

Taking the Ego out of Efficiency: Success Using Advanced Buildings in a Commercial and Industrial New Construction Program in Wisconsin

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ABSTRACT

Faced with performance mandates set by regulators, the instinct of a program administrator is to assert itself as a dominant player in a market, and use existing market resources as subordinate allies to be leveraged in the quest of meeting goals. While an administrator may be able to dominate in retrofit energy efficiency projects, energy efficiency is a minor one or two percent consideration within most new construction projects. This paper reviews a utility ratepayer funded new construction program that is taking an approach 180 degrees from the market dominating norm to achieve a primary focus on market needs that will then lead to cost effectively reaching energy efficiency and peak load reduction goals.

This paper reviews the basic tenets of the program theory: use nationally-accepted, existing standards and materials as the focus of a local program; diminish attention on the utility sponsor, and focus on the market paramount to the needs of the utility. The result? “Taking the ego out of efficiency” by underplaying the role of the utility program sponsor results in strong participation, cost effective efficiency and high customer satisfaction.

Additionally, this paper asserts that by emphasizing collaboration with existing market players and materials, it will lower the cost per transaction while easing entry and exit from the market. The acceptance of this approach in the market will be documented through examination of case studies and market reaction. Actual energy saving, peak load reductions and the associated costs will provide a basis to analyze the success of this approach and the significant lessons as this program continues its efforts.

Introduction

Using utility ratepayer funding to implement a new construction program that achieves energy efficiency goals and reduces peak demand is not a new concept. Under regulatory mandate, many utilities and governmental authorities have created special programs that offer design assistance and financial incentives to save energy in construction projects, with varying levels of success. Some have been very successful at saving energy (Quantum, 2004). At the same time, private companies, design firms, and non-profit organizations have strived to build expertise and develop tools and resources to achieve the same energy saving results. The work of these market actors occurs regardless of the infusion of ratepayer funds.

Faced with performance mandates set by regulators, the instinct of a program administrator is to assert itself as a dominant player in a market, and use existing market resources as subordinate allies to be leveraged in the quest of meeting goals. In program-driven retrofit energy efficiency projects, the program administrator is a dominant player by bringing a large portion of the financial and technical resources to the project. New construction projects

are driven by market actors with a far higher financial stake in the results. The energy efficiency component brought in by the program administrator is a very small component of project cost and design effort. Existing market actors are the dominant players in new construction, not the program administrator.

Few program administrators are willing to trust their goals to collaboration with the market where they will be a secondary player, but that was the mandate set by We Energies. With a stated objective that the new construction program will be secondary to market needs, the We Energies program was designed to take advantage of existing materials and brands in the new construction market. This allowed the program to slide into the market utilizing existing delivery channels, not disrupting existing efforts or detracting from other programs but rather capitalizing on them. The authority of the utility's brand, We Energies, provided credibility to existing market actors without competing for authority or awareness. By taking their ego out of efficiency, We Energies has been able to focus on saving energy by supporting existing market channels.

This style of new construction program quickly and successfully entered the market with limited investment and almost immediately filled its pipeline with qualified projects, exceeding its commitment goal within the first six months of the program. Referrals provided through We Energies network of account managers helped to jump start the marketing effort.

This paper looks at the first year – the pilot year – of a new construction program supported by energy incentives from We Energies.

Program Theory: A Focus on Energy

Field research conducted prior to program design confirmed a significant opportunity to realize significant peak demand reductions (Grabner, 2004). This program opportunity came with the potential for participant confusion, because numerous active programs and outreach efforts existed within the program's intended geographic, including:

- Wisconsin's multi-million dollar public benefits energy efficiency program, "Focus on Energy"
- Wisconsin Green Building Alliance - a highly active green building organization strongly promoting LEED™
- Advanced Buildings technical educational program supported by state utilities and delivered by the Energy Center of Wisconsin
- SE² (Sustainability and Energy Efficiency) commercial buildings conference and design award
- Activities on the local level in various municipalities to promote sustainable/efficient buildings

Rather than view these efforts as secondary players to be herded underneath a utility umbrella, We Energies sought to join collaboratively with them as a supportive partner. Within this context, a program theory evolved that would capture this opportunity to work through strong existing connections (specifically Advanced Buildings™ and LEED™) to the new construction market and place the role of the utility implementer in the background.

The new construction program focuses on realizing a reduction in kWh and summer peak kW while working to effect longer-term change (transformation) in the market through market

preparation efforts. The specific approach of this program is a cost-effective, easy to understand, supportive effort that increases marketplace knowledge and practices to design and construct high performance commercial buildings that provide superior energy efficiency, integrated systems performance, comfort and highly productive indoor environments. A key element of the implementation strategy is that We Energies does *not* want to be recalled as the program implementer in an effort to easily enter and exit the market with its energy savings programs.

The new construction program has been designed to meet the primary objective to capture immediate and long-term energy efficiency and peak demand reduction opportunities that are available during the design and construction of new buildings, additions, and renovations in the non-residential market. To secure these opportunities it is necessary to overcome barriers such as resistance in the design community to adopt new practices, reluctance by owners to accept increased first cost for efficient options, and tendency to design individual systems for worst-case conditions rather than efficiency of an integrated system over the range of expected operating conditions. Thus the focus of the program rests solely on the customer and is utilizing Advanced Buildings accepted performance recommendations to overcome these barriers.

A secondary objective to achieve beneficial impacts that extend beyond the life and scope of the program was also supported by taking a secondary position. The program has been designed to integrate market preparation activities into implementation while achieving near-term energy savings from active construction projects. The program theory focuses on the potential participant – what offerings and services should be provided to incent not only program participation, but a longer term attitudinal and behavioral change that will continue to provide savings after the program has ceased to exist. Due to the dual nature of the program, an overall program logic model was developed (in addition to a subordinate marketing logic) to create offerings that would bring potential participants to a tipping point of incorporating efficiency approaches and measures they normally would not have done. By leveraging efforts that will exist beyond the length of this specific program, We Energies is attempting institutionalize efficiency.

Leveraging Advanced Buildings Technical Resources

The We Energies new construction program chose to leverage the existing and growing resources of the national Advanced Buildings effort. Advanced Buildings is a suite of technical resources, trainings and information provided to both owners and design teams to improve the way buildings are designed, built and used. The materials were developed through a national consensus-based process ensuring that current design practice and technologies could achieve the indicated performance levels.

Following are several key features of Advanced Buildings being leveraged:

- Resources have been developed with the investment of utilities, foundations and efficiency organizations across the United States
- Resources are intended for stand-alone use on individual projects, and to provide the technical core of utility-sponsored new construction programs
- Technical criteria were reviewed and approved by a national criteria review committee that includes code officials, utility new construction program staff, and stakeholders from the design, construction, real estate, and equipment manufacturing communities

- Resources support integrated design in new buildings and renovations of all sizes, and are particularly well suited to promoting whole-building efficiency

The products are targeted at architects, electrical and mechanical engineers, lighting designers, and owners/managers. Advanced Buildings targets the more difficult to reach “mid-market” size segment while also facilitating work with smaller and larger facilities (Johnson, 2004).

Interface with the Statewide Advanced Buildings Program

In Wisconsin, three electric utilities (We Energies, Alliant Energy, and Madison Gas & Electric) are supporting statewide market preparation activities through an Advanced Buildings program delivered by the Energy Center of Wisconsin. The We Energies new construction program is able to leverage this Wisconsin utility investment in the statewide program to increase program participation and achieve desired market effects. The goals of the statewide Advanced Buildings program are to:

- Increase marketplace knowledge and improve practices to design and construct high performance commercial buildings that provide superior energy efficiency, systems performance, comfort and provide kWh and kW savings
- Provide technical information to improve construction project management practices, building technologies, and tools necessary to the successful construction and delivery of high performance buildings
- Integrate with other program efforts offered by the participating utilities to provide a comprehensive commercial sector service to customers
- Support renewable energy and general environmental policy to provide a clean, safe and healthy environment
- Support the LEED rating system

Interface with National Rating Efforts

An additional reason Advanced Buildings was selected for incorporation into the program was its compatibility with both LEED and ENERGY STAR[®], two highly-recognized brands within the designer and owner sectors. The working theory is that national recognition will increase interest in program participation within We Energies service territory by leveraging the equity of the established brands and enhancing the credibility of Advanced Buildings to owners and designers.

LEED, ENERGY STAR[®] and Advanced Buildings have a common goal of improving the performance of buildings to create benefits for the owner, occupants and environment. All use targets and guidelines as a primary tool to influence building design decisions around energy and environmental performance. The Advanced Buildings Benchmark criteria were designed to be compatible with and support LEED and ENERGY STAR[®] as follows:

- LEED v 2.2 credit may be achieved when meeting criteria contained in the Advanced Buildings Benchmark; however, following the Benchmark will only provide the LEED

credit if used in conjunction with approved U.S. Green Building Council documentation procedures (USGBC 2006)

- Advanced Buildings requires that the design team establish a goal of 75 or higher on the ENERGY STAR[®] Energy Performance Rating Scale. The Energy Performance Rating Scale defines the lowest energy performing buildings (most energy use per unit metric) as 1 and the highest energy performing buildings as 100. This requirement helps assure buildings are not only energy efficient but perform as low-energy buildings (Johnson, 2003)

Program Implementation

Project assistance, design incentives, and measure incentives are offered in varying degrees on individual projects to balance the program resources applied with the potential for saving energy and changing behavior based on needs of customer.

Any-size commercial, industrial, government (local, State, and Federal), or institutional new construction project in the planning or early design-stage will be considered, although projects larger than 20,000 square feet are be targeted. The program also targets larger renovation projects (over 20,000 square feet) in existing buildings that are required to comply with State energy code. Projects must be pre-approved for participation. The program channels projects through one of three participation approaches:

- **Basic Approach** is a lower-assistance participation approach that offers a limited menu of financial incentives. This track provides measure incentives to meet performance criteria for improvements in lighting power density, lighting controls, and mechanical equipment. A limited design incentive is offered for the design team to help offset labor costs for design revision and construction specifications. This approach is utilized for projects where there is limited opportunity for integrated design and those later in the design process.
- **Advanced Buildings[™] Approach** provides an expanded menu of financial incentives and project assistance to encourage integrated design. Measure incentives are paid for meeting performance criteria described in the Benchmark[™] technical reference manual for whole building, system and component performance (viewable on-line at www.poweryourdesign.com). Design incentives are available for individual measures as well as employing integrated design approaches. This approach is chosen when there is opportunity to achieve greater energy savings through integrated design, but the project size or schedule warrants a more streamlined approach.
- **Comprehensive Approach** offers the highest level of project assistance and financial incentives for custom design solutions. This approach allows the design team the greatest flexibility to meet energy performance goals by adopting integrated design solutions analyzed through whole-building energy simulations. This approach is utilized when project size, schedule, complexity, and interest level justify a high level of program resources to achieve the full benefits of integrated building design (Energy Center of Wisconsin, 2005).

Building size, project type, design stage, and project opportunities guide the selection of participation approach offered on the project. This determination is made by the program on a

case-by-case basis. Generally, new construction and major “gut” renovation projects over 80,000 square feet are channeled to the Comprehensive approach when there is commitment by the owner and design team in the pre-design or schematic design stage to explore a wide range of design options. New construction and renovation projects smaller than 80,000 square feet are most often be channeled to the Basic or Advanced Buildings approaches, as will projects larger than 80,000 square feet that do not justify the Comprehensive approach. Remodels smaller than 20,000 square feet are referred to the We Energies Prescriptive Existing Buildings program for assistance in most instances

If They Don’t Realize You’re There, It’s Easy to Leave...An Alternative to the Exit Strategy

In addition to achieving its peak demand reduction goals, the utility was focused on ease of both entry and exit out of the market. By taking a role secondary to the benefits received by program participants, they hope to move deftly into and out of markets as necessary to provide programs and not disrupt business practices or create confusion in the market by adding yet another program

We Energies already actively supports LEED and the U.S. Green Buildings Council through its local affiliate the Wisconsin Green Building Alliance, coordinates with local environmental/efficiency organizations through and Energy Codes Collaborative, supports the state Sustainability and Energy Efficiency conference in addition to participating in the state public benefits program. As a result of taking a secondary position, it allows the utility to enter and leave the market at will and reduces to potential that the program will disrupt or detract from these longer term efforts.

A detailed communication plan and outreach strategy was developed as a part of the program’s implementation plan (Energy Center of Wisconsin, 2005). Regular communication and a high level of cooperation with other programs has, to date, worked effectively. We Energies has been able to achieve a high level of participation. A subsequent benefit has been that of We Energies role as a strong corporate citizen, actively supporting the activities of the existing organizations and efforts.

Where Are We? Assessment of the Pilot Program

The existing state administered public benefits program, Focus on Energy, did not offer a nonresidential new construction program when We Energies submitted their program plans to the Public Service Commission in 2004. With this lack of recent history, We Energies began the new construction program as a pilot, due to uncertainty in construction activity levels, savings potential, and market response. A modest goal to achieve commitments worth 500 summer peak kW reduction was initially set.

Due to the time delay between design phase technical assistance and completion of construction, the 2005 goal was set as achievement of “committed” savings – measures that have been mutually agreed to by the program and owner, with installation in progress. After the pilot year, goals were set as “installed” savings, measures that are installed and operating, or capable of operating in the case on seasonal measures.

Table 1 provides goal data and results for the 2005 new construction program, as of December 31, 2005, along with goals for future years. Table 1 shows that 203 kW of project savings went past the “committed” stage to reach “installed” in 2005.

Table 1. Summer Peak kW Demand Reduction Goals for C&I New Construction in We Energies Service Territory			
Year	Annual Goal (kW)	Cumulative Goal (kW)	Annual Achieved (kW)
2005	500 (committed) 0 (installed)	0 (installed)	701 kW were committed during 2005, and 203 kW from that total were installed in 2005.
2006	1,000 (installed)	1,000 (installed)	(through April 2006): 400 kW installed plus an additional 2,500 kW accepted into program.
2007	1,500 (installed)	2,500 (installed)	
2008	1,000 (installed)	3,500 (installed)	

Table 2 provides a snapshot of program costs as of December 31, 2005. Table 2 shows costs for a pilot program that has incurred costs for 17 construction projects that have applied for program assistance and are in various stages of program implementation, but where only 8 projects provide committed or installed kW savings totaling 701 kW.

Cost Category	Cost per Summer Peak kW Committed or Installed	Cost includes:
Total Contracted Implementation Cost to We Energies	\$671 /kW	Includes incentives and all project specific costs outlined below, plus implementation contractor costs for program administration, marketing, tracking and reporting, and ongoing program design. Does not include We Energies internal management and administrative costs.
Project Cost	\$560 /kW	Includes all incentive costs outlined below, plus implementation costs related to specific projects (project meetings and program assistance). Includes costs for working with active projects that have not committed to measures, and thus have costs but contribute no kW to the committed total.
Incentive Cost	\$312 /kW	Includes financial incentives obligated for payment to the design team (for incremental design work) and owner (for incremental measure costs). Also includes contractor costs for performing the energy simulation, which is viewed as technical engineering work with direct benefit to the owner and design team, regardless of whether the project participates in the program..

Costs for new construction programs are heavily front-loaded. The costs shown in Table 2 reflect all costs for marketing and project meetings for on-going projects that have not yet reached the commitment stage, and add no kW to the denominator when calculating Table 2 costs. The authors believe that longer term, through 2008:

- Incentive costs per kW will be slightly higher as more projects take advantage of design incentives and energy simulations
- The increment of cost added by “Project Costs” will be slightly lower per kW as project pipeline empties and previous investment in implementation assistance
- The increment of cost added for “Total Contracted Implementation Costs” will be slightly lower per kW as program redesign efforts end, marketing is ramped down, and the project pipeline is converted to installed measures.

Overall, the authors believe overall contracted implementation costs will remain in the \$670 per kW range, but that a higher proportion of dollars will be going to incentives.

Table 3 provides a detailed breakout of energy impacts for projects that were committed or installed by December 31, 2005. Table 3 shows that 9 additional projects are in the pipeline with the potential to add 1,100 kW of peak kW reduction. In summary:

- Nine (9) projects are in the “pipeline”, not committed or installed, but with applications submitted, analyzed, but recommended measures not yet accepted by owner: 1,100 kW
- Six (6) projects provided “committed” savings from mutually approved measures totaling 498 kW
- Two (2) projects provided “installed” savings of 203 kW

Table 3. Results from the We Energies 2005 New Construction Pilot Program for Committed and Installed Projects					
Use	Approach*	Project SF	Peak kW	Energy kWh/yr	Therms/yr
<i>Pipeline projects</i>					
9 projects in the pipeline, with 1,100 kW of measures identified					
<i>Committed projects</i>					
Medical	Adv B	12,177	15.0	30,000	n/a
School	Comp	130,000	214.0	376,000	6,360
Industrial	Basic	63,732	23.6	94,400	n/a
Industrial	Basic	125,000	109.1	436,400	n/a
Industrial	Basic	53,871	47.0	135,108	n/a
Retail/Office/ Industrial	Comp	36,000	89.5	115,142	28,420
<i>Installed projects</i>					
Industrial	Basic	35,000	23.1	92,400	n/a
Office/ Industrial Type Repair Facility	Comp	230,000	180.0	701,382	10,000
<i>Summary results for committed plus installed projects</i>					
		685,780	701.3	1,980,832	45,280
Average per 1,000 sq ft (ksf)			1.0	2,888	114**

* Approaches: Basic = Basic, Adv B = Advanced Buildings, Comp = Comprehensive

** Annual therm savings per thousand square feet is only for Comprehensive projects (396 ksf, or 66 therms over all program ksf)

Lessons Learned

There are always risks and lessons to be learned when trying a new field approach. The following are areas of potential risk and what the program is implementing in the field to mitigate this risk.

Risks typical of all new construction programs:

- Projects never make it to – or through – construction
 - Projects are pre-qualified based on **both** financing available for project and site approval
- Project schedules altered or extended
 - A mix of both project sizes and types of owners provide a pipeline of both long and short construction schedules and project-completion risk

- Fear of participation by customer due to uncertainty of existence of program
 - Through close cooperation with existing programs, such as the public benefits program, projects both beyond either the scope or timeline of the We Energies program can be assisted

Risks associated with a new field strategy and reduced focus on the program implementer:

- Inability to attribute savings to the program
 - By creating a clear communication strategy with the evaluators from the beginning, the program staff are able to differentiate this program from other existing efforts, including the Wisconsin Focus on Energy program. The fact that there is currently no other new construction program helps allay this risk. However, Wisconsin has had past programs and other corollary efforts that could impact attribution. Current feedback from program participants has indicated that due to the high level of customer satisfaction with the program, attribution has not been a problem to date. They are identifying the program as a catalyst for change¹
- Technical assistance scope creep
 - With a focus almost completely on the customer, customer satisfaction and leveraging existing efforts, program staff can easily find themselves providing information and services beyond that necessary to achieve the specific peak savings goals. It has become increasingly important to set specific budgets for technical assistance per project to track investment to maintain the cost per kW goal
- Potential to become risk averse
 - When using an untried field strategy, using new technical resources but still having very targeted demand reduction and cost per kW goals, field staff may tend to focus on “sure” projects, potentially avoiding smaller projects or those with longer construction schedules. By using accepted technical materials already in the market and adopting a three prong approach to incentives and technical assistance, the program hopes to avoid this. An analysis at the completion of the program will provide insight as to whether this was achieved or not.

Conclusion

The new construction program met and exceeded its pilot programs goals and is ahead of schedule in meeting its full program goal. By focusing on the customer, We Energies is meeting not only is peak savings goals but realizing increased customer satisfaction and higher rates of project completion resulting in a lower cost per transaction. By “taking the ego out” of their field strategy; by not focusing on the attribution of savings or their brand and focusing instead on providing market actors and customers with messaging, incentives and technical assistance required to meet their needs, all of We Energies goals are being met.

¹ An evaluation of the pilot program has not been completed. A full evaluation of the program will take place during its four year timeline.

References

- Energy Center of Wisconsin. 2005. *We Energies New Construction Program Implementation Plan*. We Energies.
- Grabner, Kevin, Abby Vogen, Tate Walker, Lee DeBaillie. 2004. *Survey of Commercial New Construction Practices in We Energies' Territory*. Energy Center of Wisconsin.
- Hanson, Mark. 2006. Hoffman Corporation. Personal communication.
- Johnson, Jeff and Abby Vogen. 2004. *The High Performance Solution: A New Approach to Commercial New Construction*. ACEEE.
- Johnson, Jeffrey A. 2003. *Advanced Buildings Benchmark*. New Buildings Institute.
- Kleinman, Jonathan and Arun Veda. 2004. *How Can you Capture the Other Half of the Market Efficiency Vermont's Strategy for Small Commercial New Construction*. ACEEE.
- Quantum Consulting, Inc. 2004. *National Energy Efficiency Best Practices Study Volume NR8 – Non-Residential New Construction Best Practices Report*. Quantum Consulting, Berkeley, CA. Available at www.eebestpractices.com/pdf/BP_NR8.PDF.
- RLW Analytics. 2001. *Statewide Market Assessment and Evaluation, Non-Residential New Construction Program Area. Building Efficiency Assessment Quarterly*. RLW Analytics.
- Summit Blue Consulting. 2004. *Phase 1 Market Characterization, Market Assessment and Causality, New Construction Program. Draft Final Report*. Summit Blue Consulting.
- U.S. Green Building Council. 2006. *USGBC LEED™v.2.2 Checklist*. U.S. Green Building Council. www.usgbc.org.