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10 Strategic Steps to Reducing Your Energy Costs

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ABSTRACT

If your company is looking at energy management as part of its overall strategy to reduce costs and improve profits, it is not alone. While energy prices have increased at a shocking rate, so has interest in environmental responsibility. Progressive organizations are exploring ways to conserve energy and reduce greenhouse gases. Some are even creating new positions for these issues, placing someone in charge of corporate social responsibility (CSR). The CSR's job is to help a company be more socially responsible and reduce harmful emissions. Energy management can accomplish both conservation and emission goals—plus, it lowers utility costs and strengthens your bottom line!

In the past, reasonably priced energy made it difficult to justify new conservation projects. It was hard to meet the standard criteria of 2-3 years payback. However, natural gas prices have tripled in the last five years from $2 to over $6 per Dekatherm (Dth). Electric prices also have increased dramatically—by more than 100% in some parts of the country. These increased energy costs have made conservation projects more desirable. A natural gas improvement project that had a six-year payback five years ago may have less than a two-year payback today.

New technologies also have helped drive down the payback of projects and opened up new areas for potential savings. The following paper looks at how the new market offers opportunities to reduce overall energy costs.

PAPER

There are two ways to lower your energy costs: 1) reduce the unit cost of energy or 2) reduce the amount of energy consumed. Simply put, you can control either your energy supply or your energy demand. When developing an overall strategy to reduce energy costs, it is critical to consider both.

An example illustrates this concept: *ABC Company has hired an energy company to look at supply services, but has not informed it of plans to add a new production line. Because the utility is unaware of the pending operational change, it is unable to select the best tariff for the company, which could include a discounted rate for the increased load. Focusing on supply, while overlooking demand, is a costly mistake.*

A site visit is always important to understand an operation and how energy is used. There is only so much that can be done if you are trying to manage energy from an office.

Following are 10 steps to consider in developing an energy management strategy. It is important to note that every facility is different and requires a customized approach. Not all of the steps will apply to every facility but they represent common areas that could lower the cost of energy delivered to your plant and reduce inside usage.

1. **Review Tariffs—**Reviewing tariffs is always a good place to start because it provides you with tools to reduce energy costs. Since tariffs and plant operations change regularly, this should be done at least once a year (more often if you depend upon municipal or cooperative utilities, which can change their rates overnight). In many cases, you can negotiate with the local utility if a tariff is not available.

2. **Hedge Energy Costs—**Depending on your risk tolerance for variable energy costs, hedging may help you avoid energy surprises. Hedging can help you meet budget or "forward price" to coincide with product pricing. There are many ways to hedge, and you need to determine which is best for your company. Market information is critical to decide when to hedge and how much of your energy should be hedged.

3. **Demand Management—**Demand costs often make up 30-50% of an electric bill. Managing peak demand through simple load reduction techniques can effectively reduce your costs. A load-profile analysis can track energy used every 15 minutes and help you determine operational efficiencies that would reduce demand charges. Once the load-profile analysis is complete, plant personnel can identify what was operating during the peak periods to develop a demand reduction strategy. It can take several meetings and extensive monitoring of equipment to fully understand a facility. Once the operation is understood, a demand-cost analysis can be completed to demonstrate costs associated with operating and controlling key pieces of equipment.

4. **Optimize Energy Usage—**Energy usage represents 50-70% of a plant's energy bill. A walk-through energy site assessment is critical to identifying potential efficiencies. A site assessment can help you determine how energy is used in the plant and where simple steps could be taken to conserve energy. It is wise to review all of your plants at the same time so you can gain efficiencies through economies of scale. For example, the cost to install high bay fluorescent fixtures in one facility may be $200 per fixture; however, it could be lowered to $160 per fixture (or 20%) by making the conversion at several facilities and increasing the volumes. Focusing on the following areas will help you reduce energy costs:
    a. Lighting - New high bay fluorescents can help you cut lighting costs by 50%. In addition, review areas where lights can be controlled to turn off when not needed.
    b. Motors - Consider new premium efficient motors or even the new ultra efficient motors. Review applications for adjustable speed drives, synchronous belt drives and synthetic oils, which can all reduce energy costs.
    c. HVAC - An energy management system can provide great savings to your HVAC equipment. Set zones to turn off exhaust fans when not needed and control the temperature of spaces at night.
    d. Refrigeration - There are numerous opportunities to control refrigeration costs. Often, spaces can be precooled to lower demand during peak periods. Efficient drives and synthetic oil can further reduce energy costs. Defrost cycles can be reduced by adding a sensor at the evaporator and by running defrost at night. Many of these strategies can reduce refrigeration costs by 20%.
    e. Compressed Air - You can reduce compressed air costs by analyzing the operation and reducing leaks. Compressors should be staged on with controls to optimize performance. In many cases, a new smaller compressor can be used to operate during unoccupied periods. It is very reasonable to expect to reduce compressed air costs by 35%.
    f. Steam and Hot Water Usage - Steam systems have not been targeted for efficiency in recent years, but now that natural gas costs are skyrocketing, they are getting a second look. The first areas to assess are the steam traps. Generally a system that has not been tested in three to five years could have 30% of failed traps. A failed trap can cost more than $4,000 per year in lost energy. There also are areas around the boiler to consider, such as a stack economizer, reverse Osmosis water for the boiler, conductivity controls for the blow down, insulation on the pipes and valve stems, vent dampers, and ceiling air to preheat the combustion air. On the hot water side, it is much more efficient to heat water with a direct fired water heat (98%) vs. a boiler system (70%).
    g. New Technologies - There are always emerging technologies to help you reduce energy costs. Recent examples include synchronous belt drives to replace standard “V” belt drives (save up to 6%) and synthetic oil in compressors and chillers (saves up to 7%).

5. **Maximize Utility Rebates and Programs—**Many utilities and states offer rebates, audits and incentive programs that can pay for up to 50% of an energy conservation project. In many cases, you already are paying into these programs through your utility bills. It is in your best interest to get your money back (or even more then you paid into the programs). Rebate amounts and availability depend on the state, utility and project. Your project may need to be pre-approved to qualify. Normally rebates are available exclusively for energy conservation projects, but sometimes it is possible to obtain a rebate for process improvements that make production more efficient.

6. **Make Smart Equipment Purchases**—Making informed decisions on the total life-cycle costs of new equipment purchases can positively impact your bottom line. There are many factors beyond upfront price that should weigh into your decision:

    a. Energy consumption
    b. Maintenance costs
    c. Rebates available
    d. Are you fully using existing equipment?
    e. Are more efficient options available?

7. **Minimize Utility Infrastructure Costs—**Negotiating with utilities can reduce or eliminate infrastructure requirements for plant expansions or upgrades.

8. **Develop employee training and maintenance programs**—Educating employees on the cost of energy usage and leaks can lead to improved efficiency and maintenance. Efficiency improvements can be lost by not keeping up with proper maintenance. Your employees are often the best line of defense. Encourage employees to look for leaks and inefficiencies. Many companies offer a finder's fee or other recognition for cost-saving ideas. Maintenance programs also are important to maintain an efficient system. Boilers need to be tuned up twice a year. Compressed air and steam leaks should be checked yearly. Improper maintenance can cost a facility 5-10% of its total energy costs.

9. **Know Your Tax Codes—**Many states have programs that allow facilities to claim sales tax exemptions on energy used in production. In some cases, you can file retroactively for over-paid taxes. This needs to be reviewed at each facility to make sure proper exemptions are in place. Many states require that you complete an end-use analysis on a periodical basis to maintain your exemption. Remember, as you make changes to your operation, your percentage of exemption may change. Also be sure to review other utilities and energy costs for exemptions such as water, propane and gases used in the process.

10. **Identify and prioritize energy opportunities—**There are numerous opportunities for energy savings at each plant but the question is how should you prioritize them. Develop a priority list of all potential improvements and rank them based on savings and payback. This will help you determine which areas to address first, while making sure you don't forget about the others. Since market conditions and facility operations continually change, you should review, update and reprioritize this list on a monthly basis.

SUMMARY

There are many great opportunities to reduce energy costs now that energy prices are high and new technologies have reduced the payback of projects. Corporations are always looking for ways to increase profits. Addressing energy is an excellent way to be socially responsibly while improving the bottom line.