

“The First Step in Managing Industrial Energy Costs”

Imagine trying to construct a modern industrial facility—including all its mechanical systems—without a blueprint. Just get a bunch of materials and guys together at a site and tell them to “make it happen.” Could it be done? Well, maybe, but the task would certainly take longer and the result would be a confusing maze of systems, some incomplete, and many working at cross purposes. Once the building is finally done, the operations staff would probably spend all their working hours simply untangling the mess made during construction.

This underscores the value of system-wide improvements, pursued in stages so that process interruptions are minimized, and using early savings to pay for later projects. Energy assessments serve as the crucial blueprint to successfully controlling energy costs. Trying to manage energy without a blueprint—or in effect, a business plan—will yield results that at best fall short of expectations. At worst, it can interfere with the facility’s core mission. Therefore, energy assessments are the key to unlocking the returns from business-smart energy practices.

An energy assessment is a summary of how much energy is input to a facility and then distributed to various departments and systems. It summarizes fuel, power, and water use as required by process activities as well as the heating, ventilation, cooling, lighting, and domestic water requirements of the facility buildings themselves. The assessment summarizes energy inputs over a period of time (usually a year), and expresses consumption in relationship to production levels and weather conditions. A thorough assessment report will:

- Display the quantity of energy purchases.
- Describe energy consumption of major prime movers, such as boilers, furnaces, and air compressors.
- Inventory most, if not all, motor drives, ancillary equipment, and lighting fixtures.
- Establish a normal energy requirement per unit of production and per each major piece of equipment or per operating hour.
- Analyze the prevailing gas and electric utility tariffs to document the cost impact as energy use varies with production volumes as well as hourly and seasonal operating patterns.
- Identify and prioritize opportunities to improve facility performance through energy improvements. These improvements may include (1) changes in technology, (2) shifting of production activities across times of day, and (3) adjusting standard operating procedures to reflect energy-smart behavior. A proper energy assessment itemizes improvements, showing the dollar costs and benefits of each.

Facility managers and many staff often resist the suggestion of conducting an energy assessment. Here are a couple common objections, with the Alliance’s rebuttal to each:

- *“We don’t have the money to pay for an assessment.”* Let’s say we’re talking about a typical medium-sized manufacturing facility, spending perhaps \$2 million dollars on

energy each year. Studies by the U.S. Department of Energy and others suggest that the average facility can cut 10-20 percent of its energy consumption. Having 10 percent potential savings (\$200,000) is the same as saying that \$200,000 is being wasted each year. A very good energy assessment might take a few days and cost about \$20,000. What we are really being told is this: *We don't have the money for an energy assessment because we need to pay for the fuel that we're going to waste.* Too bad, because it only gets worse: energy prices are likely to rise faster than the price of an assessment.

- “*We are already as energy-efficient as we can be.*” This comment usually comes from a plant manager that has aggressively pursued equipment upgrades, or staff training, or procedural modifications, or least-cost energy purchasing strategies. Rarely do facilities thoroughly pursue all these dimensions in concert. Disappointing results may come, for example, when a new air compressor or boiler is installed, but nothing is done to address distribution leaks and poor staff practices in utilizing these systems. This is how capital investments fail to meet their payback criteria.

Energy assessments are often free through utilities, state energy offices and university-based industrial assistance programs (<http://www1.eere.energy.gov/industry/bestpractices/iacs.html>).

The knowledge that comes from an energy assessment will return value in many ways:

- The audit itself probably will reveal a number of low- or no-cost adjustments that pay for themselves immediately. A good example is shutting off steam mains that serve abandoned process lines.
- Armed with knowledge of their own energy consumption, manufacturers have a lot more leverage to negotiate contract terms with marketers through whom fuel commodities are purchased. Marketers make money based on a percentage of the fuel they broker. Uninformed energy consumers give the marketer a blank check.
- Energy consumption knowledge is a baseline for quantifying the before-and-after impacts of energy improvements. Managers can't claim victory if they don't know where they started.
- Baseline energy data helps decision-makers prioritize improvement opportunities by targeting the prime movers that consume the most fuel.
- When managers know the fuel consumption of individual pieces of equipment, they know what that equipment costs to operate. Knowledge of equipment operating costs gives the manager good understanding of the need for upgrades, replacement, or fuel-switching.
- Similarly, an energy assessment is also an inventory of emissions sources. The assessment will present and prioritize opportunities to reduce the risk of non-compliance with emissions regulations.

An energy assessment is the blueprint—a business plan—for improving business performance through smart energy choices. As the term “business plan” implies, outcomes are not accomplished all at once, but as a part of a measured process. A business plan will identify resources, milestones, and planned outcomes. Perhaps most importantly, an energy assessment describes how a plant manager can make energy decisions that contribute directly to business goals.
