

A Survey of Corporate Energy Efficiency Strategies

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ABSTRACT

This paper summarizes the results of a 2009 survey of corporate energy efficiency strategies, conducted by the Pew Center on Global Climate Change. Forty-eight companies, ranging in size from \$8 billion to \$99 billion in revenues, completed the survey. Key results included an average energy savings target of 20%, or 2.2% on an annualized basis. The three leading motivations for companies' energy efficiency strategies were reducing carbon footprint, responding to rising energy prices, and demonstrating commitment to corporate social responsibility. 60% of respondents had full-time energy managers, 87% built energy performance into the compensation review systems for facility/plant management, and 38% reported energy performance criteria at the senior management level. Almost all respondents used specific financial criteria for energy efficiency investments, simple payback and internal rate of return (IRR) being the most common. Simple payback criteria were mostly three years or less, though two were as high as 5 years. IRR criteria were mostly in the 10-15% range, though one reported a 35% IRR threshold. Respondents also reported a variety of qualitative factors affecting their internal operations, supply chains, and product and services, and summarized the lessons learned and ongoing needs for their energy efficiency strategies.

Background

The survey's principal objective was to gather quantitative data, and identify management practices as well as trends in corporate energy efficiency strategies. It is a key element of a broader Pew Center study on best practices in corporate energy efficiency strategies, whose goal is to highlight the most effective methods used by companies today to reduce their energy consumption and lower their related greenhouse gas emissions. It encompasses management approaches to improving energy efficiency, including issues such as organizational structures, financial mechanisms, and employee compensation systems that corporations put in place to drive superior energy performance. The survey results will be combined with a set of case studies in a larger report to be published in late 2009 or early 2010. The report, and related communications activities, is being funded by a three-year, \$1.4 million grant from Toyota.

With concerns growing over climate change and future energy price increases, most, if not all, companies stand to benefit from a renewed focus on energy efficiency. By cataloging and describing best practices in corporate energy efficiency, the Pew Center report is intended to serve as a resource to other companies seeking to develop new, or improve upon existing, energy efficiency programs. The report builds upon existing Pew Center research that provides practical guidance to companies seeking to manage the risks and maximize the opportunities associated with the global transition to a low-carbon economy. Past Pew Center reports and white papers

have examined corporate climate change strategies, the development of corporate greenhouse gas emissions inventories and reduction targets, adaptation planning for businesses, and the use of carbon offsets.¹

Sample Design and Response Rate

To get at best practices among industry leaders, the survey sample was drawn from major companies with a demonstrated commitment to climate and energy issues. We deliberately sought larger companies with strong energy/climate commitments, because the goal is to elicit best practices, not average practices. In this sense, the sample is intentionally not representative of the U.S. corporate population. With that objective, we drew the sample mainly from members of business-NGO and/or government-NGO partnership programs on climate change/sustainability. Included in the sample were all 43 of the companies in the Pew Center's Business Environmental Leadership Council (BELC), the largest U.S.-based association of companies dedicated to business and policy solutions to climate change. An additional 51 companies were pulled from such organizations as the U.S. Climate Action Partnership, Climate Group, World Wildlife Funds's Climate Savers, U.S. Environmental Protection Agency's Climate Leaders, and the World Business Council on Sustainable Development. Most of these companies are U.S.-based, though many operate globally; the survey covers respondents' full global operations.

ICF International's Survey Research Center programmed the questionnaire into an on-line instrument, and the Pew Center distributed it via e-mail to the 95 companies in January 2009. Prospective participants received a link to the on-line survey instrument, unique user names and passwords, and a pdf copy of the questionnaire. In all, a total of 48 companies completed the survey, a response rate of approximately 53 percent.

Survey Instrument

The instrument contained a little over 60 questions split into the following sections: general company information; overall strategy; risk management and finance; specific initiatives (internal operations, supply chain considerations, and products and services); and lessons learned. Key questions centered on organizational issues, such as internal champions in establishing efficiency programs; financial issues, such as the financing of efficiency projects and their role in competing with other priorities; and broader "lessons learned," such as major challenges in developing efficiency programs, and the methods by which those challenges were overcome.

Respondent Characteristics

Respondents ranged from semiconductor manufacturers to electric utilities, medical suppliers, chemical manufacturers, beverage companies, apparel makers, airlines, insurance companies, and heavy machinery manufacturers. This sample thus represents a representative range of companies across many different sectors of the economy. Key statistics included:

¹ All Pew Center reports are available for download at www.pewclimate.org.

- Revenues—Ranged from under \$8 billion to \$99 billion, with an average of just under \$29 billion
- Energy costs—Based on the 21 respondents who reported this data, total company energy costs ranged from \$25 million to \$27 billion, with an average of just under \$ 2 billion

Views on Climate Policy and Energy Prices

Almost all participants (98%) believe that comprehensive legislation mandating reductions in greenhouse gas emissions will be enacted in the U.S. More than half of those (57%) believe legislation will be enacted within two years, the remainder within four years.

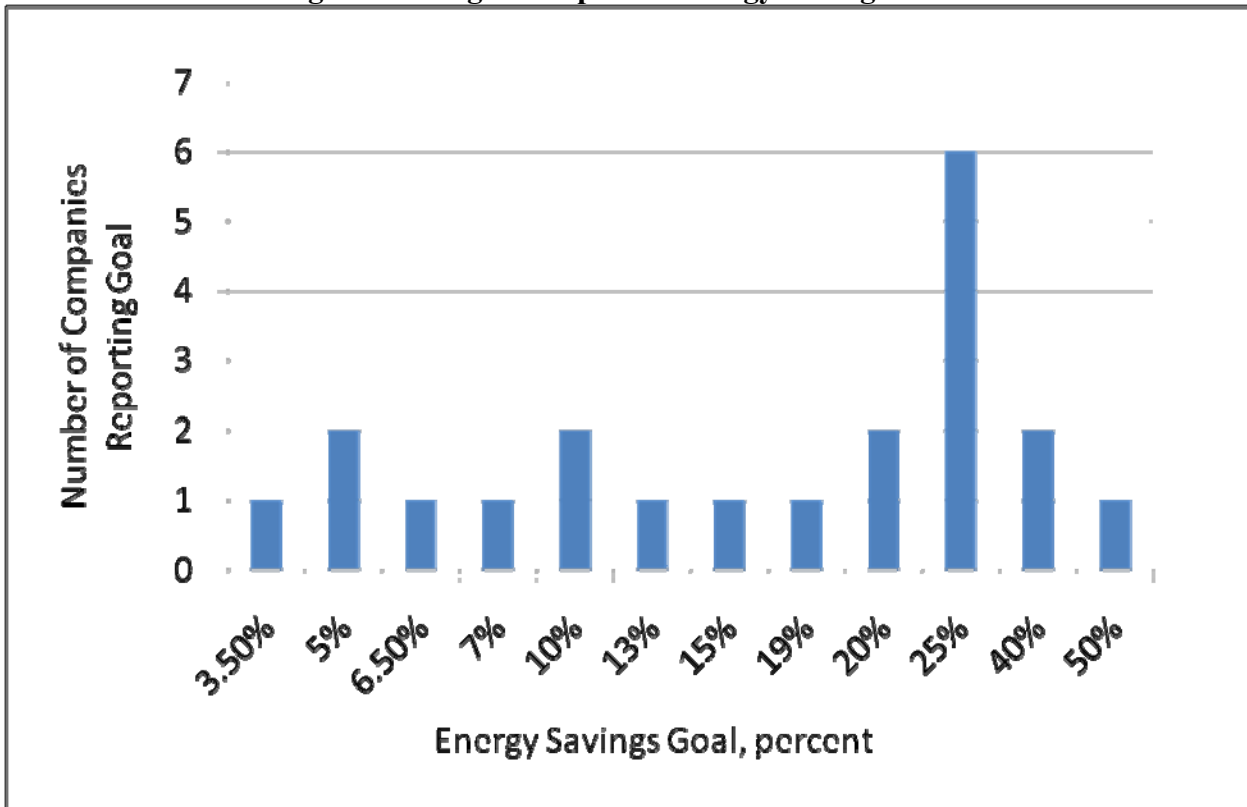
Respondents were also asked where they expect energy prices to be by 2014, using world oil prices as a general proxy. About 5% think prices will stay below \$75/barrel for the next five years; 44% believe prices will rise to the \$75-99 range, and over half believe oil will exceed \$100/barrel by 2014. The U.S. Department of Energy's 2009 Annual Energy Outlook projects a 2014 price of about \$104/barrel for crude oil imported by U.S. refiners.² Respondents' estimates thus come fairly close to the U.S. official forecast. It is also relevant to point out that prior to the 2006 Annual Energy Outlook, oil price forecasts for 2014 did not exceed \$27/barrel. Price expectations have thus risen rapidly in just four years.

Energy Efficiency Goals

One of the survey's main objectives was to obtain companies' quantitative goals for reducing energy usage or costs, using specific metrics. Twenty-one companies in the sample supplied quantitative goal information. The mean energy savings goal was 20%; however, the responses ranged from 3.5% to 50%. It is also important to understand the context for these percentages, in terms of timeframe and metrics; we therefore asked companies to supply the target year for the savings goal, the base year against which it was measured, and the metric in which the goal was expressed. The mean base year was 2003, and the mean target year was 2013. For those who reported a percentage savings target as well as a base year and a target year, the annualized savings percentage was 2.2%; in other words, the average company's target called for just over 2% energy savings per year, over about a 10-year period. A chart showing the range of reported savings targets is shown in Figure 1.

² U.S. Department of Energy. Energy Information Administration. *2009 Annual Energy Outlook*. http://www.eia.doe.gov/oiaf/aeo/aeoref_tab.html

Figure 1. Range of Reported Energy Savings Goals

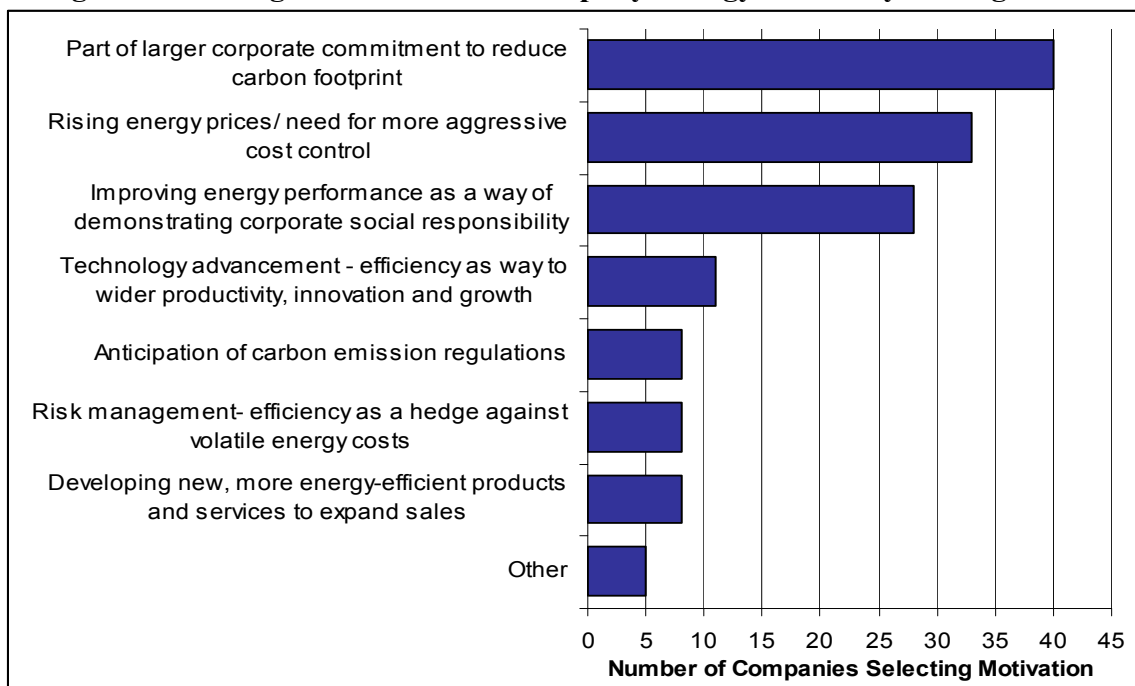


However, respondents varied considerably in the metrics they reported using for their energy savings targets. A simple percentage-of-energy savings target was the most commonly reported (21 respondents), where the goal was set in terms of reducing energy use by X% from Year A to Year B. Other respondents normalized their energy savings targets to a variety of metrics, including energy used per square foot of floor space, energy used per unit of product, or energy used per dollar of revenue. Some respondents set absolute savings targets, in energy units or in dollars.

Leading Motivations for Energy Efficiency Strategies

Respondents were asked to select the leading motivators for their energy efficiency strategies. Their answers are graphed in Figure 2. It is interesting to note that although the highest frequency of responses was that efficiency strategies are part of a corporate commitment to reduce the company's carbon footprint, the least-selected factor was anticipation of mandatory carbon emission regulations. This may reflect the sample's bias toward companies with an active voluntary commitment on climate issues. It may also reflect an understanding that most companies' facilities, except for larger power generation and industrial facilities, will not be directly regulated by carbon regulations, and that energy efficiency strategies have a sound business case with or without regulations, while also showing concrete action on reducing the company's carbon footprint.

Figure 2. Leading Motivations for Company Energy Efficiency Strategies



Scope, Staffing and Resourcing in Energy Management Strategies

Companies were asked whether their energy efficiency strategies are corporation-wide, or operate at the individual plant or division level. Almost all (94%) reported that the strategy operates corporation-wide; 3 respondents, or 6%, said that their efficiency strategies operate at a division level. However, in a follow-up question, 64% of respondents added that in addition to operating a corporation-wide strategy, they also quantify energy performance at the business unit or division level, and 81% quantify performance at the plant/facility level. Note that these percentages add up to more than 100 percent because respondents were able to select more than one business level at which they quantify their energy performance or energy savings.

Most respondents (60%) reported that they employ a full-time energy manager. Others reassigned existing staff or use other ways to support their efforts. Respondents also rated the relative level of effort, and the relative cost impact, of five basic elements of their efficiency strategy effort. Those rankings are summarized in Table 1. It is interesting to note that employee engagement ranks low in terms of management effort and dollar cost; later in the survey, many respondents noted how well their employees embraced their efficiency initiatives. This suggests that employee engagement strategies may become a larger part of companies' energy and climate strategies, especially in difficult economic times.

**Table 1. Rankings of Key Program Elements by Level of Effort and Cost
(5=greatest level of effort or cost)**

Program Element	Labor Effort	Money Spent
Program management (data collection, reporting, project development, etc.)	5	2
Operations practices improvement (no cost to low cost)	4	3
Low-cost equipment measures (typically 1 year payback or less)	3	4
Larger capital projects (multi-year paybacks, capital financing, etc.)	2	5
Employee engagement communication, etc.	1	1

Leadership and Performance Accountability

Companies were asked which people or departments they considered to be the most important champions for their efficiency strategies. CEOs and the senior management team were the most frequently selected choice, followed by plant/facility managers and operations staff. Environment/Health/Safety staff also were identified by many respondents. These results are illustrated in Table 2.

Table 2. Key Champions for Energy Efficiency Strategies

Champions	Number Selected
Board of Directors	3
CEO and Senior Management Team	37
Plant or Facility Managers	33
Accounting and Finance	4
Environmental Health and Safety	21
Operations	29
Strategic Planning	3
Other	12

Companies were also asked how energy performance is used as an element of job performance and career advancement. 49% said they explicitly include energy efficiency performance in annual review and compensation processes. We also asked which levels of management energy efficiency performance affected in this way; those results are shown in Table 3.

Table 3. Levels of Management Accountable for Energy Performance

	Number of Mentions	Percent*
Senior management (“C-level”)	17	38%
Officer level (Vice Presidents/other officers)	24	53%
Corporate Energy Manager	26	58%
Middle management (Division/dept. managers)	27	60%
Facility level (Plant managers, facility managers)	39	87%

* Percentages add up to more than 100 percent because respondents were able to select more than one business level at which energy performance is measured and accounted for.

Employee Engagement

Companies were asked whether employee engagement, beyond the core energy management leadership team, is a formal element of the corporate energy management strategy. 89% of respondents said yes, though a wide variety of employee engagement methods were reported. Those responses are summarized in Table 4.

Table 4. Methods Used for Employee Education and Engagement

Categories	Mentions	Percent of Respondents
Newsletters or Reports / E-mails / Bulk Communication	16	33%
Education and/or Trainings	11	23%
Developed a Green Program for Employees	9	19%
Green or Energy Teams / Committees	8	17%
Intranet or Website	8	17%
Employee Suggestion Box	7	15%
Energy Efficiency Campaigns or Initiatives	6	12%
Posting Signs or Posters	5	10%
Rewards / Incentive system	5	10%
Energy Themed Forums, Brownbag Lunches, Meetings and/or Conferences	5	10%
Surveys	2	4%

* Percentages add up to more than 100 percent because respondents were able to select more than one business level at which energy performance is measured and accounted for.

Finance and Risk Management Aspects of Energy Efficiency Investments

Respondents were asked whether they use a standard financial criterion to assess energy efficiency projects. 91% answered yes to this question; the distribution of responses showed that simple payback and internal rate of return were the most common criteria, though some respondents also used net operating income, lifecycle cost, and net present value methods.

15 companies reported the payback periods they use. All applied payback periods no longer than 5 years—3 years or less was the most commonly selected period. Payback periods responses are summarized in Table 5.

Table 5. Range of Reported Investment Payback Periods

Payback period	Number Selected
One Year	2
Two Years	4
Three Years	6
Four Years	1
Five years	2

Ten companies reported an IRR figure, as shown in Table 6. Half of these respondents used IRR criteria of 15% or less, and the highest reported was 35%.

Table 6. Range of Reported Investment Internal Rate of Return

IRR Threshold	Number Selected
10-15%	2
15%	3
18%	1
20%	1
22%	1
25%	1
35%	1

Beyond basic criteria like simple payback and IRR, we also asked companies if they employ any additional considerations or special processes for energy efficiency projects to ensure that efficiency projects get funded that would otherwise fail corporate financial criteria. 63% answered yes to this question. Within that group of 29, the following additional initiatives were mentioned:

- **Established a special pool of capital available only for energy efficiency projects.** 13 companies reported this approach, with capital pools ranging from \$3 million--\$240 million, available over a period of 1-7 years. The average capital pool was \$51.3 million; on an annualized basis, the average pool was \$12.8 million.
- **Build in assumptions about future energy price increases or supply shocks into the proposal to enhance financial or risk management benefits of efficiency projects.** 12 companies reported this practice, though no price information was provided.
- **Build in assumptions about future carbon prices to enhance benefits of efficiency projects.** Six reported their carbon price expectations. While these results are not statistically meaningful, these respondents expect carbon prices to exceed \$30/ton by 2020.
- **Take into account the relative lack of risk involved in energy efficiency projects.** Ten companies reported this approach, though no specific metrics were provided.
- **Take into account co-benefits of improved energy efficiency.** All 29 selected at least one co-benefit of efficiency investments. Enhanced corporation reputation was the mostly frequently selected choice, followed by improved competitive positioning. Employee morale and productivity were also selected by many respondents.

- **Bundling multiple energy efficiency projects into one larger budget item.** 11 companies reported bundling efficiency projects into aggregated investments, partly to overcome the difficulty of gaining corporate level attention for relatively small expenditures.

Challenges in Mounting Internal Initiatives

Companies were asked to identify the biggest challenges in developing and sustaining efficiency initiatives for internal operations. Lack of funding was the most widely selected factor, followed by lack of staff time for project development, and organizational barriers.

Supply Chain Initiatives

Eight respondents (17% of total sample) reported having estimated suppliers’ “energy footprint” or total usage. For those who had made such estimates, we asked whether the suppliers’ footprint was smaller than, equal to, or larger than the company’s internal operations energy footprint. One respondent said their suppliers’ footprint was smaller, one equal, and five larger than their internal energy usage. This appears to be typical—most companies that estimate suppliers’ footprint tend to find that their suppliers’ energy usage (and often their carbon footprint) outweighs their own.

Respondents were also asked, independently of the footprint-measurement question, what energy efficiency measures they have undertaken with suppliers. The most common response was providing information on third-party efficiency programs or resources, followed by setting up energy/carbon reporting systems, providing technical assistance, and in a few cases, changing suppliers based on energy/carbon performance. Table 7 summarizes these responses.

Table 7. Energy Efficiency Measures Taken with Suppliers

Supplier Energy Efficiency Measure	Frequency	Percent*
Set up a measuring/reporting system for their energy/carbon performance	10	21%
Set specific energy or GHG reduction targets	0	0%
Provided information on energy efficiency programs and other resources available from third-party sources	21	44%
Provided technical services (at your cost) to improve their energy/carbon performance	8	17%
Changed suppliers based on identification of suppliers with superior energy/carbon efficiency	6	12%
Other initiatives	10	21%

* Percentages add up to more than 100 percent because respondents were able to select more than one energy efficiency strategy that they have undertaken with their suppliers.

Companies were also asked what the biggest challenges were in developing and sustaining efficiency initiatives in the supply chain. Getting suppliers’ data was the most frequently selected factor, followed by cost issues and supplier resistance.

Products and Services

Companies reported having taken various initiatives with their products and services, at a rather high rate. 55% (26) had calculated the energy footprint from their products and services. On a comparative basis, 7 reported their product/service footprint to be smaller than their internal operations, 2 reported they were equal, and 17 reported product/service footprints larger than internal operations.

Somewhat surprisingly, 81% (38) reported that they had modified their products and services to enhance or offer new levels of energy efficiency performance. When asked to identify their motives for doing this, companies reported a range of motives: of these, the most frequently selected were, “Take advantage of new market trends brought on by consumer concerns about energy prices”, “Take advantage of new market trends brought on by consumer concerns about environmental issues”, and “Respond to competitive pressures”.

Respondents were asked to identify the biggest challenges they faced in developing, rolling out, or sustaining sales of energy efficiency products or services. The most frequent responses were cost barriers, customer unwillingness to pay, and engineering barriers.

Lessons Learned, Remaining Challenges, and Future Needs

The last section of the survey asked companies to sum up the successes, setbacks, lessons, and future needs they see for their energy efficiency strategies. The biggest successes observed in companies energy efficiency strategies included the following (top five most frequent responses shown):

- Meeting / Exceeding Goals 48% of respondents
- Implementing Corporate Wide Plan 23%
- Increasing Employee Involvement 21%
- Formalizing a Policy / Strategy 15%
- Implementing at Local Level 15%

Almost half of respondents reported meeting their goals. Many setbacks were also reported, including:

- Limited Capital for EE 19%
- Limited Leadership Buy-In 10%
- Improving EE is Harder than Expected 10%
- Competing Priorities / Resources 6%
- Lagging Momentum / Employee Interest 6%

Companies reported the most successful corrective actions they took in response to these setbacks, summarized as follows:

- Doing Audits for EE improvements 12%
- Revising a Strategy / Goals 10%
- Building Teams to Support the Effort 10%

- Increasing Employee Involvement 8%
- Developing Feedback Mechanisms 8%

We also asked companies to report any surprises or unexpected results that they experienced. Several companies reported on this, with the following summary of responses:

- Employee Interest/Involvement 15%
- Immediacy of Meeting Goals/Success 15%
- Difficulty in Implementing Strategies 6%
- Wealth of Ideas / Opportunities 6%
- Difficulty in Finding Resources 4%

Respondents were asked to report the most important lessons learned since implementing their energy efficiency strategy. Responses are summarized in Table 8. The most frequently reported lesson was the need for better communication and coordination among units of the company, followed by the need to gain support from leadership, the need to actively engage employees, and the need for measurement and feedback in sustaining success.

Table 8. Key Lessons Learned in Implementing Efficiency Strategies

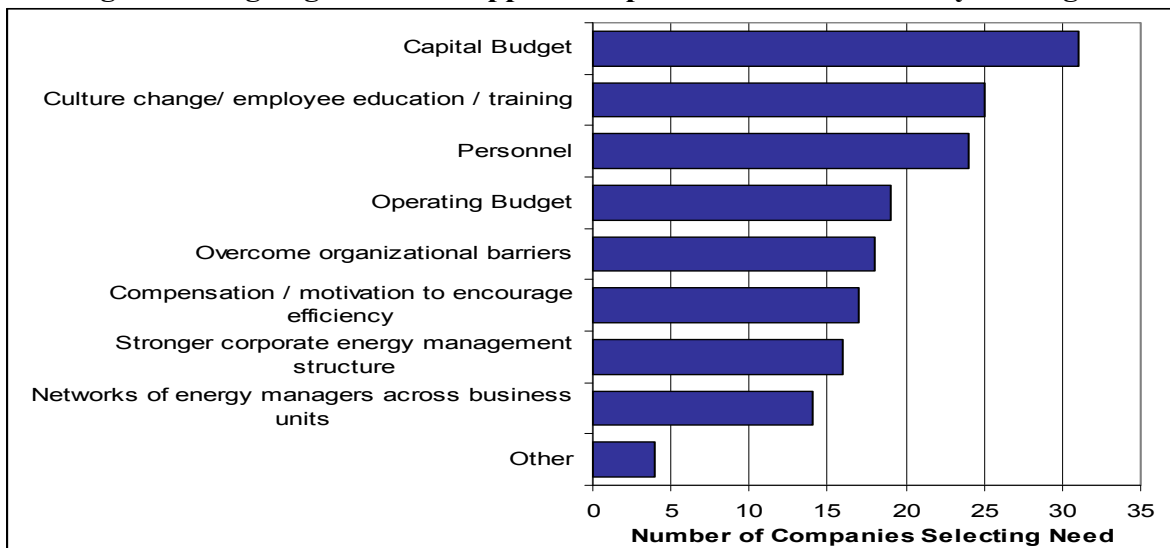
Categories	Frequency	Percent
Better Communication/Coordination Between Units	10	20.8%
Support from Management / Leadership Buy-In	7	14.6%
Employee Interest/Involvement in Energy Policy	6	12.5%
Developing a Feedback Mechanism / Measuring Results	6	12.5%
Need for Funding / Lack of Capital	4	8.3%
Setting Clear, Realistic Goals	3	6.3%
Continuous focus/awareness	2	4.2%
Other	22	45.8%

Companies reported the largest ongoing challenges keeping them from realizing the company’s energy management goals. Need for capital to pay for projects was the greatest single ongoing challenge, outnumbering any other single item by a four-to-one ratio.

The final questions respondents were asked probed their most pressing needs to sustain and improve their energy management efforts, both for specific efficiency improvements and in terms of corporate-wide resources. As was shown in earlier responses on challenges, financial resources head the list of respondents’ needs for specific efficiency improvements, followed by better management tools and technical information and assistance.

Looking more broadly at corporation-wide needs, respondents still saw capital needs as paramount. However, at the corporate level, culture change/education/training was tied with personnel needs for second place, followed by increased operating budget support, reducing organizational barriers, and better compensation and motivation systems to encourage efficiency. Figure 3 summarize these responses.

Figure 3. Ongoing Needs to Support Corporation-Wide Efficiency Strategies



Summary of Findings

The Pew Center survey brings to light several interesting facts and trends in corporate energy management, and helps identify key attributes on energy efficiency shared by leading large companies. Key findings include:

- Almost half of respondents reported setting quantified energy savings goals: the average was 20% of base year energy usage over nine years, or an annualized savings target of 2.2%
- 60% had full-time energy managers, 87% made facility/plant managers accountable for energy performance; 38% set energy performance goals for senior management.
- Over 90% of respondents reported standardized financial criteria: simple payback and IRR were the most frequent. Most simple payback thresholds were three years or less; most IRR thresholds were 15% or more.
- Most companies used other ways to support efficiency investment, including dedicated pools of capital, accounting for future energy and carbon prices, and estimating co-benefits.
- Less than half of respondents had taken specific actions to encourage energy efficiency in their supply chains; some had estimated their suppliers' energy/carbon footprint, and others established metrics and reporting systems to measure supplier performance.
- A surprisingly high 81% of respondents had modified their products and services to increase their energy efficiency; 55% had measured the energy footprint of their products and services.
- Among the surprises companies reported, the most common was the enthusiastic response they got from engaging employees.
- The greatest ongoing needs reported were greater capital and operating budgets, change in company culture/employee engagement, more personnel resources, and reduction of internal barriers to energy efficiency investment.

Conclusions

This survey sheds new light on emerging trends in energy management at some of the largest and most progressive companies. While the survey was deliberately aimed at companies known to be active in the energy efficiency and climate policy field, it produced responses that help articulate the key elements of success in corporate energy management. These include:

1. Efficiency as an integral part of corporate strategic planning and risk assessment
2. Real and sustainable senior management leadership and organizational support
3. Specific, aggressive, measurable, and accountable energy efficiency goals
4. A robust tracking and performance measurement system
5. Commitment of organizational resources in a substantial and sustained way
6. Documentation of results with quantitative, company-wide data
7. Communication of results both internally and externally

The survey produced some surprising findings, including the importance of employee engagement and enthusiasm. While efficiency has often been a behind-the-scenes engineering function driven by technology investment, today's most successful efforts draw as much on human capital and culture change to drive results as they do engineering expertise and technology investment.

Next steps in the research process include development of the case studies, which are expected to provide additional depth and detail to some of the key findings identified through the survey. For example, the case studies will seek to describe exactly how selected companies set efficiency targets and measure progress toward their goals. The case studies will also explore company experiences with various financing mechanisms for efficiency projects, including the use of dedicated pools of capital, and budgeting techniques such as bundling multiple small projects together into one larger fiscal item. Ultimately, the aim of the report is to integrate survey and case study findings to provide a comprehensive set of tools and resources for companies seeking to enhance their energy efficiency efforts.

The Pew Center also intends to develop a separate section of its Web site devoted to the topic of corporate energy efficiency. It plans to develop more case studies and additional resources that capture the advancing state of the art on this fast moving issue.