An "Energy Management Practices" Approach to Setting Greenhouse Gas Reduction Targets

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ABSTRACT

With the ratification of the Kyoto Protocol, the global drive towards greenhouse gas emission reductions has been taken to a new level. Even without U.S. ratification, American companies with global operations will be impacted both at home and abroad. Historically, companies have had 'hunt for savings' programs when energy prices were high, and then reverted to business as usual when the prices receded again. Looming regulatory requirements will force companies to put in place business systems that will recognize and account for the true value of energy. When this true value of energy (economic, environmental, and social) is considered, the rate of return on energy efficiency programs becomes more attractive.

For most companies, greenhouse gas emission reduction translates to reduced energy consumption or increased energy efficiency. An initial estimate of the savings potential of an operation is needed to set site or corporate greenhouse gas emission reduction targets. A challenging target that is reasonable and cost effective must also be defendable and supported by senior executives. The One-2-Five®Energy benchmarking database is a very helpful tool when considering setting voluntary reduction targets and developing a plan to meet those targets. By assessing site practices against a 22-element framework for best practice in energy management, a site or company can quickly understand the magnitude of its energy and greenhouse gas savings potential.

This article will outline examples of how companies have used the One-2-Five®Energy methodology for setting reduction targets and establishing an action plan for achieving those targets.

INTRODUCTION

There are several key factors driving the requirements for U.S. companies to reduce greenhouse gas emissions. The key drivers include Kyoto protocol ratification, U.S. internal regulatory and voluntary initiatives, and escalating energy prices. While many leading companies have made significant progress, there are many operations that have yet to develop a plan to operate in a carbon-constrained world.

Evaluating energy management practices is an excellent approach to building a framework for an energy efficiency and cost reduction program. Understanding the level of development of the key areas of energy management is the first step in establishing an improvement plan. Using the One-2-Five®Energy tool is one way to gain an understanding of your current management practices, and the tool also provides an initial estimate of the savings potential based on a benchmarking database.

FACTORS DRIVING THE NEED TO REDUCE GREENHOUSE GAS EMISSIONS

After many years of doubt, the Kyoto Protocol entered into force on February 16th, 2005. This event marked the start of a new era for the world. The implementation of the protocol will have a profound and widely varying impact on developing and developed countries, and a significant impact on multinational industrial companies. A big question is how the world will meet these emission reduction challenges and potentially take on additional commitments with the upcoming Conference of the Parties (COP6) meeting in November of this year.

While the United States has been somewhat shielded from the direct regulatory impact of Kyoto, the indirect impacts may be as large and have a greater impact since they are slightly delayed. Many U.S. companies have operations in countries with greenhouse gas reduction commitments under Kyoto, which will bring with it a different regulatory requirement depending on the country. On the other side of the coin, U.S. operations with parent companies based in Kyoto signatory countries will have corporate initiatives imposed on them that will require reduction efforts.

In the United States there has been a significant movement on the

regulatory front at the state level. The Regional Greenhouse Gas Initiative (RGGI) continues to gain momentum as the nine northeastern states work towards a cap-and-trade program for greenhouse gas emissions. RGGI also has participation at the observer level from the District of Columbia, Maryland, Pennsylvania, and the eastern Canadian provinces (1). In California, landmark legislation was passed in 2004 requiring automakers to sell vehicles with "reduced greenhouse gas emissions" by 2009 (2). The California legislation is being considered by other jurisdictions as well.

Another significant driver for greenhouse gas emission reductions is the significant action taken on a voluntary basis by some of the leading American corporations. The Climate Leaders Program is a US EPA-sponsored industry-government partnership that works with companies to develop long-term greenhouse gas emission reduction strategies. The Climate Leaders Program works with companies to establish their greenhouse gas emission inventory and from there establish a reduction target (3). Setting a target that is challenging but achievable can be very difficult for companies. That is where the One-2-Five®Energy approach can be helpful.

Another significant factor driving efforts to reduce greenhouse gas emissions is the cost of energy. In many areas of the U.S., average natural gas prices have doubled over the past five years, and price volatility has seen a quadrupling of prices at times. Electricity prices have fluctuated, and uncertainty in deregulating markets brings with it significant risks for a major operating cost for many facilities.

One more thing for companies to consider as global markets for carbon credits continue to grow is the potential impact of the value of a tonne of CO_2 equivalent emissions. In the North American market, the Chicago Climate Exchange (CCX) is the only voluntary, legally binding greenhouse gas emission reduction and trading program. The CCX has over 100 members, and has an emission reduction schedule that targets a level 6 percent below baseline year by 2010. As the commodity becomes more rigorously defined, and standards for monitoring, verifying, and documenting trades are more fully developed, the true value of a tonne of CO_2 equivalent will be known and could have a significant impact on the evaluation of energy projects.

All of the above-noted drivers for reducing greenhouse gas emissions point directly to energy efficiency programs as the only viable alternative for many companies. For companies to truly progress in the

area of improving energy efficiency, they must start to consider the true cost of energy (commodity costs, external impacts, life cycle costs).

ACTION PLANS

Once corporations recognize the risks associated with rising energy costs and associated greenhouse gas emissions, many companies will immediately begin to consider what to do and what the top priorities are.

Actions that can be taken to improve energy efficiency will be a combination of management practice or business systems improvements and technical projects that may or may not require capital expenditures.

As represented in Figure 1, over time the technical opportunities for improving energy efficiency will be implemented and represent less available savings. Management practice improvements are typically not the first areas that companies will focus on, largely because the short-term benefits are more difficult to quantify.

One of the most critical factors influencing the success of energy efficiency programs is a corporate commitment to the effort. In order to get corporate commitment, there has to be a return on investment for the effort. This return on investment can be considered in terms of all of the drivers identified in the previous section, but the most tangible way to quantify energy efficiency efforts is in terms of dollar savings potential.

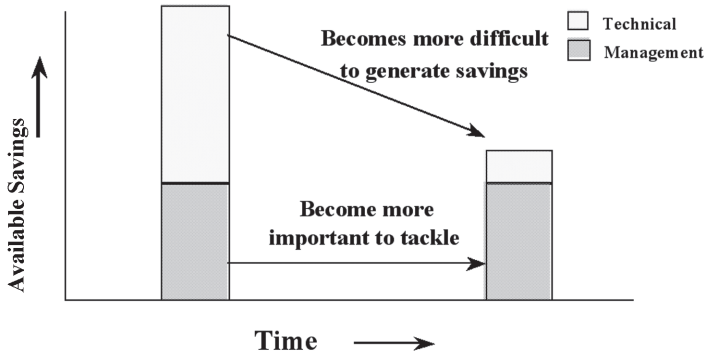

Figure 1. Energy Savings Potential vs. Time

To take this one step further, a company that has a significant energy management program in place, with a history of establishing annual targets, establishing plans to achieve those targets, and holding the appropriate personnel accountable for the targets is less likely to have a large energy dollar savings potential than a company that does not consider energy as part of its day-to-day business processes.

The company that has significant opportunity for improvement is also the company that is going to have to persuade management that something needs to be done and resources need to be allocated to get it done. An energy management action plan needs to consider the key areas of energy management, including:

- Leadership
- Understanding
- Planning
- People
- Financial/supply management
- Operations/maintenance
- Reporting
- Available technical improvements, requiring minor or major capital.

An approach to estimating the savings potential in relation to the level of development of the current energy efficiency initiatives is presented in the next section.

IMPROVEMENT POTENTIAL BENCHMARKING

To garner support for an energy efficiency or greenhouse gas emission reduction program requires either a significant regulatory driver or a quantifiable business benefit or both. The ideal way to estimate the potential business or cost reduction value is through benchmarking. Benchmarking energy use per unit of production has its limitations and is of little use when comparing significantly different facilities. Differences in size, industrial sector, geographic location, specific production process, or other factors can considerably diminish the value of the benchmarking comparisons.

When looking at energy management practices which are appli-

cable to all industrial facilities, the limitations on benchmarking noted above are no longer factors. Energy management practices benchmarking is a qualitative approach and therefore will not yield the precise quantitative results of physical energy benchmarks, so there are trade-offs, but this unique approach is gaining momentum.

Many industrial facilities and sector organizations are using energy management practice benchmarks to guide their progress. There are many different ways to do this, and one approach that has gained momentum in the United States over the past three years is the use of the One-2-Five®Energy methodology. While this is a proprietary database, as most benchmarking databases are, the principles and mechanics are easily adaptable by any organization wishing to adopt this approach. The database allows participating companies to gain an understanding of how they compare in terms of the level of development of energy management processes and practices, relative to their peers.

While the benchmarking of practices is done at the specific element level, the aggregate rating of a company (on a one to five scale) is an excellent indicator of overall energy cost savings potential. The energy cost savings potential is in turn an excellent indicator of greenhouse gas emission savings potential.

An example of the application of this approach is a group of potash mines that completed One-2-Five®Energy diagnostic sessions in 2003. The nine sites ranged in aggregate percent score from approximately 70 percent to about 30 percent. The average for the sector was 43 percent compared to an overall average for mining (based on data from 36 sites) of 27 percent. The results, as shown in Figure 2, indicate that the site with a 30 percent rating has greater energy cost savings potential, as a percent of their existing spend, than the site with a 70 percent rating (4).

The above analysis not only provides a valuable tool for the sites to evaluate themselves, but on an aggregate basis it allows for an analysis of the areas of greatest opportunity for improvement.

An assessment was made based on the One-2-Five®Energy results for the potash industry and the top four priority areas based on the number of sites that identified each as a priority area are shown in Figure 3.

The benchmarking database allows a site to gain an understanding of the level of development of its peers in the industry. It also gives a reasonable estimate of the savings potential of the operation.

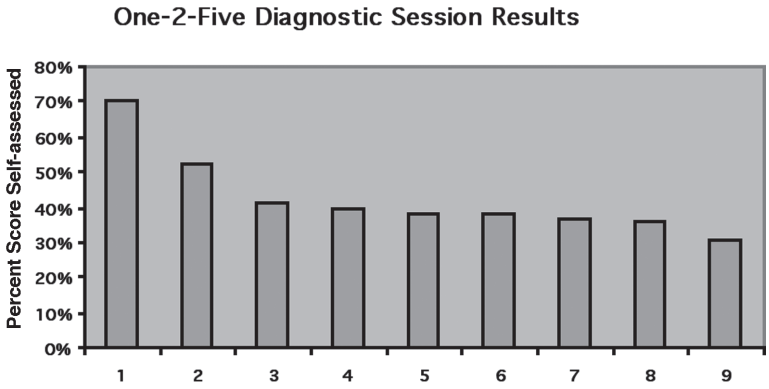

Figure 2: Energy Management Practices at Canadian Potash Operations

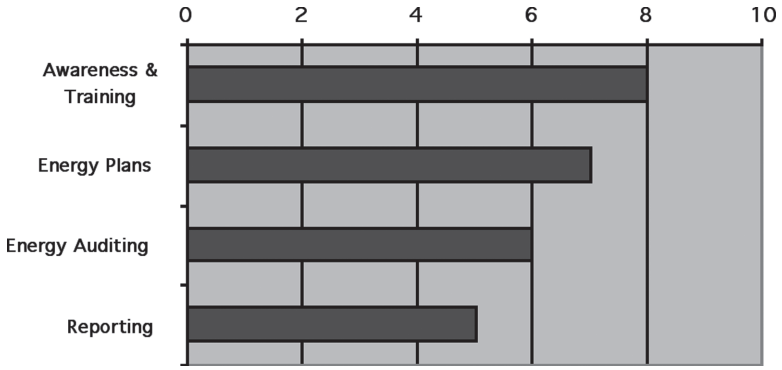

Figure 3: Areas of Greatest Opportunity for Improvement—Canadian Potash Industry

For example, a 1-star company in a specific industry may have a savings potential based on the benchmarking database, of 12-15 percent of annual energy spend. By comparison, a 5-star company in the same industry may have a 2-4 percent savings potential. This level of estimate can be used as a first attempt at setting energy and greenhouse gas emission reduction targets. The management practices benchmarking estimate of savings potential has also been used very effectively to support previously derived savings estimates at industrial operations and provides helpful documentation to support the effort to establish a plan to achieve the savings estimated.

CONCLUSIONS

Regulatory and market drivers will push companies towards establishing greenhouse gas emission reduction targets in the future. As companies evaluate their reduction potential, they will need to look at an overall energy management framework and consider the full value of a unit of energy.

Taking advantage of the existing body of work, management framework templates developed and publicly available, and available benchmarking data can expedite this process. The One-2-Five®Energy approach to benchmarking management practices is one way to gain a quick estimate of the greenhouse gas reduction potential of an industrial facility.

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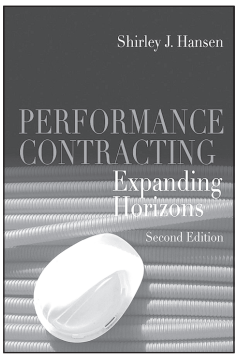
Jim Farrell is a managing consultant with Hatch Energy Consulting and is based in West Chester, Pennsylvania. Jim has fifteen years' experience in consulting worldwide in energy management, resource management, and sustainable development strategy. He has developed and delivered seminars on risk management, nutrient management, greenhouse gas emissions, and energy management practices for industrial clients. He is currently involved in implementing industrial energy efficiency programs, developing greenhouse gas reduction plans, and undertaking sustainable development reviews. He is a civil engineer with Master's degrees in science and business.



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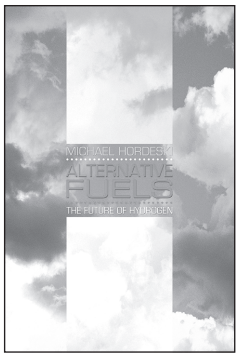

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