

**NYSERDA**

**EXECUTIVES FOR ENERGY EFFICIENCY**

**MOTIVATING BUSINESS  
LEADERS TO IMPROVE  
PROFITABILITY THROUGH  
ENERGY EFFICIENCY**

Final Report

**November 12, 2003**

**The Alliance to Save Energy**



**ALLIANCE TO  
SAVE ENERGY**

*Creating an Energy-Efficient World*

For:  
New York State Energy Research and Development Authority  
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PURPOSE:	<p>This report provides an outline of the issues and opportunities that are apparent in encouraging businesses to improve financial performance through energy efficiency. The New York State Energy Research and Development Authority and the U.S. Department of Energy co-sponsored this study to work with New York industry on a pilot basis. A Steering Committee of New York State business and policy professionals provided guidance in the formulation of this study. The report culminates with an outline of strategy elements for reducing hurdles to business energy efficiency.</p> <p>A companion report to this document, prepared by the Alliance, is entitled <i>Strategic Industrial Energy Efficiency: Reduce Costs, Build Revenues, and Control Risks</i>. Both reports are available online at <a href="http://www.ase.org/programs/industrial/e4ee">www.ase.org/programs/industrial/e4ee</a>.</p>



The Alliance to Save Energy promotes energy efficiency worldwide to achieve a healthier economy, a cleaner environment and energy security. Founded in 1977, the Alliance to Save Energy is a non-profit coalition of business, government, environmental and consumer leaders. The Alliance to Save Energy supports energy efficiency as a cost-effective energy resource under existing market conditions and advocates energy-efficiency policies that minimize costs to society and individual consumers, and that lessen greenhouse gas emissions and their impact on the global climate. To carry out its mission, the Alliance to Save Energy undertakes research, educational programs, and policy advocacy, designs and implements energy-efficiency projects, promotes technology development and deployment, and builds public-private partnerships, in the U.S. and other countries.

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## EXECUTIVE SUMMARY

The *Executives for Energy Efficiency* project, initiated in January 2003 and culminating its first phase in July 2003, is a New York State-based study of corporate receptiveness to energy efficiency. The project’s mission is to develop strategies that will facilitate motivation of New York business leaders to “improve business performance through energy efficiency.” This project is coordinated by the New York State Energy Research and Development Authority, the U.S. Department of Energy, and the Alliance to Save Energy.

This effort secured the advice and direction of a Steering Committee of business stakeholders from New York State. Through a series of meetings, discussions, and case study analyses, this project identified common hurdles to the implementation of energy-efficiency initiatives. These hurdles are listed in the table (below). Each hurdle is defined by a business issue, presented here with a suggested strategy for overcoming that hurdle.

<b>HURDLES TO BUSINESS ENERGY EFFICIENCY</b>			
<b>SEGMENT</b>	<b>DEFINING BUSINESS ISSUE</b>	<b>CRITICAL SUCCESS FACTOR</b>	<b>STRATEGY OR APPROACH</b>
1	Lacks organizational stability	Needs management stability, vision, champion	Ensure success by screening early program participants
2	Investment bias for core business	Responsive only to episodic energy crises	Step up program media/outreach during crises
3	Fixation on energy PRICE rather than EXPENSE	Lowering of energy prices/tariffs	Create “risk buster” tariff for qualified projects
4	Lacks technical appreciation	Needs case studies, proven precedents	Establish cadre of demonstration providers
5	Defers to production/business climate risks	Needs metering, documented hard data	Establish coalitions of first-movers to pool data, risk
6	Jaded by energy “snake oil” from the past	Need to secure sponsors/providers with credibility	Pre-qualify energy service companies (ESCOs), architectural and engineering consultants, and similar service providers
7	Conservative capital investment criteria	Availability of guarantees and financing	Apply funds to debt pools, guarantees, tax credits
8	Sensitive to fuel price/tariff risk	Ensure tariff/price stability	Create “risk buster” tariff for qualified projects
9*	Company compelled to adopt energy efficiency	Company edict, vision, or culture paves the way	Recognize, award, and promote to industry peers

SOURCE: Executives for Energy Efficiency Steering Committee and Staff

\*Segment 9 does not represent a “hurdle,” but recognizes the proactive pursuit of efficiency.

The body of this report covers the development of this analysis and the ensuing recommendations for facilitating hurdle reduction.

## I. OVERVIEW

The Steering Committee advances these strategy elements for promoting energy efficiency to the industrial and commercial sectors:

- **Business Philosophy.** Any outreach to corporate leaders should provide a *business philosophy* that clearly states a desired outcome for business leaders, such as improved bottom-line performance, enhanced productivity, or relief from business risks such as faults in power reliability. Energy efficiency is then identified as a way to achieve those outcomes (p. 8).
- **Incentives.** Outreach should explore financial incentives for action. These incentives should include productivity, reliability, operational, and cost-saving benefits that improve business performance. Public benefit funds, tax credits, and tariffs may also be incentives. Incentives should be tailored to a functional segmentation of industries (manufacturing, non-manufacturing; small-medium-large) (p. 9).
- **Actionable Follow-up Material.** The functional segmentation should guide the preparation of clear, easy-to-access reference and diagnostic materials for use by technicians (p. 9).
- **Industry Outreach Specialists.** Energy needs and interests vary among industry sectors. Having a cadre of sector specialists should facilitate industry-specific outreach to support energy efficiency (p. 9).
- **Message Partnering.** Effective outreach can occur when efficiency advocates partner with associations, consultants, and other groups that maintain dialogues with corporate leaders. Media or public relations expertise can also be useful (p. 10).

Considerations that shaped the Steering Committee's strategy recommendations include the following:

- **Energy Price and Tariff Risks.** Volatility in energy prices and tariffs, as well as general economic conditions, are pivotal considerations for business leaders who contemplate energy improvement projects (p. 4).
- **Risk Perceptions.** Many other business environment risks discourage decision makers from pursuing improved energy efficiency. The *Hurdles to Business Energy Efficiency* summary (Table 1) identifies types of risk and possible strategies to overcome each (p. 6).
- **Project Facilitation.** Greater corporate acceptance of energy projects may require: (1) participation of key personnel within firms who "champion" project evaluation and implementation, (2) effective use of metering data to illustrate and justify the need for an energy-efficiency project, (3) rebates and grants, and (4) independent, objective verification of commercial energy services (p. 18).
- **Energy Management Facilitation.** Energy improvement opportunities are also the result of process monitoring, maintenance, and verification procedures. Administrative continuity and changes to corporate culture may be needed if firms are to effectively adopt such procedures (p. 18).

## **II. MISSION**

The *Executives for Energy Efficiency* project, initiated in January 2003 and culminating its first phase in July 2003, is a New York State-based study of business receptiveness to energy efficiency implementation. The project's mission is to develop strategies that will facilitate motivation of New York business leaders to "improve business performance through energy efficiency."

The Steering Committee consists of 19 New York State business, association, consulting, and government leaders. They hold executive and managerial positions within their respective organizations. The collective experience of these individuals provides a variety of perspectives on energy projects and the decision makers who approve them. In addition, Steering Committee members represent many of the organizations that may assist with any future New York State initiatives.

This report is a result of the *Executives for Energy Efficiency* project. It presents the Steering Committee's collective knowledge for promoting energy efficiency to top-level business decision makers. This New York State effort is a pilot that may inspire similar initiatives in other states.

## **III. BACKGROUND**

Chief executive officers (CEOs), in collaboration with their corporate staff, have ultimate responsibility for the success of the organizations they lead. It is not always clear how corporate leaders prioritize the opportunities and challenges they face in performing their duties, particularly in the realm of energy management. In fact, many decision makers decide not to implement efficiency projects, even when hard data and subsidies are available to illustrate the potential gain with reasonable payback.

Many energy policy professionals believe that the full potential of energy efficiency for business is unreachable without corporate-level understanding and support. Energy policy is not limited to fuel price and consumption. There are broader implications for industry competitiveness, job retention, and regional economic growth. The same investments and practices that enable energy efficiency also often improve productivity, plant reliability, emissions compliance, and workplace safety. The benefits of energy efficiency accrue to all industry stakeholders, including investors, employees, and surrounding communities.

Energy optimization has impacts both within and beyond the firm itself. Ultimately, well-run firms stay in business, retaining jobs and raising tax revenue to benefit regional economic development.

## **IV. SITUATION ANALYSIS**

This section reviews the policy and business climates that preceded the *Executives*

for *Energy Efficiency* program effort, along with the Steering Committee's assessment of the challenges and opportunities relevant to promoting energy efficiency to a CEO-level audience.

**Policy Climate, 2003.** In June 2002, the New York State Energy Planning Board released a comprehensive State Energy Plan that aims to "keep New York State in the forefront among states in providing its citizens with fairly priced, clean, and efficient energy resources" (NYSEPB, June 2002). An overarching goal of the State Energy Plan is to stimulate employment related to the growth of new energy technologies, services, and practices. Plan objectives include the development and promotion of advanced energy technologies. The Plan also calls for energy markets to take environmental concerns into consideration in the evaluation and trade of energy commodities. In addition, the Plan is intended to serve as "a blueprint to inform energy decision making and help ensure that customers have the ability to choose the energy products and services that best suit their needs." New York's State Energy Plan recognizes the economic benefits of secure, reliable energy supplies and predictable energy prices (*ibid*).

Central to this approach is the assumption that companies are fully aware of their energy-related needs and opportunities. But the *Executives for Energy Efficiency* program sponsors believe that such awareness is very low. Accordingly, this report addresses the potential to improve corporate-level understanding and support for energy-related opportunities to improve business performance. A complete assessment of energy-efficiency opportunities should also include the potential for managerial and behavioral activities that reduce energy consumption, while enhancing business profitability.

**Business climate.** External business and market factors affect the investment decisions made by corporate leaders. Outside factors imposed on firms include the fluidity of energy tariffs and prices as well as overall business cycles and market conditions. The Steering Committee elaborated on these economic factors:

- *Fluidity of tariffs.* Commercial and industrial utility tariffs are not stable. Financial returns of energy project proposals are made uncertain by sudden, unanticipated changes in tariff structures. In other words, an energy project that sufficiently meets investment criteria today may not do so after a tariff revision, which can come unexpectedly. This may result in top management reluctance to commit even to energy projects that currently show a net positive benefit. Also, some companies are discouraged from pursuing energy projects because they anticipate that utilities will escalate the demand charge portion of customers' bills to compensate for their lower energy consumption.
- *Fluidity of prices.* The Steering Committee recognizes that the business community's energy concerns are also related to the level and volatility of fuel prices. Stabilization of prices would offset much of the uncertainty that interferes with the full adoption of energy efficiency.

- *Fluidity of business climates.* Global competition, consumer confidence, accounting crises and investor scrutiny all pose challenges to capital project development. This stimulates caution in the pursuit of energy-related and other capital projects.

These factors may vary in their importance over time. Their net effect is to add uncertainty to a company's investment analysis of energy-efficiency initiatives. Corporate decision makers perceive business climate uncertainties as a form of business risk. Decision makers' perceptions of risk may become "hurdles" to proceeding with otherwise attractive investment proposals. A detailed discussion of hurdles follows in Section V, below.

## V. DEVELOPING AN OUTREACH FRAMEWORK

The Steering Committee observations regarding the promotion of energy efficiency initiatives are presented in this section. This includes a discussion of the "windows of opportunity" for maximizing CEO attention. A summary of challenges and opportunities culminates in the *risk frontier segmentation scheme*.<sup>1</sup> This is presented as the *Hurdles to Business Energy Efficiency* table in the Executive Summary. The table recognizes distinct types of decision making in companies' evaluation of energy projects.

**Windows of Opportunity.** Existing business issues provide a potential lead-in to making the case for energy efficiency. The Steering Committee identifies the following:

1. *Electric reliability.* Most manufacturers recognize the business implications of discontinuities in energy supply. Even if energy costs are a small percentage of overall expenses, an unplanned stoppage of supply can be disastrous in terms of lost revenue and related cost liabilities. The reliability issue is an opportunity to the extent that widespread adoption of efficiency measures will offset some of the capacity and discontinuity issues that arise from overburdened power transmission and distribution infrastructure.
2. *Facility metering.* Measurement and verification of value are critical to demonstrating business success. This also applies to energy, particularly as a process ingredient in industry. The practice of monitoring energy across stages of production is underutilized throughout industry. Data derived from such activity will: (1) provide quantitative substance that is better appreciated by corporate financial analysts, (2) establish the relationship between energy use and corporate financial results, and (3) capture corporate attention and motivate remedial action.
3. *Productivity problems.* Energy-efficiency practices and new technologies may

<sup>1</sup> "Segmentation" is an analytical concept borrowed from marketing discipline that systematically categorizes decision makers, per some salient characteristic. Segmentation is valid in this programmatic undertaking because: (1) CEOs are not homogenous in their perceptions of energy issues, and so (2) these differences are explicitly recognized and integrated into proposed strategy elements.

often be a solution to facilities that rely on older, failure-prone assets. Technology is also a frequent solution to competitive pressures and the need to optimize the performance of existing facilities.

4. *Episodic energy crises.* Fuel price spikes and turmoil related to discontinuities in supply are two opportunities to bring CEO-level attention to energy issues. Outreach should be intensified during such events.

**Functional Segmentation: An Initial Approach.** At the outset of their analysis, the Steering Committee offered a provisional framework for outreach to CEOs. This *functional segmentation* framework segmented the potential audience as follows:

- Small manufacturing
- Medium manufacturing
- Large manufacturing
- Small non-manufacturing
- Medium non-manufacturing
- Large non-manufacturing

This breakdown anticipated that each segment would have distinct perceptions, needs, and capabilities regarding energy efficiency implementation.

Subsequent analysis pursued an understanding of decision making attributes within the functional segments. The intent was to identify within each segment any dominant concerns, biases, or practices that would generally define that segment's receptiveness to energy-efficiency initiatives. Toward that end, a survey of energy project case studies was conducted. This involved a questionnaire administered in one-on-one discussion with willing Steering Committee members. That survey and a summary of the challenges that were developed from it appear in Appendix A.

This exercise found no causal relationship<sup>2</sup> between a firm's place in the functional segmentation, shown above, versus its receptiveness to energy-efficiency initiatives. But it did reveal an overview of the challenges, critical success factors<sup>3</sup>, methods for overcoming hurdles, and "lessons learned" at the *project implementation* level.<sup>4</sup> The survey results provided a key theorem, accepted by the Steering Committee:

**Theorem (1):** CEO receptiveness to energy-efficiency initiatives varies directly with tolerance for *business risk*.

**The Risk Frontier Segmentation Framework.** Steering Committee project experiences reveal a universal consideration of *business risk* as a factor in the acceptance of energy projects. The *risk frontier* segmentation presents a typology of risk factors as they impact the acceptance of energy projects. It is presented in Table 1, *Hurdles to Energy Efficiency*. A supporting theorem accepted by the Steering Committee is:

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<sup>2</sup> The sample data provided insufficient evidence to generate a reliable inference about the decision-making characteristics of the entire population of decision makers.

<sup>3</sup> A *critical success factor* is a situational precondition that, when in place, facilitates task achievement. Without such preconditions secured, task achievement is unlikely.

<sup>4</sup> The focus on *capital projects* is distinct from implementation of energy management programs, which establish staff roles, activity metrics, and accountability for results.

**Theorem (2):** Energy outreach is best served by using a message tailored to the decision maker's *risk perception profile*.

The term *risk perception profile* refers to the decision maker's reason for resisting what would be an acceptable efficiency project, as judged by standard investment or management criteria. These reasons are categorized in the text that follows as "hurdles" to energy efficiency.

Theorem 2 recognizes that business leaders' perceptions of risk may outweigh the evidence of value as demonstrated in project analyses. Accordingly, the *risk frontier segmentation* is offered as a framework for: (1) recognizing risk perceptions as they apply to any project, and (2) developing energy improvement strategies that recognize and alleviate risk concerns. Table 1 summarizes the hurdles to top-level decision-maker energy improvement decisions. It displays for each segment its defining (risk-oriented) business issue, critical success factors in approaching its incumbents with an energy-efficiency message, and suggested methods for securing support.

<b>Table 1: HURDLES TO BUSINESS ENERGY EFFICIENCY: The Risk Frontier Segmentation</b>			
<b>SEGMENT</b>	<b>DEFINING BUSINESS ISSUE</b>	<b>CRITICAL SUCCESS FACTOR</b>	<b>STRATEGY OR APPROACH</b>
1	Lacks organizational stability	Needs management stability, vision, champion	Ensure success by screening early program participants
2	Investment bias for core business	Responsive only to episodic energy crises	Step up program media/outreach during crises
3	Fixation on energy PRICE rather than EXPENSE	Lowering of energy prices/tariffs	Create "risk buster" tariff for qualified projects
4	Lacks technical appreciation	Needs case studies, proven precedents	Establish cadre of demonstration providers
5	Defers to production/business climate risks	Needs metering, documented hard data	Establish coalitions of first-movers to pool data, risk
6	Jaded by energy "snake oil" from the past	Need to secure sponsors/providers with credibility	Pre-qualify energy service companies (ESCOs), architectural and engineering consultants, and similar service providers
7	Conservative capital investment criteria	Availability of guarantees and financing	Apply funds to debt pools, guarantees, tax credits
8	Sensitive to fuel price/tariff risk	Ensure tariff/price stability	Create "risk buster" tariff for qualified projects
9*	Company compelled to adopt energy efficiency	Company edict, vision, or culture paves the way	Recognize, award, and promote to industry peers

SOURCE: Executives for Energy Efficiency Steering Committee and Staff

Segments one through eight describe anticipated risks that make energy improvement projects less attractive to decision-makers. The final segment (9) recognizes those firms that are actually proactive in adopting energy efficiency, due to some edict or regulation imposed on the firm, or by the principles of the firm's leadership.

Only three of the segments seem to require a solution predicated on price relief or economic incentives. The other six segments may be addressed by such tactics as participant screening, media promotion, industry liaison through dedicated staff, and collaborations of early adopters to pool risks and costs. The Steering Committee agreed that all nine segments would benefit from multiple strategies.

**Translating Risks into Solutions.** Each segment depicted in Table 1 represents a *risk perception* that can be addressed in motivating energy decisions. Different messages (or *business philosophies*, as discussed below in Section VII) may contribute to conveying energy solutions to the incumbents of each segment. For example:

- Segment 2, which avoids risk by concentrating investment on core processes, may react well to a message with content and timing that coincides with episodic energy crises.
- Segment 5 decision makers defer to production and business climate risks. The appropriate message in this case may emphasize the role of metering data and its quantifiable impact on financial results.
- Segment 8 is characterized by sensitivity to fuel price and tariff volatility. A message aimed at this segment could address energy efficiency's potential for hedging against price volatility.

## VI. PREPARATION FOR DELIVERY

This section outlines the Steering Committee's thoughts for organizing material in anticipation of any effort to promote energy efficiency to a management-level audience.

**Business Philosophy.** Any overture to the business community regarding energy efficiency requires a vision that speaks primarily to business interests more so than energy-efficiency goals. Having this vision will ensure that energy efficiency is not promoted as an end in itself, but as part of a solution to current business needs.

Suggestions for message elements include:

- bottom-line financial impacts
- improved productivity
- impacts on product quality.

An up-front and concise business philosophy should be accompanied by a description of energy efficiency's contribution to that vision. Secondary message elements may reference potential opportunities, metrics that illustrate the magnitude of savings, success stories from industry peers, and contacts for accessing technical guidance.

**Financial Incentive Packaging.** The functional segmentation scheme (manufacturing, non-manufacturing; small-medium-large) assists with crafting and delivering incentives for action. The steering committee recommends:

- identifying energy-efficiency initiatives that could be made eligible for financing via public benefit funds
- tax credits applicable to energy-efficiency capital investments
- tariff design conducive to energy-efficiency investment.

**Resource Packaging by Functional Segment.** Technical assistance required by facility personnel may be organized for delivery according to the same functional segmentation suggested for financial incentive packaging. A compendium of material could be assembled for easy access, perhaps on a compact disc, a website, or both. Recommended materials include:

- case studies
- facility metering and energy study opportunities
- sources of financial assistance
- third-party assurances and verification of commercial energy services.

## **VII. MESSAGE BEARERS AND CHANNELS**

The Steering Committee addressed methods or “channels” of communication as well as the identity of possible message bearers. Channels may be as crucial to effective outreach as the content of the message itself. Suggestions for outreach include:

- presentations to Chambers of Commerce
- working with energy champions within firms to promote the message upward to top management
- media placements in the appropriate business press
- assistance from public relations firms
- mentoring arrangements among companies

The Steering Committee cautions that outreach has to make the most of the limited time that most CEOs can devote to energy issues. For any CEO audience assembled by a business or trade group, energy messengers should consider quick presentations that offer pointed issues and questions to CEOs about energy use in their facilities. The point is not so much to generate answers to questions as it is to awaken CEOs to the scope of energy-related business impacts. CEOs might be encouraged to consider:

- energy expenses as a percentage of *controllable cost*, as opposed to *total cost*
- the non-energy costs and revenue losses associated with an interruption of energy supply
- the revenue growth implications of plant capacity recaptured through productivity and energy-efficiency improvements.

**Industry Sector Specialists.** It was recommended that organizations conducting

energy promotion prepare a cadre of specialists, each devoted to a particular industry sector. Each individual could be tasked with establishing a dialog with sector incumbents, getting to know their business needs and positioning energy solutions accordingly.

**Message partners.** A number of existing government-business partnership initiatives are dedicated to improving business performance. The U.S. Environmental Protection Agency's *Energy Star for Manufacturers* and the U.S. Department of Energy's *BestPractices* programs are leading examples. Their networks and experience may assist new energy-efficiency initiatives sponsored at the state or regional level. The calendars of events for these existing programs might be leveraged to launch regional initiatives. Similarly, Chambers of Commerce, business councils, economic development offices, trade associations, and non-governmental (advocacy) groups are potential message partners due to their existing networks and momentum.

Delivery of technical content can also benefit from partnering. The Steering Committee recognizes energy service companies (ESCOs), architectural and engineering consultants, and service vendors as potential partners who may advance energy-efficiency program material as a part of their regular interaction with energy-using facilities. These entities are particularly valuable since their working relationships put them in contact with the same corporate decision makers who will sign-off on energy projects.

**Agenda partners.** Energy efficiency may be advanced in concert with related agendas. The Steering Committee recognizes initiatives that support:

- the development of distributed generation
- greenhouse gas emissions benchmarking and abatement
- the emerging market for emissions trading credits.

## **VIII. CONCLUSIONS**

Energy efficiency has many benefits: overcoming energy supply constraints, improving market behavior, reducing environmental impacts, and contributing to regional economic development through the improved financial performance of businesses. The *Executives for Energy Efficiency* project offers a framework for motivating corporate decision makers to embrace energy-based solutions for their ongoing competitive challenges.

The Steering Committee provided valuable insight regarding the opportunities to advance energy efficiency. Their recommendations are a major step in that direction. Key elements include the construction of an appropriate message, including a concise business philosophy that relates energy efficiency to business priorities. Equally important are the message bearers and the availability of technical guidance that give CEOs and other decision makers the ability to follow up on energy opportunities.

Dynamic and unpredictable currents in the overall business climate add an element of uncertainty to an individual firm's analysis of investment decisions. These uncertainties manifest to the decision maker as business risk. The Steering Committee asserts that business decision makers face many hurdles caused by risk. The approach to efficiency advocacy offered by the Steering Committee is to recognize risk perceptions and devise solutions that respond to those risks. The Hurdles to Business Energy Efficiency (Table 1) offers strategies that are tailored to various types of perceived risk. While some approaches focus on energy prices or financial incentives, many hurdles may be addressed through a variety of tactics, such as media promotion, industry liaison through dedicated staff, and the use of recognition and awards for superior achievement.

## APPENDIX A

### Explanation of Hurdles to Energy Efficiency as Identified by the Steering Committee.

A survey of the entire steering committee asked each member to think of one past energy efficiency initiative with which they were familiar, and then posed these questions:

1. What was/were the barrier(s)?
2. How were these overcome?
3. Was there a specific piece of information, condition, etc. that made the difference, and what was it?
4. What is the lesson/advice learned from that episode?
5. What is a typical example in which a perfectly good project was rejected? Please explain why you think that was.

The barriers (hurdles) identified by this survey are summarized in this Appendix. Leading challenges are indicated by a strength and frequency index in Appendix C. Responses to questions 2-5 became input for the Hurdles to Energy Efficiency displayed in Table 1 of the text (p. 7).

**Production risk.** Energy projects that involve the implementation of major equipment, by virtue of their being new, impose a certain risk of disrupting well-established, facility-wide processes. To the extent that any new installation is operationally untested and unproven, the chance of production failure is a concern. Given these circumstances, decision makers tend to forgo certain energy savings in order to avoid the potential of much greater lost revenue from facility disruption.

**Economic conditions risk.** Uncertainty about future sales, consumer confidence, and general economic conditions may cause business doubt. In such a climate, capital investment (especially for non-core activities) is even harder to achieve.

**Division between corporate and plant cultures.** Corporate officers and plant staff can frequently be disconnected and have different goals. Differences in professional language and thinking may also stall energy initiatives.

**Lack of organizational stability.** Management disarray prevents some companies from doing much more than to survive from day to day. Without a vision, strong leadership, and shared sense of purpose, it is virtually impossible to get a company to systematically identify, prioritize, and implement optimizing initiatives of any kind.

**Core business bias.** With all else equal, many decision makers prioritize investment in core process activities rather than ancillary functions, like plant utilities, in terms of time and resource allocation. Concurrently, if energy-efficiency projects are considered, there is a tendency to enumerate only utility bill savings. Benefits related to productivity, avoided downtime, enhanced safety, and lower

insurance costs may not be captured. If added to the analysis, these issues may be enough to make a project proposal exceedingly profitable.

**“Not invented here” syndrome.** Some facilities limit themselves to home-grown solutions, somehow discounting initiatives that are proposed by “outsiders.” This could be viewed as an outgrowth of the desire to limit production risk.

**Impact on product or service quality.** Some manufacturers believe that their product quality or service is at risk if changes are made to their production process. It may be that distribution, retailing, customer service, and other logistics are optimized for the present process profile, to which a change would have an unforeseen ripple effect on pre- and post-process efficiencies.

**Energy price risk.** Energy consumers experience volatile movement in energy prices and tariffs. Project economics may work with today’s rates, but a change in energy prices could instantly make a good proposal turn bad, relative to other capital investment opportunities.

**Misunderstanding of energy markets.** In the wake of utility deregulation, many companies are still unprepared to navigate the reality of fully and partially opened commodity markets for energy.

**Bad past experiences with energy projects.** Since the first energy crises of the 1970s, a large number of energy management solutions have emerged. Some have been more successful than others, and a few have been failures that made some recipients even worse-off. People have long memories, which to this day can bar entry to consideration of energy-efficiency proposals.

## APPENDIX B

### EXECUTIVES FOR ENERGY EFFICIENCY Project Experience Questionnaire

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1. Which of these best describes the kind of organization that considered this project? (check one):

- small/medium manufacturer     small/medium institution  
 large manufacturer             large institution

Definitions:

- *small/medium* refers to a single-plant, single-location organization;
- *large* refers to a single plant within a multi-plant, multi-location organization
- *institution* is any organization not involved in manufacturing

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2. Which of these best described the key decision maker for this project? (check one)

- CEO/President or Owner  
 Other corporate-level officer  
 Director level  
 Facility manager  
 Team of managers, consultants or others

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3. Which of these best describes the energy improvement you recommended? (check one)

- a single, major capital investment item  
 a variety of equipment changes as a package  
 maintenance/behavioral changes  
 combination of equipment changes and maintenance/behavioral changes

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4. Which of the following client attributes describes the most decisive barrier(s) to this project's acceptance or rejection? (please indicate up to three choices in order of importance with 1, 2, and 3)

- lack of management organization, authority, ability to act, etc.  
 capital budgeting criteria, priorities, and/or process  
 concern with volatility in energy prices or tariffs  
 perception that the energy project would compromise core products, service, or production  
 lack of decision-maker appreciation of the technology or energy management activity  
 suspicion of energy projects in general due to bad experiences in the past  
 poor prevailing economy at the time

Or:

- The client proactively sought energy solutions due to regulation, control, corporate vision, or some other compelling reason.

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5. How would you describe the most important factor(s) that secured (or would have secured) approval of this project? (please indicate up to three choices in order of importance with 1, 2, and 3)

- rebates, grants, subsidies, financing, etc.  
 hard numbers or metering data that prove operational/financial impacts  
 assurance as to energy price/tariff stability  
 performance guarantees, or a guarantee from the *right person*  
 prestige/reputation of solution provider(s)  
 knowledge of successful precedents  
 the presence of a dedicated project champion within the organization  
 a change in business culture among management, staff, or both  
 recognition or awards from industry, the government, or others

## APPENDIX C

### Calculation of “Frequency and Strength” Indices Relative Strength of Energy Efficiency Hurdles

The *Executives for Energy Efficiency* Steering Committee collectively generated a list of barriers (hurdles) to energy efficiency (see Appendix A). The ensuing task was to determine how frequently, and with what weight, each of the barriers influenced decision-maker outcomes. To achieve this, a questionnaire was circulated to three Steering Committee members, all engineering consultants, who provided a total of 31 case histories.<sup>5</sup> The respondents were asked to assign a ranking (1, 2, or 3, with “1” being most important) to the top three barriers that applied to each case that they provided. The questionnaire reconstituted the list of barriers as offered by the larger Steering Committee, and accommodation for write-in responses was provided (see Appendix B).

Note that this relatively small sample size provides limited inference about the general population of decision makers. For each case (identities kept confidential), the case suppliers were asked to identify the three most decisive hurdles to that project’s acceptance or rejection.

To index these responses, the formula shown below was devised. It represents the importance of a single variable (barrier) as a function of its frequency of citation and its ordinal ranking of importance:

$$\left\{ 1 - \left[ \left( \frac{\sum X_i}{n^2} \right)_z \div \sum \left( \frac{\sum X_i}{n^2} \right)_{All_z} \right] \right\} \times 100$$

Where:

$X_i$  = individual barrier incidence to which an ordinal ranking (1,2, or 3) was assigned;

$Z$  = a variable describing a discrete type of barrier (from Table 1); and

$n$  = the frequency with which a ranking was assigned to a variable “z.” The value “n” is squared in order to weight the average.

The analysis of 31 cases provided the results summarized in Table 2 (next page).

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<sup>5</sup> Bob De Saro of Energy Research Company, Terry Madden of O’Brien & Gere, and Mark Tebbano of Clough Harbour & Associates. The breakdown of energy-efficiency solutions from the 31 cases is as follows:

- 16 proposed a single, large capital item
- 8 recommended a package of equipment types
- 5 represented a combination of equipment and maintenance practices
- 2 were feasibility studies.

**Table 2:  
RELATIVE STRENGTH OF ENERGY EFFICIENCY HURDLES  
From NY Executives for Energy Efficiency Sample of 31 cases**

TYPE OF HURDLE (Corresponds to a <i>Risk Frontier</i> Segment)	FREQUENCY & STRENGTH INDEX <sup>1</sup> (100 = absolute)
1. Capital budgeting process and criteria	97.6
2. Lack of organizational stability	94.2
3. Risk of adverse impact on product quality and service	93.8
4. Lack of technical appreciation on the part of top management	90.3
5. Bad prevailing economy at decision time	83.5
6. (Tie) Cost and risk associated with new technology	70.3
6. (Tie) Low priority of energy projects relative to core business	70.3

SOURCE: *Executives for Energy Efficiency* Steering Committee and staff analysis.

Highlights of the sample study suggest that capital budgeting criteria and project selection processes pose the primary business hurdles to adopting energy-efficiency initiatives. Note that capital budgeting is a multi-faceted issue. It may pertain to any of the following:

- Some energy-efficiency projects do not have a rate of return to compete with other project opportunities. Many of these project justifications may understate the full range of non-energy benefits, i.e., they claim only fuel bill impacts while ignoring waste and material savings as well as new revenues made available through higher capacity utilization.
- Capital budget processes tend to favor core activities over energy projects for a variety of reasons. This may be reflected in a shorter payback requirement being assigned to “non-core” proposals such as energy improvements.
- Lines of accountability within a corporation can interfere with making truly effective capital budgeting decisions. For example, incentives and rewards may accrue to a corporate energy management division instead of the facility managers who have to scramble to meet energy targets with existing resources.

Of the remaining top hurdles suggested by the sample, two relate to corporate or management characteristics. They are (#2) lack of organization and (#4) the lack of technical appreciation on the part of top management. Another two are clearly operations-oriented barriers: (#3) the risk of adverse impact on product quality and (#6) the risk of disruption associated with new technology implementation. These items may be interpreted as a joint consequence of both operations and top management thinking.

These sample findings are paralleled by the results of a 2003 survey of over 100 facility managers (Thumann, et. al., 2003). Respondents to that effort collectively indicated that the top reasons for not applying energy-efficient technologies were *lack of capital or utility incentives* (89.7 percent) and *lack of trained staff to perform implementation* (10.3 percent).

An analysis of challenges must appreciate the roles of the decision makers involved in each case. In the Steering Committee sample of 31 energy implementation cases, the primary decision makers were:

- Facility or engineering managers (13 cases)
- Non-CEO corporate officers (11 cases)
- Directors (6 cases)
- CEO/President/Owner (1 case)

Given the disparity of organizational titles among decision makers, a few implications are worthy of additional consideration, specifically:

- the manner in which CEOs delegate decision making to others
- the role of a CEO within an organization's decision team

Also, the nature of any CEO's position relative to the overall corporate structure has very different implications for perception of business risk and the CEO's ability to fulfill his or her performance objectives. For example:

- CEO responds to a Board of Directors,
- CEO co-leads with a President,
- the President and CEO are combined in one position, or
- the CEO/President/Owner are all one-in-the-same.

These variations in corporate format should be considered when designing outreach to CEOs.

## APPENDIX D

### Calculation of “Frequency and Strength” Indices Critical Success Factors for Energy-Efficiency Projects

The same sample of 31 cases referenced in Appendix C presented respondent opinions as to the critical success factors that secured (or would have secured) approval of the energy-efficiency proposal that was the subject of each case. The questionnaire offered a list of critical success factors as originally suggested by the overall Steering Committee. The methodology for index calculation is exactly as in Appendix C, except:

Z = a variable describing a critical success factor (see Table 3, below).

Summary results from the 31 cases are as follows:

<b>SUGGESTED CRITICAL SUCCESS FACTOR</b>	<b>FREQUENCY &amp; STRENGTH INDEX<sup>1</sup> (100 = absolute)</b>
1. Provision of rebates and grants	98.8
2. Participation of project champions within companies	97.6
3. Availability of metering data	96.7
4. Change of corporate culture	85.0
5. Continuity of administration	80.0
6. Knowledge of precedents or case studies	75.0
7. Performance guarantees	70.0

SOURCE: *Executives for Energy Efficiency* Steering Committee and staff analysis.

According to the sample data, the strongest precursors for the successful implementation of capital improvement projects are financial incentives, the presence of internal project champions, and the use of metering data. Corporate culture and administrative continuity are also applicable to adopting efficiency procedures and practices. Knowledge of precedents and the availability of performance guarantees may play a role in some cases.

It is important to note that these indicators are generalized across many cases. Each instance of project implementation is unique, so project advocates should be prepared to seek and interpret the elements that apply to each situation.

Similar considerations for efficiency program outreach include the following:

- Rebates to industry are insufficient for securing lasting change in energy-use behavior. A change in corporate culture will be necessary.
- Efficiency promotion should include non-energy benefits, such as enhanced productivity, workplace safety, and increased capacity utilization.
- Efficiency benefits should be expressed to corporate decision-makers in financial terms.
- Companies should be encouraged to announce their energy successes in corporate and shareholder communications. Rewards may be offered to key staff as an incentive for continued improvement.
- Some companies may appreciate press coverage for their achievements.

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