

Non-Energy Benefits from Commercial & Industrial Programs: What Are the Benefits and Why Are They Important to Participants?

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ABSTRACT

This paper discusses the non-energy benefits of energy efficiency programs on commercial and industrial customers taking part in Wisconsin's Focus on Energy programs. The findings presented in this paper are summarized from a series of studies published between January 30, 2003 and October 20, 2003. These studies focus on the non-energy benefits of programs offered across all market sectors served by the Focus on Energy Programs. However, the contents of this paper present only the non-energy benefits to the commercial and industrial business sectors.

The non-energy benefits presented in this paper are grouped into three different types of business-service configurations, each focusing on a different type of program and the non-energy benefits experienced as a result of their participation, including: 1) The non-energy benefits on the businesses that partnered to deliver residential services. These commercial businesses report significant non-energy benefits associated with the service offerings provided through the programs; 2) The non-energy benefits of selected educational workshops and conferences serving the commercial and industrial sectors. These programs offered training on how to incorporate energy efficient practices into their business operations; and 3) The non-energy benefits on participants in the Business Programs. These programs offered incentives to install energy efficient equipment in their facilities.

The findings presented in this paper demonstrate the power of energy efficiency programs to provide much more than energy savings, documenting that public benefits programs provide a wide range of benefits.

Introduction

In 2001 the State of Wisconsin launched its "Focus on Energy" (Focus) public benefits energy efficiency programs. In general, these programs serve both residential and non-residential customers of the state's regulated utilities. Program services include a wide range of programs that target specific markets, including non-low-income residential, low-income residential, commercial, industrial and agricultural markets. These programs offer a wide range of program services including information and education programs, incentive programs, and programs incorporating market transformation components. However, these programs primarily focus on acquiring energy resources in the short-term through the installation and use of energy efficient technologies, and through energy related behavior changes. Focus programs are offered through non-profit program administrators who provide services directly to the target sectors or who contract with private firms to offer services to the target sectors.

This paper summarizes the program's non-energy benefits on commercial and industrial businesses that have partnered to offer residential services or who have participated in one or more of the business programs. The paper focuses on the direct benefits to the businesses and excludes a discussion of the benefits to the utility or to society in general. This exclusion is not

to suggest that these benefits are not important, but rather to focus the paper on the benefits to the businesses themselves. Readers who are interested in the societal benefits of these programs are referred to two recent publications that deal with the environmental benefits of the programs and the benefits of the programs on Wisconsin's economy, including the creation of jobs within the State (Erickson 2004; Ward 2004). The Erickson paper is presented in these proceedings, the Ward publication is available through the State of Wisconsin's Focus on Energy evaluation publications.

The non-energy benefits reported in this paper are summarized from a series of reports published from January 30, 2003 to October 20, 2003 (Hall 2003a, 2003b; Talerico 2003). These studies focused on the non-energy benefits of programs offered across all market sectors served by the Focus on Energy Programs. The non-energy benefits presented in this paper cover three different programs, offering different services to different markets. These include:

1. The commercial businesses offering services through Focus on Energy's residential programs. The type of businesses and programs covered in this section include:
 - a. *Wisconsin's ENERGYSTAR® Homes (WESH)* program, in which building contractors build new homes to meet the program's ENERGYSTAR® specifications. In this program an inspection process is used to certify a home as a WESH home. The certification process involves reviews of construction plans and on-site visits to insure that homes are built to WESH specifications.
 - b. *Home Performance with ENERGYSTAR® (HPwES)* program, in which trained professional inspectors work with homeowners to identify ways to make their existing home more efficient and help them find contractors to make the improvements to their home.
 - c. *Apartment and Condo Energy Services (ACES)* program, in which owners of apartments can obtain assessments of their facilities with recommendations for incentivized energy efficient equipment that can be installed in their buildings.
2. The commercial and industrial customers who have participated in one of the Focus's educational workshops and conferences and the non-energy benefits experienced as a result of using the knowledge and skills obtained. The workshops and conferences covered in this paper include:
 - a. *Building Expectations Conference: High Performance Buildings, High Quality Indoor Spaces*. This two-day conference demonstrates ways in which building owners and managers can increase the energy efficiency and environmental conditions of their buildings. The conference provides sessions on high-efficiency lighting systems and retrofit designs, improving air quality using energy efficient practices, improving building airflow and air movement management, and presenting green building designs. The conference also offers tours of facilities implementing one or more of the practices covered in the conference.
 - b. *Energy Rx: Measurement and Diagnostic Tools Workshop*. This half-day workshop demonstrates energy management and diagnostics tools and provides attendees with hands-on experience in how to use the tools to increase the energy efficiency of their facilities. The workshop focuses on demonstrating the correct use of the tools and explaining how tools can assist in quantifying energy usage and calculating energy savings potential.

- c. *Advanced Management for Compressed Air Systems Workshop*. This one-day workshop focuses on how to design, configure and maintain compressed air systems to achieve maximum energy savings, improved system performance and lower operating costs.
3. The commercial and industrial businesses participating by purchasing and installing one or more of the incentivized measures, including the following types of equipment.
- a. Lighting systems and system upgrades
 - b. Heating ventilation and air conditioning
 - c. Compressed air systems
 - d. Commercial washers
 - e. Motors, pumps and drives
 - f. Boilers
 - g. Refrigeration systems
 - h. Building envelope improvements and upgrades
 - i. Heat recovery and cogeneration
 - j. Water heater measures
 - k. Energy management systems
 - l. Daylighting

Evaluation Approach

For each of the programs evaluated, the overall approach to identifying and quantifying the non-energy benefits was identical, with only minor changes in the way in which the data were collected. In summary, TecMarket Works worked with the Focus on Energy program evaluation, management and implementation leads to identify and rank a series of potential program-specific non-energy benefits that could be addressed in the study. The ranking was necessary because this process produced a long series of potential benefits for each program that needed to be refined for the data collection phase. TecMarket Works then developed draft interview instruments to be used for each program. These instruments were then reviewed by the evaluation, program management, and program implementation leads, leading to the finalization of the field instruments. These instruments were then used to guide non-energy benefits interviews within each of the program groups. Table 1 provides a description of the types and number of individuals interviewed for each program included in the study. In each case the participants targeted represented a census of the participant population for the selected events or programs (instead of a sample).

Table 1. Individuals Interviewed to Assess Non-Energy Benefits

Evaluation Target	Number Interviewed
Wisconsin Energy Star Homes Contractors	28
Home Performance with Energy Star Contractors	26
Apartment and Condo Owners and Managers	21
Building Expectations Conference: High Performance Buildings	26
Energy Rx: Measurement and Diagnostic Tools Workshop	20
Advanced Management for Compressed Air Systems Workshop	15
Business Programs Participants	74
Total Interviews	210

Research Results

The following sections of the paper present the research results across the three program areas.

Businesses Participating in Residential Program Offerings

The evaluation of the commercial businesses offering residential services involved seventy-five interviews across the three program areas included in the research. The results of the interviews for each of the three program areas are presented below.

Wisconsin Energy Star Homes Contractors

Contractors taking part in the Wisconsin Energy Star Homes program report a wide range of non-energy benefits associated with the service(s) they provide as a WESH ally. Ninety-three percent of the interviewed partners said they have increased their knowledge of energy efficient practices, adding to their ability to provide their customers with valued services. It is not surprising then that 86% of these contractors also said that they have or are now more likely to promote themselves as an energy efficient homebuilder. Sixty-four percent indicated that the program has increased the value to their firm associated with promoting energy efficient homes in the market.

Contractors indicate that their WESH homes are better homes, improving the products their firm places in the market. For example, contractors report that the homes they build are safer and more durable as a result of building to the WESH specifications. Seventy-five percent said the program has increased the safety aspects of the homes they build and 61% said they now provide a more durable home. Many contractors (32%) say they now build a better home overall. These aspects make the homes easier to sell, with 39% saying they have an easier time selling their WESH homes compared to the non-WESH homes they build.

Other non-energy benefits include bringing new customers into their business, receiving fewer customer callbacks on their homes, providing improved corporate image and better public relations, among other benefits. Table 2 presents the non-energy benefits reported by contractors building WESH certified homes for Wisconsin's Focus on Energy programs.

These results indicate that the commercial contractors who partnered to offer program services have obtained substantial non-energy benefits as a result of their participation, and that many of these benefits not only improve the homes they build, but also improve their standing in the market. These benefits also suggest that the adoption of WESH-associated skills or using WESH specifications may have a significant market transformation effect, as those acquired skills or use of WESH specifications are transferred to other homes they build, or in the homes built by their competitors who must keep up with changing market practices caused by the WESH program.

Program administrators who must find and enroll partners to grow the program will want to use these results when they approach contractors who may want to become involved in the program specifically as a result of the non-energy benefits.

Table 2. Benefits of WESH Participation

Non-Energy Effect Reported	Percent Reporting
Increased our knowledge of energy efficient practices	93%
More likely to promote themselves as energy efficient home builder	86%
Increased the safety aspects of the home	75%
Became a more valuable component of our business	64%
Increased the durability of the home	61%
Makes it easier to sell the homes	39%
Increased the diversity of homes offered or equipment configurations	36%
Build a better home showing the market we are a quality builder	32%
Build a more comfortable home for customers	29%
Brought in new customers to our business	21%
Updated/modernized our home construction practices	18%
Provides a higher resale value for our customers	18%
Receive fewer call-backs to fix a problem in the home	18%
Improved indoor air quality for our customers	14%
We are more educated about energy efficient building practices	14%
Improved corporate image, better public relations	14%
Increased the number of homes we sell	7%
Increased our share of the market	7%

Home Performance with Energy Star Contractors

Contractors taking part in the Wisconsin’s Home Performance with Energy Star program also report a wide range of non-energy benefits associated with the services they provide as a HPwES ally. Most interviewed contractors report that they are able to provide their customers with a home that is more comfortable, safer and more durable, enhancing their image in the market. Specifically, 88% said they provide a more comfortable home to their customers, 85% said their homes are safer and 84% said that their homes are more durable. It is not surprising then that 65% of these contractors said that they have an improved public image as a result of their association with the HPwES program.

These aspects have caused new customers to come to HPwES contractors, increasing their business and the associated sales from their business. Fifty-four percent of contractors said that the program has caused new customers to come to them; with 44% indicating the program has increased sales levels and market share (35%). Other non-energy benefits include decreased numbers of customer callbacks, being seen as a more credible builder, and increased positive feedback from their customers. They also report that the program provides a reduction to their customer’s utility bills, a valued service to customers.

Table 3 presents the non-energy benefits reported by contractors building and retrofitting HPwES homes for Wisconsin’s focus on Energy programs.

These results indicate that HPwES contractors experience many of the same benefits as the WESH contractors including better homes and more business. These results suggest that HPwES may also have a significant market transformation effect beyond the customers that use HPwES services.

As with the WESH program, understanding and using these benefits to enroll additional contractors in the HPwES program can be an effective way to grow the program. Contractors are more likely to become involved when they see the type of non-energy benefits the program provides.

Table 3. Benefits of HPwES Participation

Non-Energy Effect Reported	Percent Reporting
Provide customers with more comfortable home	88%
Provide customers with a safer home	85%
Increased durability of our homes	84%
Improved image and public relations	65%
Caused new customers to come to us	54%
Increased company sales	44%
Build or provide a better performing home for customers	35%
Increased market share	35%
Lowered bills for our customers	23%
Decreased customer call backs	19%
Known as a more credible & knowledgeable builder	15%
Obtained training and updated techniques	15%
Positive feedback from the customer	8%

Apartment and Condo Owners and Managers

Owners and managers of apartment buildings participating in the ACES program also report a wide range of non-energy benefits associated with the service and equipment they receive through the program. Interviewed participants report being more informed about energy efficient equipment and product choices, making it easier to identify or locate energy efficient equipment for all of their facilities. Specifically, 57% said that they are more informed about energy efficient equipment choices and 43% said it is easier for them to identify and locate this equipment. Fifty-two percent of participants interviewed said that the program has allowed them to increase the durability of the equipment in their facilities, reducing repair and maintenance costs for 38% of the participants and generating fewer tenant complaints for 33%. One-third of the owners also indicate that they experience fewer safety violations, with the program helping to reduce the costs associated with these violations. Twenty-nine percent report that their property values have increased as a result of the actions taken, and their tenants (33%) are more satisfied with their units. Other non-energy benefits include reduced levels of dangerous gases in their buildings, improved customer response associated with showing their buildings and, for a few, the ability to charge higher rental rates. Table 4 presents the non-energy benefits from participating in the ACES program.

These results indicate that the owners of rental properties who are served by the program obtain significant non-energy effect as a result of their participation. These results also strongly suggest that these benefits have the potential to reduce energy consumption within both participating and non-participating facilities as the program-induced methods and equipment are used in non-participating facilities. These results also suggest that energy efficiency may not be the primary result from taking the actions for many of the participants, but rather an important

secondary benefit. Program implementers will want to use these results in their marketing materials to fully convey the benefits of program participation to acquire remaining potential.

Table 4. Benefits of ACES Participation

Non-Energy Benefit Reported	Percent Reporting
More informed about energy efficient products	57%
Increased durability of equipment in facilities	52%
Better able to identify and locate energy efficient equipment	43%
Have more comfortable units	43%
Reduced repair and maintenance costs	38%
Receive fewer complaints from tenants	33%
Fewer safety violations and associated costs	33%
More satisfied tenants	33%
Increased value of the property	29%
Able to improve the air quality in building	24%
Can offer rental units with more control over the utility bill	19%
Can offer units with reduced levels of dangerous gases (CO/CO ₂)	14%
Easier to show and rent units	10%
Able to ask higher prices for units	10%
Reduced water and sewer costs	10%
Lowered insurance costs for building	10%
Reduced tenant turnover or increased occupancy rate	5%
Increased market share	5%

Businesses Taking Part in Focus Educational Programs

The evaluation of the Focus on Energy educational workshops and conferences and the identification of their associated non-energy benefits involved sixty-one interviews with attendees from three of the educational efforts. In this study the research focused on a specific set of benefits identified during the benefit prioritization meetings held with program evaluators, managers and implementers. The results of these interviews are discussed in the following paragraphs and are displayed in the table following the discussion.

Building Expectations Conference

Almost one third of the attendees of the Building Expectations Conference indicated that the conference provided training that helped them take actions that significantly increased levels of employee morale and satisfaction. Thirty percent of attendees interviewed said that satisfaction and morale had increased. Likewise, 30% also indicated that they were able to take conference-learned actions in their buildings that decreased their non-energy operating costs, and 19% they had taken actions that decreased maintenance costs in their facilities. One of these attendees reported that the conference brought the awareness of a problem with dampers not working properly. According to this attendee, fixing the problem was a direct result of attending the conference and was worth \$150,000 per year to the company, more than offsetting the entire cost of the conference. Attendees also reported that the conference provided information to take actions that increased productivity (19%), increased equipment life (19%), decreased waste

generations (15%) and reduced injuries or illness in their facilities (15%). Other benefits included reduced personnel needs and a reduction in defects and product error rates. These benefits were reported within one year of conference attendance. As the conference attendees are able to use more of the information obtained, this impact should increase.

Energy Rx Workshop

Attendees of the Energy Rx Workshop reported lower levels of non-energy benefits than the Building Expectation Conference, however several of the benefits studied did apply to small percentages of attendees. Ten percent of the attendees reported benefits in the areas of increased morale and employee satisfaction, decreased operating costs, and decreased maintenance costs. Five percent reported the workshop helped decrease waste generation and personnel needs.

Advanced Management of Compressed Air Systems Workshop

Of the three education efforts studied, this workshop experienced the highest level of non-energy benefits, with significant benefits across all but one of the benefit categories. Almost half of the attendees (47%) reported that the workshop helped their company decrease their operating costs. Forty percent reported a decrease in maintenance costs from less system down time, fewer problems and repairs, and less usage of the system. Thirty-three percent reported increased productivity with the improved air pressures and less air waste; and 27% reported that employee morale has increased as a result of increased power to the machines, less down time, and “no smell from leaking oil.” Twenty percent of attendees interviewed reported decreased waste in their facilities and fewer defects and product error rates. Other benefits included increased equipment life and decreased personnel needs. In addition, 13% reported increased sales as a result of improved compressed air systems.

Table 5 provides a summary of the non-energy benefits reported by attendees of the three conferences and workshops examined in this study.

Table 5. Percent of Attendees Reporting Experiencing a Benefit As a Result of Attending an Educational Workshop or Conference

Non-Energy Effect	Building Expectations attendees (n=26)	Energy Rx attendees (n=20)	Advanced Management Compressed Air attendees (n=15)
Increased employee morale and satisfaction	30%	10%	27%
Decreased non-energy operating costs	30%	10%	47%
Decreased maintenance	19%	10%	40%
Increased production or productivity	19%	0%	33%
Increased equipment life	19%	0%	7%
Decreased waste generation	15%	5%	20%
Decreased injuries or illness	15%	0%	0%
Decreased personnel needs	11%	5%	13%
Decreased defects and product error rates	4%	0%	20%
Increased sales	0%	0%	13%

As with the residential programs, program administrators will want to have a clear understanding of the non-energy benefits associated with taking part in Focus’s educational services. These results provide case-testimony of the wider range of program benefits beyond

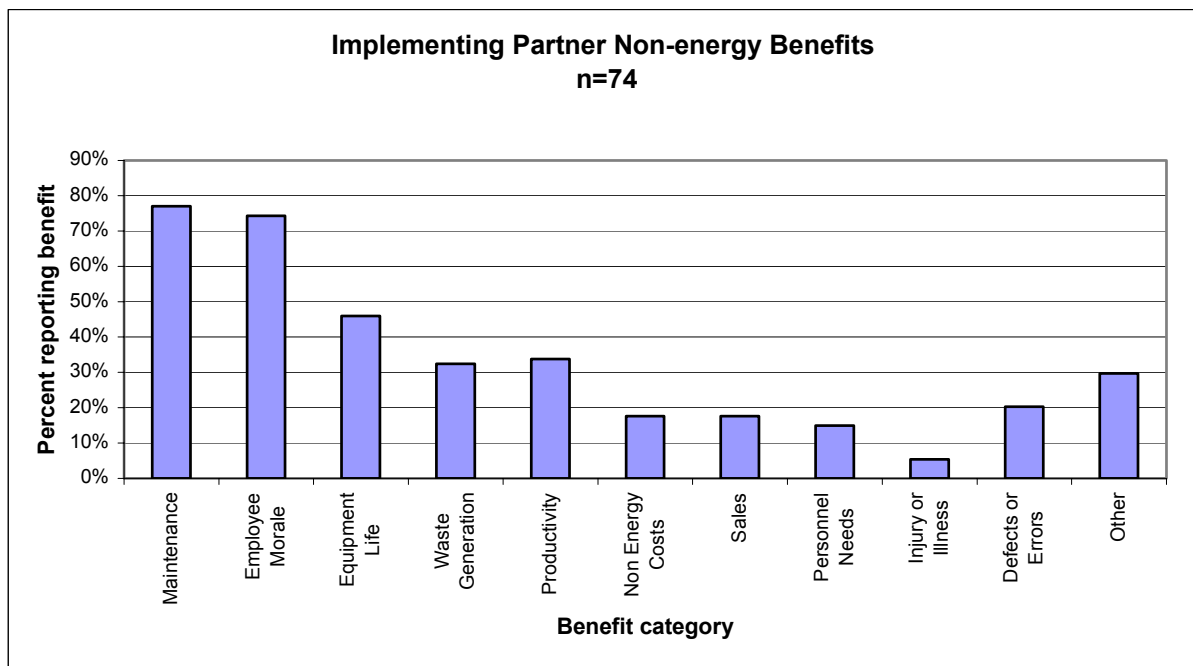
energy savings. If potential participants have a better understanding of the range of benefits associated with specific educational events, attendance in these events can be expected to increase along with an increase in the use of the skills and information learned to save energy and reduce greenhouse gas emissions.

Businesses Installing Energy Efficient Equipment

The evaluation of the Business Programs non-energy benefits involved seventy-four interviews with participants who had purchased and installed one of the program-covered technologies. The results of the Business Programs Participant interviews are presented below.

A change in maintenance costs, and in employee morale and satisfaction were the most common benefits in which implementing Partners reported a change, with about 75% of all interviewees reporting these benefits as being a direct result of the measures installed through the program. Forty-six percent of all interviewed participants report that the program measures have extended the life of the equipment they have, with 34% indicating that the productivity of their business has improved as a result of the program measures. A similar amount (32%) said that they had reduced the amount of waste products generated in their facility, and 20% said that program measures had decreased product defects and error rates. Other non-energy benefits include lower non-energy operating costs, reduced personnel needs, increased sales levels and reduced illness and injury rates. The following figure presents the percent of participants reporting the non-energy effect on their business.

Figure 1. Partners Reporting a Change

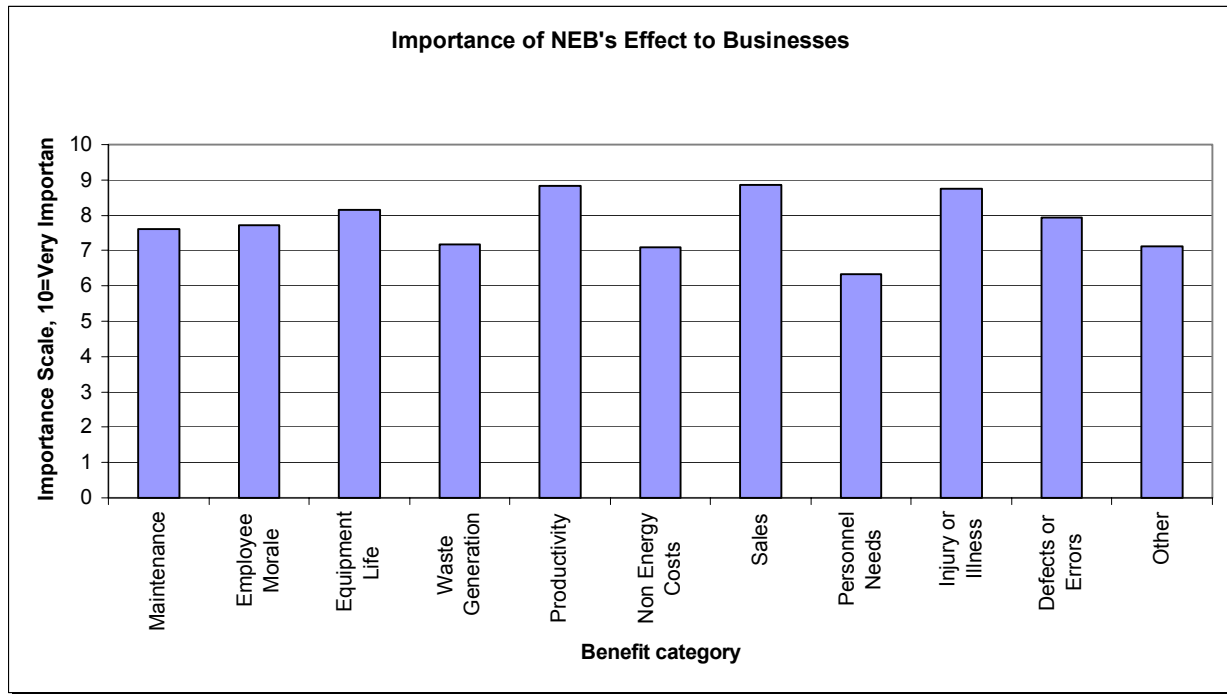


Importance of NEBs to Businesses

We also asked participants how important each of these benefits were to them and their operations. To measure importance we used a 1 to 10 scale, with 1 meaning of little importance,

and a 10 meaning extreme importance. Overall, the changes were considered to be quite important to most of the implementing partners. The following graphic shows the average level of importance for each of the benefits measured. Effects on productivity, sales and illness and injury rates scored as the most important to these participants, as these effects directly influence profits. Next in importance are improved equipment life, reduced defects and error rates, improved employee morale and satisfaction, and reduced maintenance costs. Of lower importance (but still important) are reduced non-energy costs and reduced personnel needs. It is interesting to note that reduced costs are rated much lower in importance to these participants than most other benefits. These data indicate that dollar savings from the actions installed are not as important to these customers as program benefits that influence production. Program administrators need to understand that saving money will often not be as important to these customers as benefits that directly influence profits. While these are clearly related concepts, it is more important to show potential participants how program measures can influence profits than it is to show them how much money they can save through measure installation.

Figure 2. Importance of the Benefit Change to Business Operations



Value of the Benefits to Participants

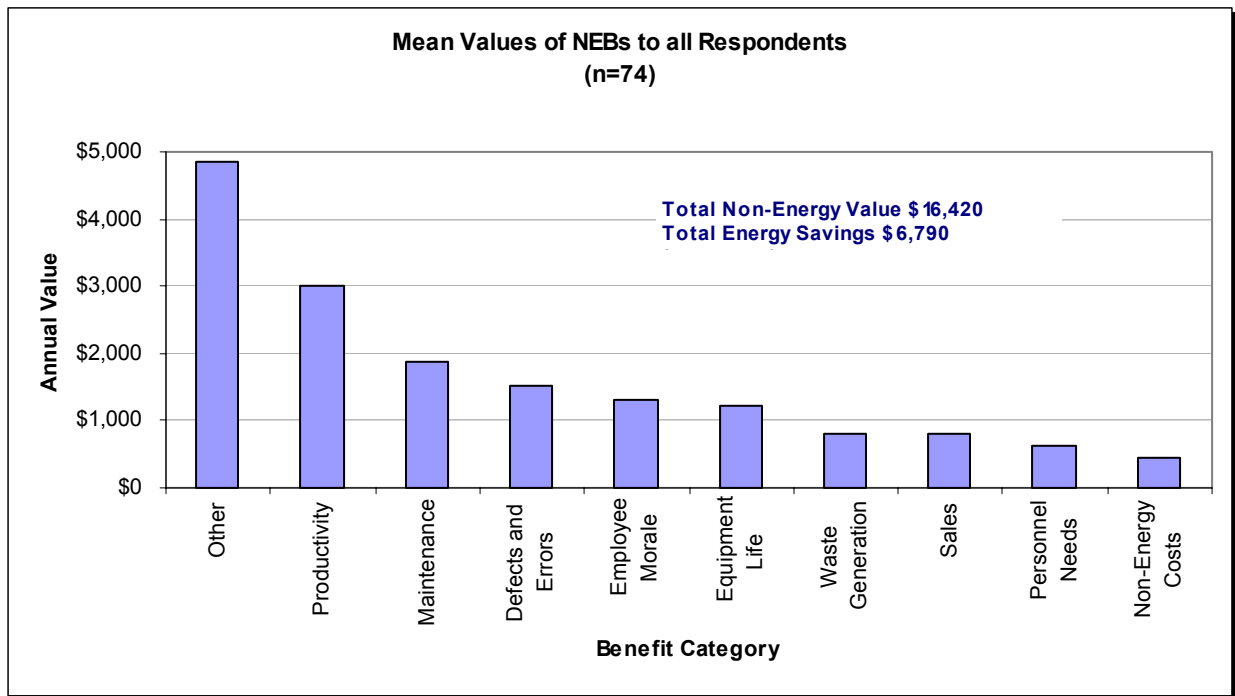
Interviewed participants value the non-energy benefits of installed program measures at a level of value more than two and a half times greater than the program's energy savings. Annual program energy savings are estimated in the Focus tracking system at about \$6,790 per interviewed participant, however the total value of the non-energy effect is valued at about \$16,420.¹

¹ Assumes that participants who said that the effect applied to them, but who were unable to provide an estimated value for the effect would value that effect at the average value provided by those that could estimate the value.

The following graphic provides the estimated value of the non-energy benefits for the interviewed participants. It is interesting to note that the largest effect category is not any of the categories targeted in the research, but was reported by the participants as “other” benefits not specifically targeted in the interview protocol. Other benefits included items such as increased goodwill with customers, more aesthetically pleasing buildings, decreases in storage space needs, and added usable square feet in buildings. The highest valued item in this category was associated with adding useable square feet to the office that was previously not used because of poor environmental conditions that improved as a result of the measures installed.

The following graphic displays the value that interviewed participants place on the non-energy benefits of the program. All values are average annual values per participant and include both the negative and positive values for each reported benefit. The benefit listed as “personnel needs” includes a need for additional or fewer labor hours as a result of the energy efficient practice. The benefit listed as “non-energy costs” includes increases or decreases in operating costs that are not included in the other benefit categories.

Figure 3. Mean Values for Non-Energy Benefits



The following table provides a presentation of the non-energy benefits measured in the study, the percent of customers indicating that the effect applies to their business and is a direct result of the measures installed, and the average value of the benefit. “Other” includes such items as additional office space, customer satisfaction, and less deterioration in lighting quality.

Excluding these participants from the analysis results in an average value of \$6,560 per participant. Setting this group’s benefits value to zero results in an average value of \$4,570 per participant.

Table 6. Summary of Reported Values for Non-Energy Benefits

Non-Energy Benefit	Percent Reporting a Change	Mean Value
Maintenance	77%	\$1,866
Employee Morale	74%	\$1,301
Equipment Life	46%	\$1,210
Productivity	34%	\$3,000
Waste Generation	32%	\$813
Defects and Errors	20%	\$1,510
Non-Energy Costs	18%	\$459
Sales	18%	\$791
Other	18%	\$4,853
Personnel Needs	15%	\$617
Injuries or Illness	5%	\$0
Total Benefits per Installed Technology		\$16,420

Summary

The non-energy benefits of energy efficiency programs represent what can arguably be called the most important results for the customers who participate, and for many, or perhaps most, the value of the non-energy benefits can be far greater than the energy savings. These findings are consistent with other similar research in the commercial and industrial sectors. In a study conducted by the United States Environmental Protection Agency and Lawrence Berkeley National Laboratory (Worrell et al 2001) researchers found that across fifty-two different in-depth case studies of industrial customers who had installed energy efficient technologies, on average, the value of productivity gains from those changes significantly exceeded the total value of the energy savings. These findings are not rare, but are indeed the norm (Boyd 2000; Chisti 1994; Elliott 1997; Ingram 1995; Lilly 1999; Mills 1994; Pellegrino 1997; Pye 1998; Pye 1999; Quinn 1997; Romm 1994; USDOE 1997).

Non-energy benefits research is not only important for understanding how our programs affect participants, allies, and the market in general. But should be considered valuable information around which programs and program marketing strategies should be designed. Program administrators and implementers who want to increase both enrollments and ally support for their programs, will want to be fully informed about the non-energy benefits their programs provide to allies, but especially for the participants. Studies that help program designers, administrators, and implementers understand the full range of program benefits can be used to increase the number of allies supporting or offering the program, can increase the number of participants enrolled in the program, and can speed the movement of the market toward increased energy efficiency. The authors of this paper suggest that the adoption of energy saving measures, or the transformation of markets to be more energy efficient may be, at best, a difficult task unless there are substantial non-energy benefits associated with the program or the product offering. Understanding the non-energy benefits and their value in the market is a key step in designing and offering programs that increase energy savings and move markets toward increased energy efficiency.

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