
ABB

The frugal manufacturer

Part 2, Analyzing industry's commitment to improvement

CHRISTOPHER WATTS – Energy, so our physics books tell us, is the ability to do work, and work is at the heart of all industrial production. In view of the environmental impacts of its energy footprint and the rising price of energy, industry is having to re-assess its energy usage and seek to produce more with less. Part two of this three-part article investigates why commitment to energy efficiency in industry remains weak despite the broad acknowledgement of its value.

In issue 3/2011 of *ABB Review*, the first part of this series of articles discussed the importance of energy efficiency to industry → 2. The findings were based on a survey commissioned by ABB and performed by the Economist Intelligence Unit → 1. While most industry managers appear to appreciate the importance of energy efficiency in securing long-term financial performance, relatively few are practicing the discipline, and low levels of energy-efficiency remain the norm. Only 40 percent of survey respondents say they have invested in capital, plant and equipment to improve energy efficiency within the past three years. Respondents who have done so are more likely to be in developing economies, where 49 percent have invested in equipment to improve energy efficiency, versus 34 percent in developed regions. North America trails clearly in this respect, with only 21 percent of respondents saying their firms have invested in equipment over the past three years to improve energy efficiency.

Looking beyond investments in plant and equipment, and focusing on energy efficiency practices, the situation remains poor – but slightly less so. 46 percent of firms do not have a company-wide energy management system in place to track and optimize energy use, according to survey results; 50 percent do have such systems; the rest say they don't know. Among relatively small firms in the survey sample (annual revenues under $1 billion), a clear majority, 55 percent, have no energy management system. These findings are all the more surprising given that experts consider various kinds of energy management systems to be highly cost-effective → 3.

> Forty-six percent of firms do not have a company-wide energy management system in place to track and optimize energy use.

At one level, an energy management system may refer to an organizational framework to actively take control of corporate energy use – as, for example, the new ISO 50001 standard, due in the sec-

Title picture
The importance of measures to increase energy efficiency is broadly recognized in industry. In many sectors, however, the implementation is lagging behind. The title illustration shows the mechanical hoist drum at Totten mine, Sudbury, Ontario, Canada, which is equipped with energy-efficient drives from ABB.

1 The frugal manufacturer

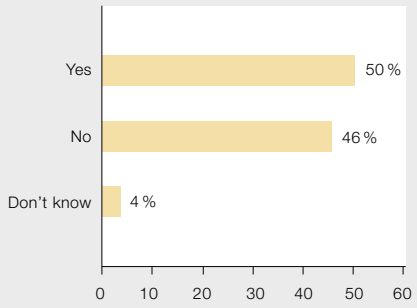
This series of articles presents the findings of a report commissioned by ABB and researched and written by the Economist Intelligence Unit. The survey collected input from 348 senior industry executives, mostly in North America, Asia-Pacific, and Western Europe, asking them about their plans to invest in improving energy efficiency in production processes, the issues they face as they consider these investments, and the factors that are likely to influence industrial energy efficiency in the coming years. In addition to the online survey, the study conducted 15 in-depth interviews with senior business executives, policy makers, and other experts in industrial energy efficiency.

2 Summary of part 1 :Industry leaders recognize the importance of energy efficiency

The first part of the series, “The frugal manufacturer: Using energy sparingly”, was published in the previous edition of the *ABB Review* (see pages 7–12 of issue 3/2011). The findings of the first part include:

- 88 percent of respondents say industrial energy efficiency will be a critical success factor for their business in the coming two decades.
- 72 percent “agree strongly” or “agree somewhat” that energy efficiency is a critical success factor for manufacturers today.
- 59 percent say that in making the financial and business case for investments in efficiency, the energy price is one of the biggest factors.
- 26 percent see improving their company’s image as another reason to invest in energy efficiency.

3 Do you have a company-wide system in place to track and optimize energy use?



Only 48 percent of firms regularly report progress on improving energy efficiency at either plant level, business unit level, or group level.

ond half of 2011, will set out → 4. “Energy efficiency is not complicated,” insists Doug May, VP of Energy and Climate Change at the Dow Chemical company. “It just takes discipline, and it takes a commitment to measuring it, looking for the opportunities, having the behavior and the organization in place to identify them and address them.”

At another level, an energy management setup may include systems of software, switches, and controls. Considering, for example, the case of Bayer MaterialScience, which supplies plastics and other materials to customers such as car manufacturers. The firm has introduced plant analytics that enable it to reduce variation in its product quality and allow the plant to run closer to its “boilerplate” capacity. The system cost some $ 700,000, with an expected payback period of less than one year. “Such investments are not very big,” says Hans-Joachim Leimkühler, Director of Process Design at Bayer Technology Services, which acts as an in-house counsel for Bayer MaterialScience. “But the results are sometimes very considerable.”

Further evidence of industry’s hesitance to take control of energy efficiency emerges in the survey. Just 34 percent of companies have conducted an energy audit across the entire company or group. McCallion of EBRD highlights the role energy audits can play in measuring and managing energy use: “An energy audit is the key driver for companies to realize not just which technical measures to pursue, but what the financial benefits of those technical measures are,” he says. “It’s how you end up with investments that have internal rates of return in excess of 100 percent. You need to look to energy audits to unlock [these projects].”

Given industry’s apparent weak commitment to gauging its energy use and striving to manage its energy needs, it comes perhaps as little surprise that fewer than half of firms (48 percent) regularly report progress on improving energy efficiency at either plant level, business unit level, or group level → 5.

In a further indication of industry’s lack of emphasis on core energy efficiency, survey findings show that companies are far

4 ISO 50001 — a new energy management standard

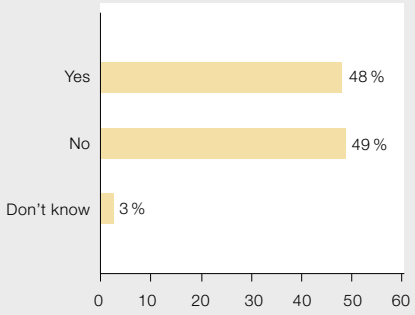
Since 2008, the International Organization for Standardization, a Geneva-based group that establishes operating norms for business, government and society, has been compiling an international energy management standard — ISO 50001. The standard is due to launch in the second half of 2011.

What can companies expect? ISO 50001 will provide a framework to help them plan and manage their energy use. Rather than setting out technical requirements, the standard will set out the procedures and practices that constitute a sound energy management system.

Among other areas, ISO 50001 will cover the following:
- Making better use of existing energy-consuming assets
- Benchmarking
- Measuring
- Documenting and reporting energy intensity improvements
- Transparency and communication in the management of energy resources
- Energy management best practices
- Assessing and prioritizing the implementation of new energy-efficient technologies
- Promoting energy efficiency throughout the supply chain
- Energy management improvements in the context of carbon dioxide emissions reduction projects.

ISO 50001 is likely to be particularly appealing for those organizations that already operate according to the ISO 9001 quality management standard. Experts say the new energy management standard may be worthwhile for any organization with large energy bills – say, over $ 500,000 a year. In time, the ISO hopes that this new standard will have a positive impact on the way in which up to 60 percent of the world's energy is used.

5 Does your company regularly report its progress on improving energy efficiency?



more likely to have undertaken measures to drive energy efficiency in areas other than their core manufacturing processes. Asked in which specific areas their companies have undertaken measures in the past three years to improve energy efficiency, 67 percent of respondents say lighting systems, 48 percent air conditioning, 45 percent heating and 42 percent water use. Just 40 percent have taken energy efficiency measures relating to plant and equipment in their factories → 6.

A question of funding

What holds companies back from making a stronger commitment to energy efficiency improvements in their core production processes? When asked to name the two most significant obstacles to investment in energy efficiency, 42 percent of executives point to a "lack of a clear-cut financial case for energy efficiency investments," more than any other obstacle → 7. The next biggest barrier, highlighted by 28 percent of respondents, is "lack of funds." In some cases, particularly in high-growth markets, group management is torn between allocating capital to expand capacity, and committing funds to increase energy efficiency. This point is illustrated by L. Rajasekar, Executive President of UltraTech Cement, which is doubling its production capacity every 10 years. "[Market] capacity continues to grow, so we also have to grow," he says. "If we don't grow, then we don't maintain our market share."

Interviews with industry executives reveal a number of practices that help their companies to overcome some of the financial barriers to investment. The 3M group, for example, allocates capital to each of the six business units; from there, points out Steve Schultz, Global Manager of Corporate Energy at 3M, "they determine what their best opportunities are. It may be growth, and it may be margin improvement." Furthermore, as plant managers at the firm make a financial case for investment, they can make use of 3M's corporate-wide energy projects database. Says Schultz: "That database allows us to share information from facility to facility, so that one facility can learn from another facility what worked, and sometimes also what didn't work."

There are other ways to make the financial investment case more compelling. For example, measures to improve the efficiency of existing equipment can be all the more cost-effective if undertaken as part of normal capital investment and plant maintenance cycles, to reduce production downtime. "Timing and coordination with operations is absolutely critical in our business," notes May of Dow, whose plants run day and night. "The economics really get impacted if you're bringing down the equipment just to implement the project." And as top management become increasingly aware of the importance of some "softer" benefits of energy efficiency for long-term growth, it may be that these benefits add weight to the financial case. Says Ian Gilmour, Safety, Health and Environment and Manufacturing Manager at Orica, an Australian chemicals manufacturer: "The other way I argue it is: Image, reputation, and benefit to society. And I have a board that listens to that argument."

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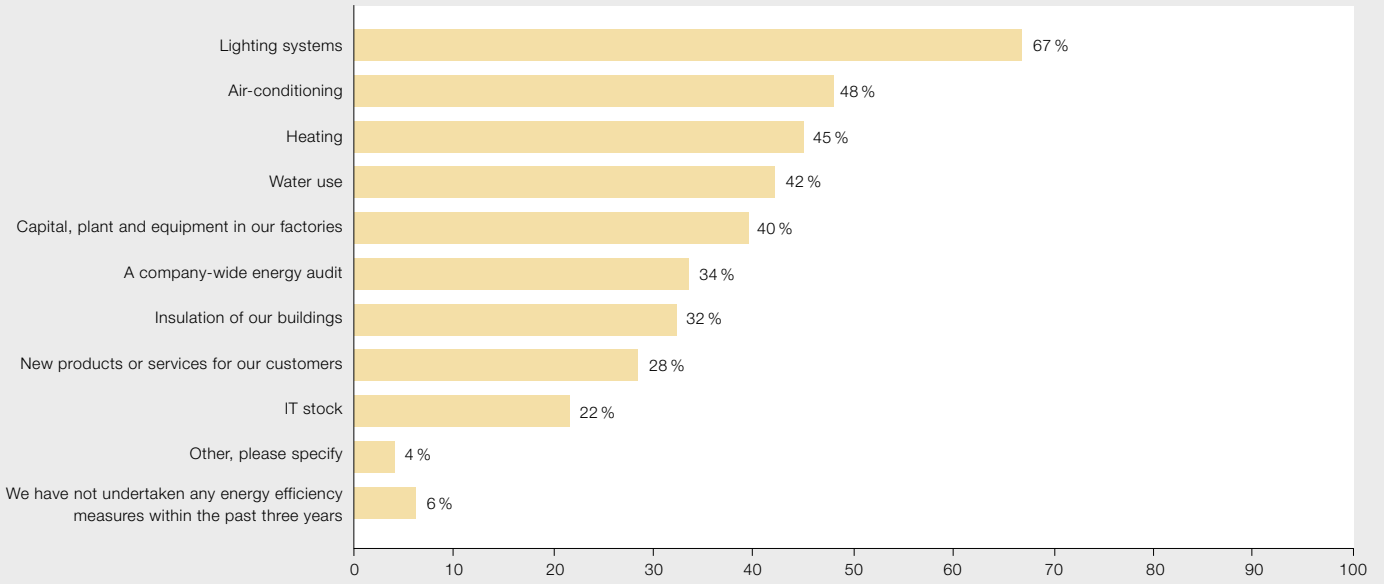
6 With regard to which of the following has your organization undertaken measures within the past three years to improve energy efficiency? Select all that apply



The general lack of information about energy options is compounded, perhaps, by the widespread difficulty in benchmarking plant efficiency levels across geographic regions and industry segments.

Benchmarking alternatives

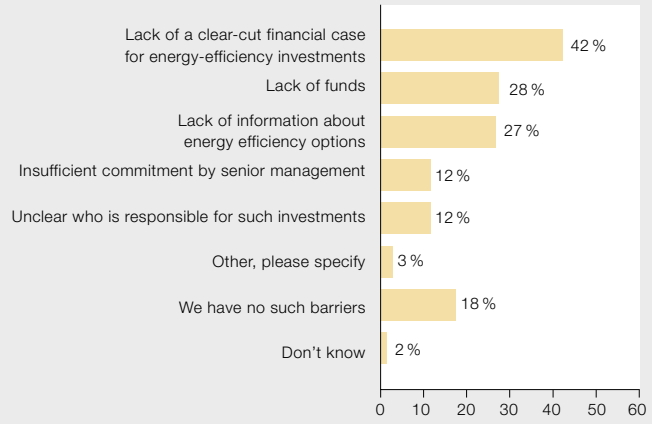
Financial barriers are not the only issue holding back investments in energy efficiency. One of the challenges in putting together a sound investment case, and securing funding, for efficiency improvements lies in what some managers say is a lack of information about energy options. This is the third most significant barrier, flagged by 27 percent of respondents. One notable variance in the survey results is that, in the Asia-Pacific region, 37 percent of respondents highlight the issue of inadequate information-considerably more than the proportion of managers there that blame lack of funds (24 percent).

Meanwhile, among smaller firms, the proportion of managers who say that lack of information is a barrier is higher than the sample average, at 32 percent. BEE Director General Ajay Mathur illustrates the effects of inadequate specialist information: “There can be a problem of ‘I’m going to get this new technology, will it work?’ The guy who comes to the door says, ‘Put this widget in, and your energy consumption will drop by half.’ Will it? Or will the plant stop? So the perceived risk of new technologies is something that constrains the early adoption of energy efficient technologies.” Furthermore, in making assessments such as these, it must be taken into account that smaller companies have fewer resources available to manage energy efficiency: In 17 percent of smaller firms, responsibility for energy efficiency rests with a dedicated energy efficiency manager, in contrast to 24 percent at larger firms → 8.

In India, BEE has a dedicated program to provide information on industrial efficiency to small and medium enterprises (SMEs). The body’s director general, Mathur, says many of India’s SMEs are organized in geographic and sector-based clusters. “We are bringing in state-of-the-art engineering knowledge through consultants who go into these plants and see what is possible,” he says. The consultants discuss the options in seminars with equipment vendors, plant managers, and lenders, before a project is implemented. Later, others in the cluster can see the investment in action, and if they want to do the same, “the business case is already proven – there’s somebody who’s doing it,” says Mathur. BEE is rolling out this model in 25 SME clusters nationwide.

The general lack of information about energy options is compounded, perhaps, by the widespread difficulty in benchmarking plant efficiency levels across geographic regions and industry segments. For some manufacturing processes, reliable benchmarks are available: “In ammonia and ammonium nitrate, there’s a worldwide conference where everybody will share data,” says Safety, Health and Environment and

7 What, if any, are the main barriers to investment in industrial energy efficiency in your organization? Select up to two



8 Who has formal responsibility for energy efficiency in your organization?

Manufacturing Manager, Ian Gilmour, of Orica (Australia). "We all know what plants everybody else has got, and what kinds of efficiencies they get. It's all published data," he says. But in many cases, benchmarking remains a challenge. "The diversity of manufacturing processes and product mixes varies so much from plant to plant, that it becomes almost impossible to benchmark against either a domestic or even global competitor," points out the ACEEE's Associate Director R. Neal Elliott. It comes as no surprise that 77 percent of survey respondents agree that "industries need clearer benchmarks for what constitutes energy efficiency" in their sectors.

Still, in the general absence of reliable benchmarks, industry is using a variety of other yardsticks to measure their energy efficiency, and efficiency gains. Hans-Joachim Leimkühler, the process design director at Bayer Technology Services, provides one example: "We cannot compare Plant A with Plant B. So we compare Plant A actual with Plant A optimal," a level that is arrived at through workshops with plant staff. Some companies are comparing a plant's energy efficiency performance with its prior-year performance, to track continuous improvement; other companies are benchmarking not their energy use, but rather the way they manage energy – a practice that ISO 50001 is likely to reinforce.

Many companies cite a lack of cash or a need to prioritize investment in expanding manufacturing capacity as the reason for deferring efficiency investments. Yet other companies show how it is possible to overcome these obstacles. For a start, there are many simple, low-cost projects with short payback periods that not only affect short-term profitability, but will affect long-term financial performance as well.

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This article is the second of three parts of the report, The frugal manufacturer: Using energy sparingly. The report was researched and written by the Economist Intelligence Unit and commissioned by ABB. The third and final part of this series, to be published in a forthcoming issue of *ABB Review*, will focus on regulatory aspects of energy efficiency.

The Economist Intelligence Unit bears sole responsibility for the content of the report. The findings and views expressed in the report do not necessarily reflect the views of the sponsor.

For further information on energy efficiency of industry, utilities, buildings and transportation please visit www.abb.com/energyefficiency

The Economist Intelligence Unit would like to thank all survey respondents, as well as executives cited in the report.

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