office. Thus, the engineer must develop a staff or team capable of approaching the energy management market in a professional way. This may be economically painful initially, but the long-range benefits to both the financial stability of the firm, and the public, should prove well worth the investment.

As stated earlier, the professional firm makes or loses money when the contract is negotiated. Since every energy management program is unique, there is no common denominator to assess a fee basis. Furthermore, when such rigid fee structures are attempted, there has historically been a lack of clear definition by those proposing the fee basis as to what services are to be provided for the fee proposed. This leads inevitably to misunderstandings between the professional and the client.

The only way a professional can establish a fee for energy management consultation is to understand the extent of the involvement required, and determine a fixed or maximum fee on the basis of the anticipated time involved. As a limit, the energy cost savings potential must warrant the cost of the fee. If not, the scope of the project must be reduced to within the potentially available funds.