

# Energy Management

Driving Value in Industrial Environments

April 2009

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## Executive Summary

Are you responsible for managing energy in your plant or currently in the process of establishing a formal energy management program? Aberdeen Group surveyed 230 executives to understand the success companies are realizing by effectively managing energy across the enterprise. Energy management started as a cost saving initiative, but is now starting to become a strategic part of the company's larger corporate social responsibility program. Whether you are just implementing an energy management program or have been on this journey for many years, this report will provide insight into the business processes and technology enablers adopted by the top performers to gain quantifiable business value.

### Research Benchmark

Aberdeen's Research Benchmarks provide an in-depth and comprehensive look into process, procedure, methodologies, and technologies with best practice identification and actionable recommendations.

### Best-in-Class Performance

Aberdeen used three Key Performance Indicators (KPIs) to identify Best-in-Class performance, with the Best-in-Class averaging:

- 90% Overall Equipment Effectiveness (OEE)
- 15% Reduced energy consumption
- 14% Outperformance of corporate operating margin goals

### Competitive Maturity Assessment

Survey results show that the firms enjoying Best-in-Class performance shared several common characteristics.

- Best-in-Class companies are over three-times as likely as Laggards to invest in energy management solutions to gain real-time visibility into energy data
- Best-in-Class companies are over two-times as likely as Laggards to consider energy costs while scheduling production
- Best-in-Class companies are nearly four-times as likely as Laggards to consider energy efficiency while scheduling maintenance

"We have established cross-functional team across multiple plants to ensure best practices are shared and implemented. We track energy usage by asset. Our focus is to create a culture of energy and sustainability."

~ Maintenance Manager, Food  
& Beverage

### Required Actions

In addition to the specific recommendations in Chapter Three of this report, to achieve Best-in-Class performance, companies must:

- Include energy management in corporate-wide sustainability initiatives
- Provide real-time as well as historical energy data to appropriate employees as actionable intelligence
- Invest in automating energy management to gain visibility into energy data and integrate it with existing technology investments

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## Chapter One: Benchmarking the Best-in-Class

### Business Context

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The volatile price of energy has put increasing pressure on the executives in the energy intensive industries. It is now more important than ever to understand a plant's energy's needs and cut out wasteful energy consumption wherever possible so that companies can improve predictability into energy usage. Organizations realize that they can only pass on some energy increases to their customers and need to look within to reduce cost and consumption.

This benchmark study will examine how Best-in-Class companies are moving towards energy efficient operations to not only be environmentally responsible but to gain sustainable business benefits through their energy management initiatives. The focus of this study is to highlight the capabilities adopted by Best-in-Class companies to create an energy-aware culture across plants resulting in both tangible and intangible gains to the organization. The analysis will highlight the top strategies established by Best-in-Class companies and will take a deeper dive into the processes, organization, knowledge and performance management capabilities adopted to successfully execute those strategies. This report will explore the role technology plays in automating the capabilities discussed, giving executives the visibility into energy data to make effective decisions.

### Improving Bottom-Line Results

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Before diving into the benefits and intricacies associated with managing energy, it is of interest to establish why enterprises are undertaking such initiatives in the current economic environment.

The top pressure driving companies to focus on energy management, selected by 80% of total survey respondents, is the need to reduce costs in manufacturing operations (Figure 1). Aberdeen Group's research in the past two years has consistently showed cost as the top driver for industrial organizations. But in all those research projects, the approaches companies took to reduce cost included reducing unscheduled downtime, improving overall yield, increasing quality, or reducing inventory, to name just a few.

While all these are critical areas for cutting costs, executives managing industrial plants often underestimate the ability to reduce costs through an effective energy management strategy. This is especially critical in an energy-intensive plant where energy cost is a large percentage, often upwards of 25% of the total operational costs of the plant. In such a scenario the ability to cut even a small percentage of total energy consumption can result in significant savings for the organization. Eighty percent (80%) of respondent companies are focusing on energy management to realize those savings.

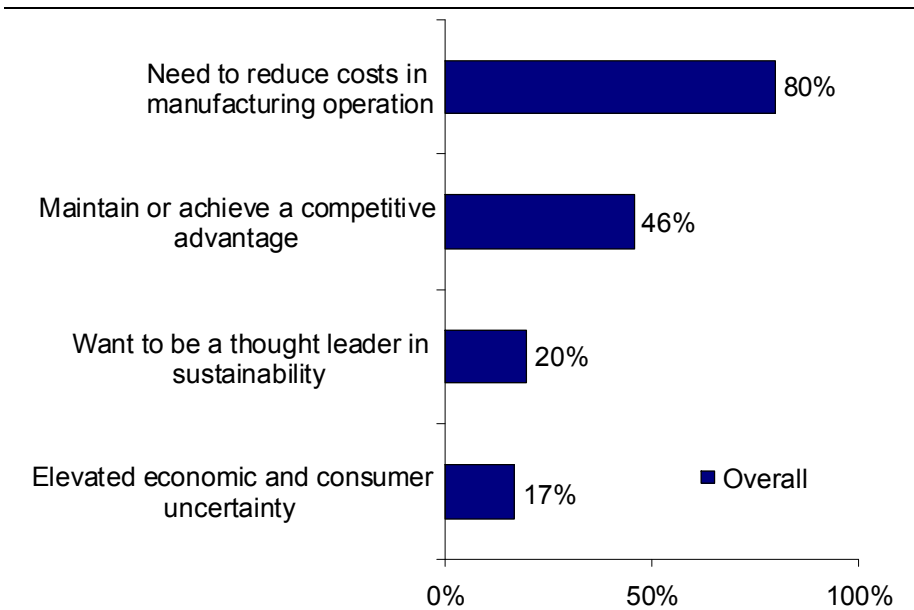
### Fast Facts

Best-in-Class enterprises realize:

- √ 15% Reduction in energy consumption
- √ 90% Overall Equipment Effectiveness
- √ 14% Higher operating margin relative to set corporate goals

While the question in the survey allowed responding companies to choose the top two pressures driving focus on energy management, it is interesting to see the percentage of respondents selecting cost as a driver compared to the rest of the pressures (Figure 1).

**Figure 1: Top Market Pressures**



Source: Aberdeen Group, April 2009

Another important point to notice is the lack of focus on sustainability as a driver for energy management (only 20%), which is an indicator that many in the marketplace still don't associate energy management with the organization's higher sustainability goals. It is critical to understand that energy management is not a responsibility of an energy engineer or an energy team within a plant. To gain and sustain long term benefits from an energy management initiative, companies should take a long look at where they have expertise regarding energy efficiency and work to incorporate these resources into an overall corporate-wide sustainability strategy. By leveraging current resources and aligning these with overall corporate initiatives true momentum can be created, helping to establish an energy-aware culture across the enterprise.

"We have energy as a focus to improve productivity and to reduce manufacturing cost."

~ Director of Manufacturing Operations, Chemical Company

## The Maturity Class Framework

Aberdeen used three key performance criteria to distinguish the Best-in-Class from Industry Average and Laggard organizations. These are:

- **Reduction in Energy Consumption:** Measured as the year-over-year change in energy consumption and controlled for year-over-year changes in production output and normalized by energy intensity of the production process

- **Overall Equipment Effectiveness (OEE):** Composite metric accounting for availability, performance, and quality
- **Operating Margin:** Measured as operating margin realized relative to the corporate goals established

The three KPIs used to determine Best-in-Class companies are critical to measure success of any energy management initiative, as it not only takes into consideration how effectively a plant is managing energy but also considers operational metrics, which includes quality, availability and throughput, and corporate metrics.

**Table 1: Top Performers Earn Best-in-Class Status**

Definition of Maturity Class	Mean Class Performance
<b>Best-in-Class: Top 20%</b> of aggregate performance scorers	<ul style="list-style-type: none"> <li>▪ 90% Overall Equipment Effectiveness</li> <li>▪ 15% Reduction in Energy Consumption</li> <li>▪ 14% Margin</li> </ul>
<b>Industry Average: Middle 50%</b> of aggregate performance scorers	<ul style="list-style-type: none"> <li>▪ 80% Overall Equipment Effectiveness</li> <li>▪ 7% Reduction in Energy Consumption</li> <li>▪ 2% Margin</li> </ul>
<b>Laggard: Bottom 30%</b> of aggregate performance scorers	<ul style="list-style-type: none"> <li>▪ 66% Overall Equipment Effectiveness</li> <li>▪ 6% Increase in Energy Consumption</li> <li>▪ -9% Margin</li> </ul>

Source: Aberdeen Group, April 2009

Best-in-Class companies are able to effectively manage energy by reducing energy consumption by 15%, while realizing 90% OEE and outperforming corporate targets for operating margins by 14%. Best-in-Class companies are not only able to reduce energy consumption, but are also able to successfully translate these into operational and financial gains for the organization. Underperforming companies should use this research to understand the steps taken by their Best-in-Class peers and implement those practices in their strategic as well as tactical actions to realize such improved performance.

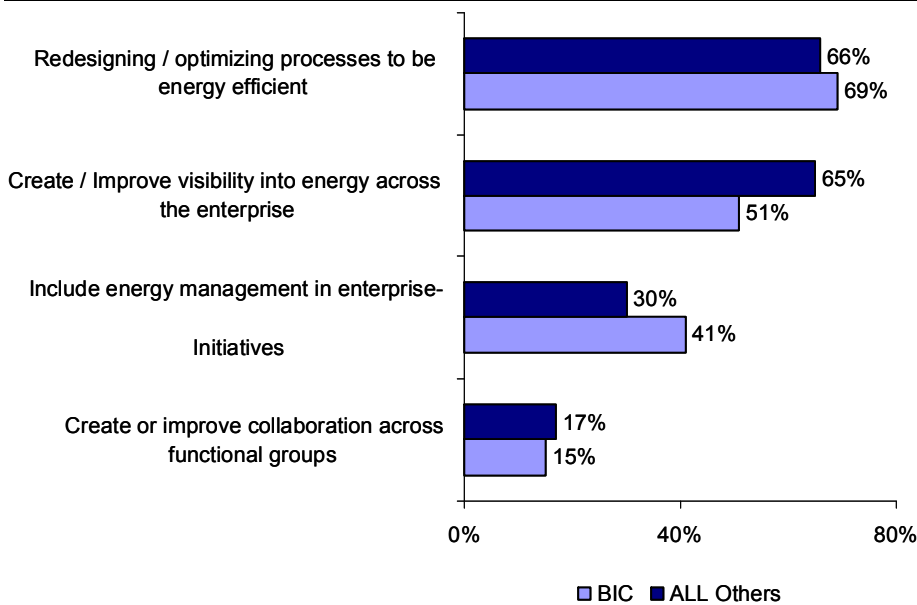
"Our energy management initiatives are around optimizing processes that generate steam to reduce natural gas consumption."

~ Mid-Size European Chemical Company

## Top Strategies for Energy Management

On a strategic level, the top actions adopted by the Best-in-Class to improve the performance of their energy management initiatives do not differ substantially from those adopted by their competitors (Figure 2).

**Figure 2: Strategic Actions**



Source: Aberdeen Group, April 2009

However, there are several strategic actions that are being deployed by a larger share of the population, warranting further analysis on the relevance of these strategies to effectively manage energy. The top strategy, as selected by the majority of Best-in-Class as well as other responding executives, is to redesign / optimize processes to be more energy efficient (Figure 2). Best-in-Class companies are redesigning and optimizing production, maintenance, and energy delivery processes among others to effectively manage energy across different plants. Energy management is not just about tracking energy consumption through utility bills but it is also about how effective companies are when it comes to considering energy in operational decision making.

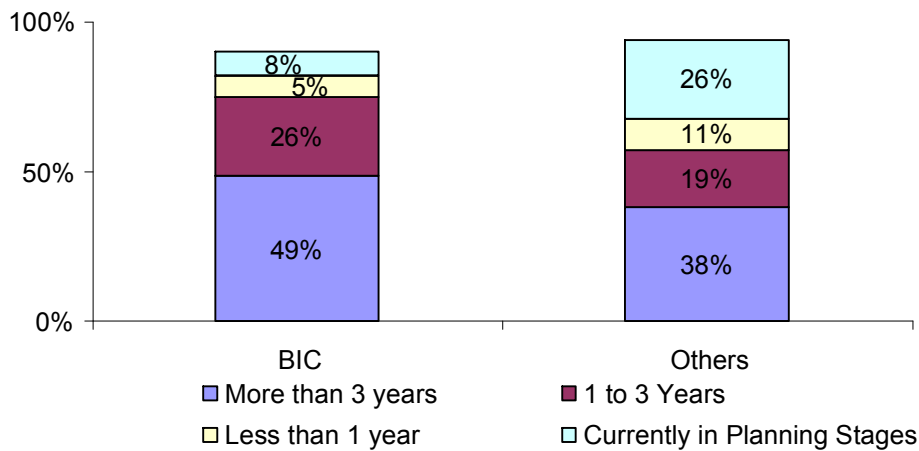
The one area that Best-in-Class companies differentiate themselves is in the inclusion of energy management in enterprise-wide corporate social responsibility initiatives. Best-in-Class companies are elevating energy management to the enterprise level by adopting this strategy, ensuring that all employees have skin in the game when it comes to energy management.

While at first glance it is counter-intuitive that Best-in-Class companies are less likely to adopt a strategy of improving visibility across the enterprise, this is likely due to the maturity of Best-in-Class companies (Figure 3). To a large degree these companies already have processes in place to understand their energy usage and are now at the stage to utilize this visibility to improve decision making.

"We have established a corporate energy team which links facilities engineering staffs, our corporate engineering group and our EHS staffs to work together to find ways to minimize energy use. We currently have pilot testing projects at specific sites to determine if we want to utilize a new technology across our global facilities."

~ Manager, Manufacturing Operations, Large Consumer Packaged Goods Company

**Figure 3: Maturity of Energy Management Initiative**



Source: Aberdeen Group, April 2009

The findings in Figure 2 show that the top strategy adopted for a successful energy management initiative is the exact same for a majority of responding companies, irrespective of the performance. But there can be a dramatic difference in pursuing a strategy and how you execute a strategy. One of the possible reasons might also be related to how long a particular company has been pursuing an energy management initiative (Figure 3).

But just to be clear, the amount of time spent pursuing a specific strategy isn't an inherent basis for performance differentiation itself. The longer a company is in the energy management journey, the more opportunity an organization gets to understand and establish best practices as compared to their peers. The next chapter will highlight the best practices adopted by Best-in-Class companies resulting in improved overall performance.

### The Best-in-Class PACE Model

How do the Best-in-Class manage energy and achieve high level of operational and financial performance as discussed in Table 1? The answer involves a combination of adjustments to the day-to-day process, support from senior management and collaboration across functional groups, coordination of knowledge related to energy, and investments in supporting technologies to provide data to appropriate decision makers. Table 3 summarizes the capabilities that Aberdeen found to be most clearly tied to Best-in-Class performance.

**Table 2: The Best-in-Class PACE Framework**

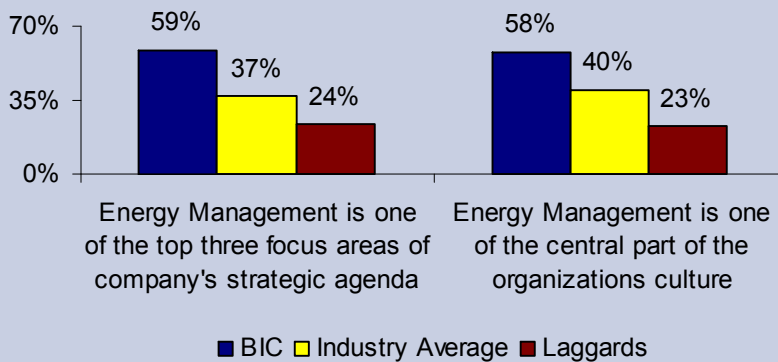
Pressures	Actions	Capabilities	Enablers
<ul style="list-style-type: none"> <li>Need to reduce costs in manufacturing operation</li> </ul>	<ul style="list-style-type: none"> <li>Redesigning / optimizing processes to be energy efficient</li> <li>Create / Improve visibility into energy across the enterprise</li> </ul>	<ul style="list-style-type: none"> <li>Standardized processes to monitor emissions across the enterprise</li> <li>Established corporate team to ensure the success of an energy management program</li> <li>Energy data is collected automatically and stored in a central location</li> <li>Maintenance schedules and alerts are based on asset condition and energy efficiency</li> <li>Energy costs are taken into consideration while scheduling production</li> </ul>	<ul style="list-style-type: none"> <li>Energy Management</li> <li>Environmental Management</li> <li>Dashboards</li> <li>Alert / Event Management</li> <li>Analytics</li> <li>Predictive Maintenance</li> <li>Automated Workflows</li> <li>Statistical Process Control</li> <li>Advanced Process Control</li> </ul>

Source: Aberdeen Group, April 2009

**Aberdeen Insights — Strategy**

The only one strategy that differentiates Best-in-Class performance is the inclusion of energy management in enterprise wide CSR initiatives (Figure 2). Aberdeen Group did further analysis to understand what this focus means to a Best-in-Class company.

**Figure 4: Energy Management: Top on the Strategic Agenda**



Source: Aberdeen Group, April 2009

*continued*

### Aberdeen Insights — Strategy

Best-in-Class companies are found to be more than two-times as likely as Laggards to have energy management as one of the top three focuses of company's strategic agenda and are also two-times as likely to establish an energy-aware culture across the enterprise. This tells a lot about the focus and importance energy management initiatives are given in a Best-in-Class organization. Both these actions are the foundation to the success Best-in-Class companies are enjoying with their energy management initiatives. By having both the above capabilities, Best-in-Class companies are not only making sure that the energy management programs are supported by senior management, but are also ensuring that all the employees are bought into such initiatives and are actively pursuing it in their day-to-day activities. Establishing such a holistic approach will help companies to gain and, more importantly, sustain the benefits achieved from an energy management program.

The next chapter will highlight the business processes established by Best-in-Class companies to create an energy aware culture across the enterprise.

## Chapter Two: Benchmarking Requirements for Success

The way in which companies implement the business processes designed to manage energy and support the strategic actions being taken is highly correlated to successfully responding to market pressures and the achievement of Best-in-Class performance.

### Competitive Assessment

Aberdeen Group analyzed the aggregated metrics of surveyed companies to determine whether their performance ranked as Best-in-Class, Industry Average, or Laggard. In addition to having common performance levels, each class also shared characteristics in five key categories: (1) **process** (the approaches they take to execute their daily operations); (2) **organization** (corporate focus and collaboration among stakeholders); (3) **knowledge management** (contextualizing data and exposing it to key stakeholders); (4) **technology** (the selection of appropriate tools and effective deployment of those tools); and (5) **performance management** (the ability of the organization to measure its results to improve its business). These characteristics (identified in Table 3) serve as a guideline for best practices, and correlate directly with Best-in-Class performance across the key metrics.

#### Fast Facts

Best-in-Class companies are:

- √ Three-times as likely as Laggards to invest in energy management solutions
- √ Two-times as likely as Laggards to update energy delivery systems to reduce energy waste
- √ Five-times as likely as Laggards to invest in dashboards to improve visibility into energy data
- √ Two-times as likely as Laggards to employ consultants to guide their energy management programs

**Table 3: The Competitive Framework**

	Best-in-Class	Average	Laggards
<b>Process</b>	Established formal energy management programs endorsed by senior management		
	58%	38%	26%
	Established short term and long term goals for individual plants / facilities		
<b>Organization</b>	57%	49%	30%
	Standardized processes to monitor energy consumption across the enterprise		
	82%	49%	31%
	Established corporate team to ensure the success of an energy management program		
<b>Organization</b>	61%	50%	37%
	Roles and responsibilities established within departments to successfully execute energy management programs		
	68%	54%	26%
	Active cross-functional teams guiding the success of energy management programs		
<b>Organization</b>	55%	34%	21%

	Best-in-Class	Average	Laggards
	Internal as well as external recognition to the department / plant that meets the energy as well as the emission goals		
	34%	31%	15%
<b>Knowledge Management</b>	Energy data is collected automatically and stored in a central location		
	67%	50%	19%
	Real-time and historical energy usage data easily accessible to decision maker		
	62%	42%	21%
	Maintenance schedules and alerts are based on asset condition and energy efficiency		
	62%	34%	16%
	Energy costs are taken into consideration while scheduling production		
55%	41%	23%	
<b>Performance Management</b>	Metrics established to quantify the benefits of energy management programs		
	62%	38%	18%
	Operational metrics are linked to financial metrics		
56%	45%	31%	
<b>Technology</b>	Energy Management technology currently in use:		
	▪ 46% Energy Management Systems	▪ 22% Energy Management Systems	▪ 15% Energy Management Systems

Source: Aberdeen Group, April 2009

## Process

One of the major areas of differentiation for Best-in-Class companies is that of putting in place an efficient process to enable the success of their energy management initiatives. Best-in-Class companies are more than two-times as likely as Laggards to establish a formal energy management program endorsed by the senior management and are also 90% more likely than Laggards to establish short term and long term goals for individual plants / facilities. Both of these are important business processes, as they allow employees to gain support from senior management. This enables the senior executives to make employees across functional department accountable for energy consumption by setting individual goals.

Best-in-Class companies are also standardizing the process of monitoring energy data across the enterprise. Eighty-two percent (82%) of the Best-in-Class companies have already established this process of gaining visibility into energy data, which explains why Best-in-Class companies were found less likely to establish the strategy of improving visibility (Figure 2). Standardizing processes is about understanding the best practices, capturing

those practices and implementing it across the plants. The Best-in-Class are able to understand which energy data to collect, where to collect from, how frequently to collect that data and how to use all the data together to make effective decisions. This process will enable companies to equip employees with the right energy information at the right time to take corrective and preventive actions.

## **Organization**

One of the common challenges among industrial plants is the level of awareness among employees about managing energy across the plants. Another challenge is that the employees on the plant floor do not have a lot of influence and control when it comes to making energy management decisions. And more often the lack of collaboration between corporate engineering and plant engineering groups makes the process of implementing any new energy management process very slow. Best-in-Class companies are addressing these challenges by having an effective organization structure in place.

Best-in-Class have established corporate teams to ensure the success of an energy management program. Having sponsorship from the corporate team is important, but companies need to ensure that the strategies established in the board rooms are implemented efficiently on the plant floor. Best-in-Class companies are establishing roles and responsibilities across functional teams to ensure that the corporate goals are well communicated with their employees and there are roles established to ensure the success of these goals. Best-in-Class are also ensuring that these functional heads communicate to share best practices across different departments by establishing cross-functional teams.

While driving accountability for energy consumption is critical, Best-in-Class companies are ensuring that they reward the plants / departments that are able to successfully achieve the goals established by the corporate team. Providing internal and external recognition to employees is an important part of senior management's strategy to foster an energy-aware culture across the organization.

## **Knowledge Management**

There are two major ways the Best-in-Class are differentiating themselves from the Industry Average and Laggards on how they manage knowledge across the enterprise. Manual data collection process has always been cumbersome due to the quality and consistency of the data collected across different plants. Providing the right energy data to the employees is the key to making effective energy decisions. Best-in-Class companies are three-times as likely as Laggards to automatically collect energy data and store it in a central location. These companies are also ensuring that employees have access to both real-time as well as historical energy data to understand the trends about energy usage in a plant.

“We have established top down involvement from management and employee. We also have energy management training at each facility. We have developed employee incentive programs for energy efficiency.”

~ Manager, Mining Operations

While having energy information is critical, the next step is to utilize that information to optimize operational processes (maintenance, production etc) to reduce energy consumption. Best-in-Class companies are nearly four-times as likely as Laggards to use energy data and asset condition data to schedule maintenance activities. So if there is a motor or a compressor that is utilizing more energy than expected, with the help of the available data, plant floor employees have the ability to schedule maintenance to understand the spike in energy consumption and establish corrective actions. This will help companies to not only reduce energy consumption but also provide an ability to improve OEE through reduced asset downtime.

Best-in Class companies are also aware of the continuous change in energy prices and want to include that while scheduling production. Because of the real-time as well as historical visibility into energy data, Best-in-Class companies are able to include energy cost while optimizing production scheduling. This is an area in which Laggard companies need immediate attention, as less than 25% of Laggards are using energy data in operational decision making. These are also critical steps to successfully execute the top strategic actions of optimizing processes to be more energy efficient (Figure 2).

### **Performance Management**

Given the definition of Best-in-Class, effectively measuring and managing energy management performance is a necessary requirement for achieving Best-in-Class status. This enables companies to benchmark themselves internally across functional groups as well as externally against their peers and industry standards. Best-in-Class companies are also establishing metrics to quantify the benefits of energy management programs. Establishing metrics enables executives as well as plant managers to continuously monitor and measure the success of their energy management programs in a tangible fashion. This data becomes critical for energy managers to make future decisions on scaling the energy management process to multiple plants based on the success rate. This is one area that needs specific attention from the Laggard companies, with only 18% of Laggards currently establishing metrics to quantify the benefits of energy management programs, as compared to 62% of Best-in-Class.

“We have established centralized decision making when it comes to energy management. We are now in the process of implementing a global energy management plan from a supply side and demand side.”

~ Director, Business Process Management, Large Pharmaceutical Company

### **Case Study — Holcim**

Holcim is a global building material company employing some 85,000 people, with production sites in over 70 countries and 17 cement and grinding plants located in the United States. Holcim’s core businesses include the manufacture and distribution of cement, and the production, processing and distribution of aggregates (crushed stone, gravel and sand), ready-mix concrete, and asphalt. In 2008, Holcim recorded sales of over 25 billion Swiss francs (US \$22 billion).

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### Case Study — Holcim

Holcim (US) Inc. started with a formalized corporate energy management program in 2007, with most of the energy initiatives prior to 2007 being through capital investments. With this corporate level approach Holcim has been able to change from being focused on local capital investment to a people-driven culture focused on critical areas such as safety, emissions, and energy.

Currently each plant in the United States has a dedicated energy champion who is responsible for driving the energy management program. Holcim's energy management program is based on a pyramid structure with focus on five major areas:

- Carbon Emission Management – Ultimate goal is to reduce carbon emissions
- Energy Value Chain Management – Strive for innovation and creative solutions
- Energy at the Right Value – Demand-side management, procurement of energy through renewable sources and helping customers and suppliers conserve energy
- Energy Culture – Educating employees on energy conservation
- Energy Efficiency – Optimizing equipment, tools and systems

The energy efficiency program, which is the foundation of the pyramid structure, starts with a one week assessment by a team of 15 specialized employees from different plants as well as a couple of outside consultants. The focus of these assessments is towards culture, technical assessment, and cost structure. The cultural aspect is driven by structured interviews of employees at different levels to gain visibility into their understanding of energy management. Some of the other important areas of focus are to understand the programs currently in place in each of these plants, to understand how energy management initiatives are impacting such programs and also to drive communication down to the operator / mechanic level.

On the technology side, Holcim is leveraging advanced process control system to gain visibility into energy data across different plants and is integrating that data in to enterprise level business systems to make that data available to executives.

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### Case Study — Hilcom

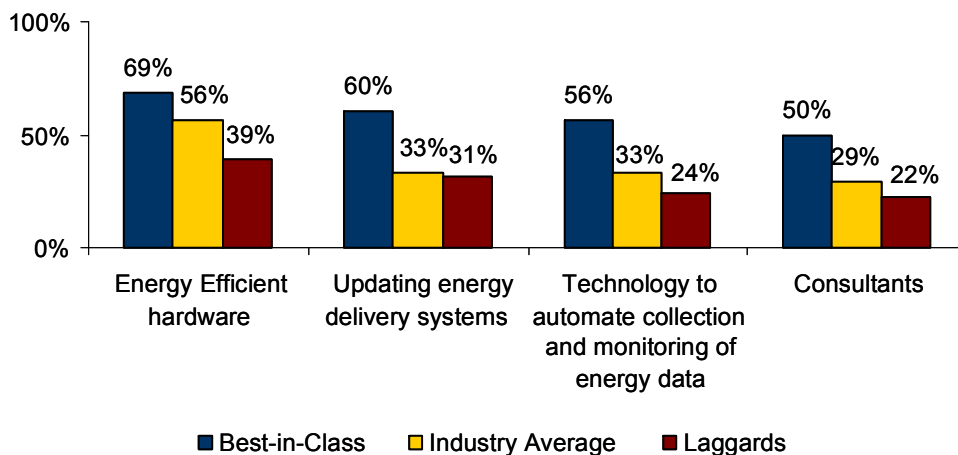
According to Solomon Baumgartner, Manager of Energy and Strategy Support at Holcim, “Our plants in United States were able to save nearly \$5 million in the last year. The interesting aspect is that this savings has been realized without any capital investments across these plants. At year-end 2007, we also made inroads toward reducing our CO<sub>2</sub> emissions and achieved a reduction of over 16% per ton of product since the effort began in 1990. In 2008, five additional plants qualified for the top 75% for energy efficiency. This means a total of eight Holcim (US) plants, including three plants which got recognized in 2007, representing more than 50% of all our active assets. We are currently in the process of applying for the awards.”

### Investing in Energy Management Enablers

In addition to the capabilities highlighted in Table 3, Best-in-Class companies are investing in specific enablers to be energy efficient. The majority of energy consumed in all industrial plants is done so by the equipment in these plants. Best-in-Class companies are nearly two-times as likely as Laggards to invest in energy efficient hardware such as variable frequency drives, cooling and heating systems, meters, etc. Variable frequency drives can be used to save energy on rotating equipments such as pumps, fans, conveyor and machine tool drives by controlling the speed of the motor through adjusting the power supplied to the equipment.

Best-in-Class are also two-times as likely as Laggards to update energy delivery systems. This is a major source of energy waste and Best-in-Class companies are investing in these systems to minimize waste during energy transfer between the energy production and consumption areas.

**Figure 5: Enablers for Energy Management**

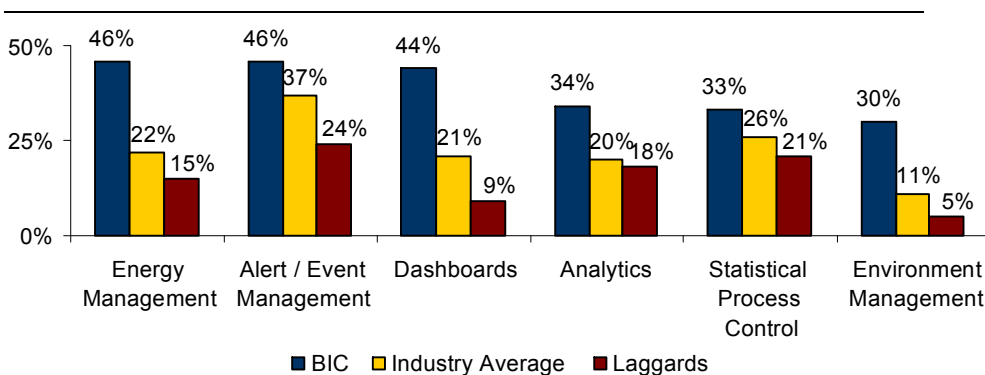


Source: Aberdeen Group, April 2009

Best-in-Class companies are also more likely to get external help by employing consultants to help with implementing an energy management program. These external consultants provide value through plant audits, helping executives to understand the gaps in energy management process and also provide some critical recommendations on the steps required to make the plant more energy efficient. The next stage for these consultants is to become a part of the plant's internal team to successfully execute the recommendations provided and sustain the short-term gains made.

An important differentiator for Best-in-Class companies is the ability to improve visibility into energy data to make effective decisions. Best-in-Class companies are able to have such visibility by investing in technology to automate the collection and monitoring of energy data. Aberdeen did further analysis to understand which specific technology helps companies to realize Best-in-Class performance (Figure 6).

**Figure 6: Technology Tools**



Source: Aberdeen Group, April 2009

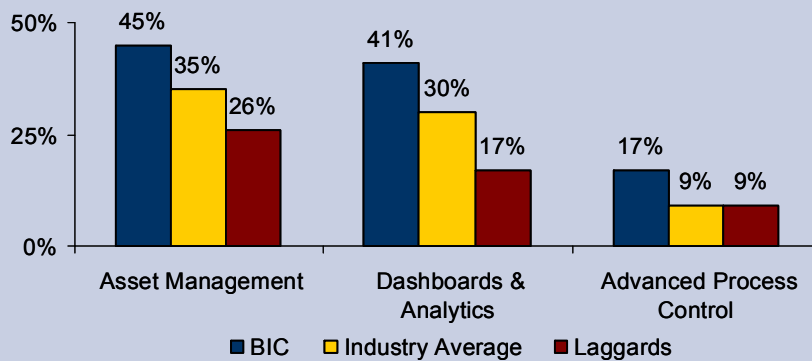
Energy management tools help companies to automatically collect energy related data, providing decision makers with real-time insight into energy management processes that aid in operational decision making. It allows companies to collect critical energy information such as energy consumption, energy costs, and energy efficiency, and also provides drill down visibility into energy data per production line, plant, or product produced. This information is critical in making decisions as to how to efficiently utilize energy across different plants. Having such visibility is one of the main reasons Best-in-Class companies are able to reduce energy consumption by 15%.

Statistical Process Control software enables companies to establish control limits and monitor data in real-time and when integrated with alert management, alerts employees when the processes are out of the control limits. Best-in-Class are also investing in analytics, dashboards, and alert management to provide the right energy data to the right person at the right time to enable decision making.

**Aberdeen Insights — Technology**

While investing in energy management tools is important for Best-in-Class performance, as shown in Figure 6, one of the a major differentiators for Best-in-Class companies has been their ability to use energy data to optimize production and maintenance processes. To enable that, Best-in-Class companies are establishing real-time interoperability between their energy management systems and the technologies mentioned in Figure 7.

**Figure 7: Interoperability with Energy Management Tools**



Source: Aberdeen Group, April 2009

Interoperability with asset management enables maintenance departments to include energy consumption data while scheduling maintenance activities. Similarly, the integration with Advanced Process Control (APC) enables plant operators to include critical information related to energy usage and cost in the optimization process, along with other variables on the plant floor, to achieve the optimal balance of output, quality, and energy efficiency. Finally, integration with dashboards and analytical solutions will enable executives to understand the real value from the huge amount of energy data collected and present that data in front of the appropriate employees for efficient decision making.

## Chapter Three: Required Actions

Whether a company is trying to move its performance in managing energy from Laggard to Industry Average, or Industry Average to Best-in-Class, the following actions will help spur the necessary performance improvements:

### Laggard Steps to Success

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- **Establish a formal energy management program endorsed by senior management.** Laggard companies should start with formalizing an energy management program based on a plant-wide audit to understand energy trends and usage. They should also get the plan endorsed by senior management so that appropriate resources can be allocated for the success of the energy management program. Only 26% of Laggards have currently formalized energy management programs.
- **Include energy data as part of the optimization process to schedule maintenance.** Only 16% of Laggard companies are considering energy consumption data as a factor while scheduling maintenance. Establishing such a process will help Laggard companies to improve energy efficiency as well as operational performance.
- **Invest in Energy Management Systems.** This will ensure real-time visibility into energy data and provide a better understanding of plants' energy usage. This will also enable Laggard companies to utilize the available energy data to optimize production processes. Best-in-Class companies are three-times as likely as Laggards to invest in energy management solutions.

### Industry Average Steps to Success

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- **Establish energy goals at the plant level and recognize plants that outperform those goals.** Drive accountability for energy usage by establishing short term and long term goals for individual plants / facilities. Also provide internal and external recognition to the plant that meets these goals. This will help companies establish an energy-aware culture across different plants.
- **Measure Performance.** Establish metrics to quantify the benefits of energy management programs and link operational metrics to corporate metrics to better understand the impact of energy management initiatives on corporate goals.
- **Monitor energy costs and take that into consideration while scheduling production.** Less than 50% of Industry Average companies are currently including energy data in production scheduling decisions. To reduce energy costs, Industry Average companies need to continuously monitor energy costs and utilize

### Fast Facts

Best-in-Class companies are:

- √ Two-times as likely as Laggards to establish a formal energy management program endorsed by the senior management
- √ Three-times as likely as Laggards to automatically collect energy data and store it in a central location
- √ Two-times as likely as Laggards to have energy management as one of the top three focuses of company's strategic agenda

that data to optimize production scheduling. This will ensure that production is scheduled when the energy costs are low, thereby driving annual energy costs lower.

## Best-in-Class Steps to Success

- **Include energy management in the corporate-wide sustainability initiative.** It is critical for Best-in-Class companies to elevate their energy management program at an enterprise level by including these programs in CSR initiatives. Only 41% of Best-in-Class companies currently have a strategy around including energy management in corporate-wide initiatives (Figure 2). This is a critical step for Best-in-Class companies to scale their energy management programs based on prior best practices and retain their competitive advantage.
- **Invest in automating energy management and integrate it with existing technology investments.** Best-in-Class companies should optimize production and maintenance processes to be energy efficient. This will require Best-in-Class companies to gain visibility into energy data through an energy management system and integrate it with asset management, dashboards, analytics and APC solutions to successfully optimize plant processes.

“We’ve trained employees on our goals and solicited their input on potential projects. We have also formed special committees to execute some of the initiatives, and posted our goals on plant bulletin boards.”

~ Director, Mid-size Chemical Company

### Aberdeen Insights — Summary

There are a lot of different approaches companies are taking to manage energy efficiently across different industrial plants. Best-in-Class companies have truly taken a holistic approach towards energy management by establishing the right strategy and effectively executing the strategy through change in business process and organizational structure. Best-in-Class companies have invested in technology to automate these business processes, improve visibility into energy data and utilize it to optimize plant processes.

This has enabled Best-in-Class companies to create an energy-aware culture and truly transform their organization to Best-in-Class by not only being energy efficient, but also by realizing higher operational and corporate performance. Look out for future Aberdeen Research on *Sustainable Production: Finding Value in Hype* that will explore how Best-in-Class companies are addressing energy management along with environment and safety as part of a corporate-wide sustainability program.

## Appendix A: Research Methodology

Between February and March 2009, Aberdeen examined the use, the experiences, and the intentions of more than 250 enterprises with and without energy management initiatives in a diverse set of enterprises.

Aberdeen supplemented this online survey effort with telephone interviews with select survey respondents, gathering additional information on energy management strategies, experiences, and results.

Responding enterprises included the following:

- *Job title / function:* The research sample included respondents with the following job titles: senior management (CxO, VP, etc.) (13%); Director (15%); Manager (43%); Staff (17%); consultants (5%); other (7%).
- *Industry:* The research sample included respondents from the following industries: Food and Beverage (18%); Automotive (15%); Chemicals (15%); Industrial Equipment Mfg (11%); Metals (9%); Mining (8%); Energy (7%); Utilities (6%); Oil and Gas (5%).
- *Geography:* The majority of respondents (68%) were from North America. Most other respondents were from the Asia-Pacific region (11%) and Europe (15%).
- *Company size:* Thirty percent (30%) of respondents were from large enterprises (annual revenues above US \$1 billion); 40% were from midsize enterprises (annual revenues between \$50 million and \$1 billion); and 30% of respondents were from small businesses (annual revenues of \$50 million or less).
- *Headcount:* Twenty percent (20%) of respondents were from small enterprises (headcount between 1 and 99 employees); 38% were from midsize enterprises (headcount between 100 and 999 employees); and 42% of respondents were from large businesses (headcount greater than 1,000 employees).

Solution providers recognized as sponsors were solicited after the fact and had no substantive influence on the direction of this report. Their sponsorship has made it possible for Aberdeen Group to make these findings available to readers at no charge.

### Study Focus

Responding executives completed an online survey that included questions designed to determine the following:

- √ The maturity of energy management initiatives and the performance improvement garnered from such initiatives
- √ The structure and effectiveness of existing energy management initiatives
- √ Current and planned use of technology to effectively manage energy

The study aimed to identify emerging best practices to manage energy in an industrial environment, and to provide a framework by which readers could assess their own management capabilities.

**Table 4: The PACE Framework Key**

Overview
<p>Aberdeen applies a methodology to benchmark research that evaluates the business pressures, actions, capabilities, and enablers (PACE) that indicate corporate behavior in specific business processes. These terms are defined as follows:</p> <p><b>Pressures</b> — external forces that impact an organization’s market position, competitiveness, or business operations (e.g., economic, political and regulatory, technology, changing customer preferences, competitive)</p> <p><b>Actions</b> — the strategic approaches that an organization takes in response to industry pressures (e.g., align the corporate business model to leverage industry opportunities, such as product / service strategy, target markets, financial strategy, go-to-market, and sales strategy)</p> <p><b>Capabilities</b> — the business process competencies required to execute corporate strategy (e.g., skilled people, brand, market positioning, viable products / services, ecosystem partners, financing)</p> <p><b>Enablers</b> — the key functionality of technology solutions required to support the organization’s enabling business practices (e.g., development platform, applications, network connectivity, user interface, training and support, partner interfaces, data cleansing, and management)</p>

Source: Aberdeen Group, April 2009

**Table 5: The Competitive Framework Key**

Overview	
<p>The Aberdeen Competitive Framework defines enterprises as falling into one of the following three levels of practices and performance:</p> <p><b>Best-in-Class (20%)</b> — Practices that are the best currently being employed and are significantly superior to the Industry Average, and result in the top industry performance.</p> <p><b>Industry Average (50%)</b> — Practices that represent the average or norm, and result in average industry performance.</p> <p><b>Laggards (30%)</b> — Practices that are significantly behind the average of the industry, and result in below average performance.</p>	<p>In the following categories:</p> <p><b>Process</b> — What is the scope of process standardization? What is the efficiency and effectiveness of this process?</p> <p><b>Organization</b> — How is your company currently organized to manage and optimize this particular process?</p> <p><b>Knowledge</b> — What visibility do you have into key data and intelligence required to manage this process?</p> <p><b>Technology</b> — What level of automation have you used to support this process? How is this automation integrated and aligned?</p> <p><b>Performance</b> — What do you measure? How frequently? What’s your actual performance?</p>

Source: Aberdeen Group, April 2009

**Table 6: The Relationship Between PACE and the Competitive Framework**

PACE and the Competitive Framework – How They Interact
<p>Aberdeen research indicates that companies that identify the most influential pressures and take the most transformational and effective actions are most likely to achieve superior performance. The level of competitive performance that a company achieves is strongly determined by the PACE choices that they make and how well they execute those decisions.</p>

Source: Aberdeen Group, April 2009

## Appendix B: Related Aberdeen Research

Related Aberdeen research that forms a companion or reference to this report includes:

- [\*A Platform Approach to Manufacturing Operations Management\*](#); March 2009
- [\*Managing Risks in Asset Intensive Operations\*](#); March 2009
- [\*Sustainability Matters: The Corporate Executives Strategic Agenda\*](#); March 2009
- [\*The Cost of Quality: Defining the Value of Enterprise Quality Management\*](#); August 2008
- [\*Compliance and Traceability in Real-Time: Accelerating the Speed of Business\*](#); December, 2008
- [\*Manufacturing Operations Management: The Next Generation of Manufacturing System\*](#); January 2008
- [\*Event Driven Manufacturing Intelligence: Creating Closed Loop Performance Management\*](#); May 2008
- [\*Global Manufacturing Operations Management\*](#); August 2008
- [\*Building a Green Supply Chain: Social Responsibility for Fun and Profit\*](#); March 2008

Information on these and any other Aberdeen publications can be found at [www.aberdeen.com](http://www.aberdeen.com).

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