

Commercial Windows Initiative

Market Progress Evaluation Report # 2

prepared by

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HMG Project # 0305

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1. EXECUTIVE SUMMARY

The Commercial Windows Initiative (CWI), a project developed and implemented by the West Wall Group (WWG), worked with fenestration market participants from virtually every facet of the market. They worked with manufacturers of commercial windows and window components. CWI reached architects, specifiers, designers and developers to boost demand and market share for energy-efficient, factory-built commercial windows. They engaged building code organizations and program administrators, utilities and industry associations.

The goal of CWI was to work with all these parties to increase sales of already efficient products and encourage the design, manufacture and sale of new, more efficient products. WWG had an extensive list of milestones and goals for CWI, some of which were met earlier, and are discussed in the first Market Progress Evaluation Report (MPER)¹. It was judged impractical to determine whether one of the primary goals, a specific percent market share increase, had been met, because the data required in order to make that determination was not attainable at a reasonable cost. In the evaluation of CWI's second phase, we did not make any further attempts to assess the absolute size of the market nor the share of it that CWI-qualified products have.

For several reasons, the full impact of this initiative was not realized. This report will discuss what progress was made by CWI in transforming the market (outside of market share determinants), and what market transformation developments are likely to continue. Quantification of the change has been elusive since a reliable baseline could not be established.

The broad goals of the evaluation are to help the Alliance to assess:

- Whether the Initiative's design and implementation were effective in achieving the Alliance goal of transforming the market for commercial factory-built fenestration products
- Whether the tracking process established by the implementer provided accurate estimates of market share and market share trends
- What potential modifications or realignment of the program might help the Alliance to meet its original or newly recognized goals (adaptive management)

Based on the results of the evaluation, HMG provides the following key findings.

Progress Toward the Program Goal Of Increasing Market Penetration of CWI-specified Windows Could Not Be Reliably Measured. - The principal finding is that the foremost performance criterion for the Commercial Window

¹ Northwest Energy Efficiency Alliance. *Commercial Windows Initiative Market Progress Evaluation Report #1*, January 2005.

Initiative (increasing market share by 38% from an assumed baseline of 12%) could not be accurately measured. The data collected from manufacturers led to untenable conclusions and it is now clear that manufacturers' data alone will not be sufficient to establish CWI progress or energy impacts. Methods beyond using manufacturing data were not within the evaluation budget and there is no guarantee that they would provide better results. The evaluators therefore can draw no conclusions regarding the main program goal.

Products Developed to Meet the CWI Specifications - At least four manufacturers have said that they are developing (or have developed) products specifically designed to meet the CWI specifications.² Their commitment to meeting the CWI specification is a clear sign of market impact by the program.

CWI Had a Significant Impact Through Education – A majority of the manufacturers, architects, and others who were interviewed in preparation for this report praised CWI's accomplishments in raising the level of awareness and energy expertise among the building design community. CWI's training sessions were lauded fairly consistently as having taught designers about window features that result in energy savings, indirectly raising the average specified performance of projects in the Northwest.

Market Structure - The original program approach was limited to factory-built products for punched openings. However, the market (at both the supply and demand sides) does not make a clear distinction between factory-built and site-built products. This may have contributed to some of the difficulty in obtaining reliable data on product sales.³ Additionally, the factory-built products market appears already to have made a shift to vinyl products (partly because of its strong connection to the multifamily building market). The program may have been more effective if it had expanded to all commercial windows earlier. (This was done in 2005 but too late to have a substantial impact on either the program or the market.)

Stakeholders' Attitudes - Virtually all stakeholders stated that CWI had been beneficial for the industry and added their appreciation for the CWI staff's efforts. In particular, virtually everyone interviewed stated that CWI's education and training of design professionals was of considerable value in advancing the use of high performance commercial windows. Most felt that a significantly reduced scope for CWI represents a loss to the Northwest fenestration community, though they generally felt that it would not mark the beginning of a retreat from the use of high performance products.

² Additionally, another manufacturer said that his company designed a product specifically to compete with these manufacturers' newly designed products.

³ This is not to say that confusion between site and factory-built products was the sole factor. It is not clear that even if the program solved this issue by expanding its focus to include all commercial glazing, that it would have been possible to obtain a reliable estimate of various manufacturers' market share, or of qualifying products' market share.

Energy Performance Awareness in the Market - In implementing the CWI, WWG learned that the architectural community and the manufacturing community were much less aware of energy performance issues than had been thought. Consequently, WWG had to revamp their messages to teach architects and manufacturers about the technical aspects of window specifications (including U-factors, SHGC and visible transmittance).

Program Marketing – CWI spent much of their time with architects and manufacturers’ representatives providing information about performance in the language that the recipients use. CWI staff learned that the design community is interested in “design solutions” not in the advantages of the range of products of one or more manufacturers.

CWI Impacts on Other Programs and Codes – CWI had a positive influence on the Northwest code discussions and on glazing requirements for commercial energy efficiency programs.

2. INTRODUCTION AND BACKGROUND

The HESCHONG MAHONE GROUP, INC. (HMG) was hired by the Alliance in January 2003 to evaluate the progress and success of its Commercial Window Initiative. This is the final (second of two) Market Progress Evaluation Reports (MPERs). It provides an evaluation of the activities and achievements of the Initiative for 2005.

2.1 Background

In 1998, the Northwest Energy Efficiency Alliance launched the ENERGYSTAR® Residential Windows program with D&R International as the implementation contractor. The stated goal of the Residential Window program was to increase the awareness of and market share of ENERGYSTAR® residential windows. D&R and the program evaluation contractor estimated that market share grew from about 10-15% in 1997⁴ to an estimated 66% by the second quarter of 2001.⁵ Awareness of ENERGYSTAR® windows also increased. The increase was significant among manufacturers and retailers, moderate among builders and minimal among homebuyers and remodelers.

About the time that the program was ending, the Alliance partnered with DOE (through Lawrence Berkeley National Lab) to sponsor a study of the nonresidential window market.⁶ The report pointed out the vast opportunity for improvements in the use of energy efficient commercial glazing. Since many of the same manufacturers in the Northwest who supply windows to the residential market also produce commercial windows, the D&R staff who had implemented the residential window program was well placed to design a program focused on commercial windows. At the end of the ENERGYSTAR® Residential Windows program several of the key D&R people who had worked on the program split off into their own company, West Wall Group. They submitted a proposal for a commercial windows initiative in 2001 which the Alliance accepted and the program launched in 2002.

The market transformation hypothesis is that more high efficiency windows will be installed in commercial buildings if (a) an easily recognized identification mark (e.g., a label or a logo) is developed that helps users identify and select them, and (b) market actors are provided outreach and education on the value of high-performance windows. While there is currently no ENERGYSTAR® standard for

⁴ Northwest Energy Efficiency Alliance. *Market Progress Evaluation Report ENERGYSTAR® Windows Program, No.4*. November 2000. Prepared by Quantec. Page ES-2.

⁵ Northwest Energy Efficiency Alliance. *Market Progress Evaluation Report ENERGYSTAR® Windows Program, No.5*. January 2002. Prepared by Quantec. Page ES-1.

⁶ Northwest Energy Efficiency Alliance. *Market Research Report: A Characterization of the Nonresidential Fenestration Market*. November 2002. Prepared by Eley Associates.

commercial windows, this project proposed such levels for the Northwest (and began work with U.S. DOE to explore development of a national specification). A second level of market transformation could occur if the specifications that the identification mark is based on are eventually adopted into state codes to lock in the efficiency levels.

2.2 Project Description

The Commercial Windows Initiative (CWI), a project developed and implemented by the West Wall Group (WWG), worked with fenestration market participants from virtually every facet of the market. They worked with manufacturers of commercial windows and window components. CWI reached architects, specifiers, designers and developers to boost demand and market share for energy-efficient, factory-built commercial windows. They engaged building code organizations and program administrators, utilities and industry associations.

Commercial glazing can be roughly divided into four types: curtain wall systems, store fronts, site-built punched openings and factory-built punched openings. CWI originally specifically targeted factory-built windows in the commercial “punched opening” market.⁷ Punched opening refers to the hole in a wall where a factory-built commercial window is installed. Both new and existing commercial and large multifamily buildings are included in the initiative’s scope. Also, both metal and non-metal windows are included⁸.

Approximately 28 million square feet of commercial glazing is installed annually in the Northwest. Punched openings represent 44% of the commercial windows market, with factory-built product going into about 32% of these punched openings. The initial CWI market was therefore approximately 4 million square feet per year or about 14% of the total market.⁹ Approximately 40% of factory-built, punched opening windows are thought to be metal and 60% non-metal.¹⁰

The market transformation goal, as stated in the program proposal, was to increase by at least 38 percent the market share of high efficiency factory-built windows in the commercial punched openings market, from an assumed baseline of 12% to at least 50% by the end of 2005 and 70% by 2010.

The focus and activities of the program were designed to shift over time from an initial supply-side focus to one that emphasizes the demand side (i.e. window specifiers including architects, engineers, and facility managers). The majority of

⁷ In 2005, this was expanded to include all commercial glazing systems but the great majority of the program effort was already completed by that time.

⁸ Non-metal is a comprehensive term including vinyl, fiberglass, wood, and combinations of these materials.

⁹ These figures are quoted in the CWI Statement of Work and are based on an Alliance Market Research Report (*A Characterization of the Nonresidential Fenestration Market*, prepared by Eley Associates, November 2002).

¹⁰ These data are from interviews with Nick Limb, Principal of *Ducker Research*, 2002, and 2004.

effort in the first phase of the program (as described in the first MPER) involved working with manufacturers, first to develop the criteria for the CWI specifications, and then to help develop marketing messages and educate manufacturers' representatives.

Once the early emphasis on supply-side efforts was well established, WWG shifted their attention to education and marketing to architects and others on the demand side of the commercial window market.

2.3 Program Activities

The CWI program operated from September 2002 through December 2005. Implementation tasks included:

- Establishing a steering committee of industry experts and market actors
- Defining a product specification in conjunction with the Steering Committee, NFRC, and national labs
- Developing a recognizable and acceptable label, logo or brand for qualifying product
- Developing and implementing supply-side marketing activities with manufacturers and distributors
- Developing and implementing demand-side marketing activities for developers, architects, specifiers, glazing and general contractors
- Coordinating with BetterBricks
- Seeking out and leveraging existing utility programs
- Investigating expanding CWI to include site-built commercial windows

In addition to these specific accomplishments, the West Wall Group established a procedure for tracking market share of CWI-qualifying products. The basic steps are:

- Call and email known manufacturers within the Northwest market for their sales data on a quarterly basis
- Track and report market share for qualifying products (in the 2nd and 3rd year)
- Coordinate/collaborate with the Alliance's evaluation contractor

The accomplishments and status of these tasks since the first MPER are discussed in the following sections. First, we present a summary of program accomplishments described in the first MPER.

2.3.1 Summary of First Year Accomplishments

The first year achievements of goals, as described fully in the first MPER, are summarized in this section.

Establishment of a Steering Committee

One of the first steps that West Wall Group took in launching the CWI program was to assemble a steering committee of interested and capable industry members who represented a diverse set of interests and industry perspectives.

Development of CWI Specification

In April, 2004, based on committee input, WWG and the Alliance settled on the technical criteria shown in Figure 1. They also decided that qualifying products must have NFRC certified U-factor, Solar Heat Gain Coefficient (SHGC) and Visible Light Transmittance (VLT) ratings.

<i>Window Type</i>	<i>U-factor (max)</i>	<i>SHGC (max)</i>	<i>VLT (min)</i>
Metal Frame	0.42	0.40	0.50
Non-metal Frame	0.35	0.40	0.50

Figure 1: Final CWI Specifications

Developing a recognizable and acceptable label, logo or brand for qualifying product

Part of the CWI plan for increasing demand for, and consequently, market share of, CWI-qualified commercial window products was to make them easy to refer to and specify by attaching a recognizable emblem to them. The CWI brand is used on all publications and promotional material. The CWI brand was never intended to be a long-term, stand-alone brand, such as Energy Star®, but rather as a recognizable program brand that would help build program awareness.

Developing and implementing supply-side marketing activities with manufacturers and distributors

West Wall Group focused its initial marketing efforts primarily on the supply side of the market – window manufacturers and the glass and extrusion manufacturers who serve the market. WWG's goals were to develop marketing materials, deliver training to manufacturers' staff on up-selling high performance product lines, identify projects as case studies and examples for promotional materials, and identify opportunities for marketing and promotional coordination. CWI personnel had over 150 meetings with individual manufacturer representatives. The CWI web site (<http://www.commercialwindowsinitiative.org/>) was also developed and used as a marketing tool.

Developing and implementing demand-side marketing activities for developers, architects, specifiers, glazing and general contractors

WWG gave presentations to the design and development community focusing on three main topics: the CWI program, the evolution of high efficiency windows and case studies of successful buildings with high-performance windows. CWI staff

met with approximately 150 different architects at firms throughout the Northwest region. CWI also met with developers of commercial projects.

Seeking out and leveraging existing utility programs

CWI contacted or met with nearly forty different utility program staff members to start exploring ways to cooperate on programs. CWI facilitated connections between utilities and manufacturers to address specific project/building needs. CWI exploited opportunities to coordinate on outreach and marketing with utility programs, and other opportunities for joint activities.

Coordinating with BetterBricks¹¹

The Commercial Windows Initiative and BetterBricks coordinated on issues, outreach and activities whenever possible. WWG staff met regularly with BetterBricks staff to discuss opportunities for coordinated marketing and educational programs. The two entities made coordinated presentations throughout the Northwest. The CWI and BetterBricks' web sites were linked.

Tracking and reporting market share for qualifying products in Years Two and Three.

One of the primary intended means for determining if the Initiative met its goals was to track the share of the market that CWI-qualifying products had over time. WWG was charged by its contract with the Alliance to track the number of CWI-qualifying products in the Northwest and to provide an estimate of the percentage of the total Northwest sales qualifying products sales represent. This was meant to allow the Alliance to assess the success of the program at increasing the market share of qualifying products over time. The first Market Progress Evaluation Report (MPER) detailed the steps that WWG took to establish the market share tracking (MST) process, the results and how the results were used in our evaluation efforts. The Alliance ultimately concluded that the MST data was not robust enough to use for determining market share.

2.3.2 Summary of 2005 Activities

The CWI accomplishments in 2005 as reported by WWG include:

Continuing supply-side marketing activities with manufacturers and distributors

During 2005, CWI continued to assist manufacturers with crafting their messages to developers and design teams so that manufacturers' more efficient products would be considered. The most active manufacturers, in terms of working with CWI, were component manufacturers (e.g., frame and insulated glass manufacturers) – making those components that contribute to greater efficiency.

¹¹ BetterBricks is the brand used for many of the Alliance's commercial sector activities. Here, it refers to the technical services contractors, in particular the lighting and daylighting labs supported by the Alliance.

This is not surprising since these manufacturers who serve several window manufacturers have more to gain from their investment than do individual window manufacturers, especially those who also have non-CWI qualifying product lines.

Coordinating with BetterBricks

The Commercial Windows Initiative continued to work with BetterBricks, primarily on coordinated presentations at the Integrated Design Labs in Seattle, Boise and Portland.

Continuing demand-side marketing activities

The bulk of the demand-side marketing effort was focused on training architects on high performance window issues and the value of CWI-qualified products. CWI worked with regional chapters of the AIA to co-sponsor presentations. For example, CWI worked with the AIA Seattle chapter to provide a windows training course that was offered under the auspices of the AIA chapter.

Seeking out and leveraging existing utility & other programs

CWI met with several utilities to coordinate training opportunities and program offerings. CWI worked with Idaho Power, Tacoma Power and Eugene Water & Electric Board. CWI was instrumental in getting a window specification included in Idaho Power's new construction program.

CWI seems to have spent a fair level of effort working with the Seattle Office of Housing through Seattle City Lights, to promote good decisions for replacement windows, particularly for historic buildings.

2.3.3 Program Impacts & Market Impacts

The first MPER on the CWI program contains an extensive discussion of efforts and issues with trying to establish a baseline for sales of CWI qualifying products, and to track sales of these products as a percentage of the overall Northwest market for manufactured commercial windows. There was no better set of data available for the Phase II evaluation, so we made no attempt to refine the analysis.

However, another market impact came to light during discussions with several manufacturers. At least four manufacturers created new products that meet the CWI specifications and brought them to market within the last year. One manufacturer specifically stated that their design intent was to meet the CWI specifications. Another stated that their design intent was to compete with those manufacturers who had designed to the CWI specifications. Another manufacturer stated that the CWI marketing assistance helped them to sell a higher percentage of their (existing) high performance products than they were capable of doing before linking with CWI.

2.3.4 Program Direction

CWI, as originally approved by the Alliance's Board in 2002 with West Wall Group as the contractor, ended on December 31, 2005. Commercial sector windows-related activities will continue but mainly under the BetterBricks Integrated Design Labs. The marketing support element is going away though there will be limited manufacturers' support to maintain relations. There will also be support to work on NFRC, codes initiatives, and local code enforcement.¹²

¹² Subsequently, West Wall Group reformed the CWI as a non-profit entity (501C3), and secured funding from several sources to continue the education and training work.

3. CURRENT EVALUATION

3.1 Evaluation Description

The original goals of the evaluation, as written in the initial scope of work for the evaluation, were to help the Alliance assess:

- Whether the Initiative's design was likely to meet the Alliance goal of transforming the market for commercial factory-built fenestration products
- Whether the Initiative's implementation was effective in accomplishing that goal
- Whether the tracking process established by the implementer provided accurate estimates of market share and market share trends
- What potential modifications or realignment the program needs in order to meet its original or newly recognized goals (adaptive management)

Due to the Alliance's new direction for the CWI, these evaluation goals were deemed to be significantly less relevant for this final MPER than they had been for the first one. Although revised versions of them remained as evaluation goals for this report, the primary goals for the current report were to assess:

- Whether informed market actors felt CWI caused an impact in the choice of efficient windows
- What informed market actors felt about the prospects for continuing improvements in both manufactured commercial window products and commercial site-built commercial fenestration in the absence of the kinds of activities and assistance CWI had been offering
- Whether the CWI was key to developing a national effort or program
- Whether there were any tangible impacts (e.g., improved building designs or code changes) that could be reliably attributed to the CWI

In large part, these revised goals reflect the Alliance's decision to effectively end the CWI program. The Alliance evaluation manager did not feel it was useful to spend resources on broad, market-based research because the knowledge gained would not be able to be used to improve the program. The scope was therefore narrow and the focus was on gathering information from those who had been most directly involved with CWI.

It is important to note that we did not do an impact evaluation focused on changes in market share. A review of the WWG's monthly reports clearly indicated that there was no more reliable data in 2005 than there had been earlier. A full discussion of the difficulties associated with tracking market shares is provided in the first MPER.

As with the previous MPER, the evaluation assesses the degree to which West Wall Group has met the progress indicators developed during the program planning process. While progress indicators do not equate directly to market transformation, the Alliance hypothesizes that achieving them shows movement in that direction. In this MPER, several of the progress indicators are analyzed:

- Increased awareness of the Initiative's specifications and associated products
- Increased total production and sales of qualifying products
- Increased numbers of (commercial building) projects with punched openings specifying qualified products
- Increased availability and number of qualifying products

3.2 Evaluation Activities

The evaluation included several different activities which, cumulatively, led to the conclusions contained in this report. The following is a list of evaluation activities:

- Review of WWG monthly reports
- Review of WWG web site
- Interviews with market actors
- Interviews with targeted manufacturers
- Interviews with the president of WWG and the Alliance project manager

3.2.1 Reviewing WWG Material

Based on our review of the WWG monthly reports, we found that CWI continued their marketing activities with both demand-side and supply-side market actors, as well as continued coordination with BetterBricks. Additionally they worked with various utilities to coordinate training sessions and investigate potential program offerings.

Coordinating with BetterBricks

The Commercial Windows Initiative continued to coordinate with BetterBricks primarily through coordinated presentations at the labs (Seattle, Portland and Boise).

Continuing Demand-Side Marketing Activities

According to the WWG monthly reports, CWI staff had approximately 20 meetings from January 2003 to August 2005 with architects in the Northwest. The meetings were used to discuss projects, provide information on high

performance windows and conduct Personality Profile¹³ interviews. CWI staff continued their efforts to find projects that could be used as case studies or promotional examples.

The majority of the CWI outreach appears to be with regional AIA chapters related to presentations on commercial windows. CWI worked with several AIA offices, including Portland and other Oregon Chapters, the Idaho state chapters, as well as other regional Idaho Chapters, and several Washington chapters. CWI spent a great deal of time working with the Seattle chapter to deliver several window-specific classes.

Seeking out and leveraging existing utility & other programs

CWI staff coordinated with Idaho Power throughout the year. CWI provided technical information and support that was instrumental in getting a window specification included in Idaho Power's new construction program. According to the Idaho Power program manager, the program requirement would most likely have been lower without the CWI support. In the spring of 2005, CWI conducted training in Idaho Power service territory in conjunction with other BetterBricks training. Attendees included designers (architects and engineers) and utility program staff.

CWI worked with the Seattle Office of Housing through Seattle City Light, to find a solution for replacement windows in historic buildings. CWI worked to promote good decisions by educating policy makers and decision makers. CWI conducted several seminars to facilitate greater understanding of the issues for replacement windows. CWI provided educational tools, information on specific products, and companies and ultimately provided a good solution to the Office of Housing. The former program manager with the Seattle Office of Housing said, "... education and advancements as assisted by Commercial Windows Initiative ... resulted in the City's CWI-standard implementation in the Multifamily Conservation Grants [and] gave the city a much greater depth of [knowledge about] the nature of fenestration. With this education, facets such as longevity, comfort, sound, historical, health, and technology became forefront to our programs."

CWI also met with other utilities, local jurisdictions and other entities including Tacoma Power, the Energy Trust of Oregon, City of Portland and Eugene Water & Electric Board to coordinate training opportunities and program offerings.

CWI's web site continued to be mostly focused on establishing good connections to the design community, and providing designers with insights into good designs that included high-performance products. WWG added a significant number of new projects to the profile section since fall of 2004. The project profiles also act as teaching tools to impart good information about energy efficiency features of

¹³ In its marketing materials, the CWI profiled design professionals who incorporate energy efficiency into their design decisions on new construction or retrofit projects. These profiles provide a human face to the energy efficiency "story." They also provide some assurance to designers unfamiliar with high performance window technologies that these products are accepted in the broader design community. CWI gathered the information needed for these Personality Profiles by interviewing the candidates.

the windows used. In the section of the web site dedicated to “Technical Information,” virtually nothing has been added in the last year, and there is still no mention of the Designer’s Guide.

The Designer’s Guide was updated for 2005. It remains one of the more impressive products of the CWI. It contains a significant amount of good technical information: definitions of window efficiency terms, a discussion of new NFRC procedures and software, and a discussion of how window performance features affect use of space within a building. The Designer’s Guide also contains all of the information found on the web site about individual projects and people, as well as several pages of details on individual manufacturers’ CWI-qualifying products.

3.2.2 Market Actor Interviews

For the second phase of the evaluation, we interviewed a small number of both supply-side and demand-side market actors who had participated in the program to assess:

- Their opinions about the efforts of the Initiative
- Their familiarity with the Initiative’s marketing materials
- Their perceptions of changes in other activities and programs (e.g., BetterBricks, utility programs) related to the work of the Initiative.
- Their attitudes about the potential impact of the program changes
- Product design changes due to the CWI
- Building design changes based on the CWI specification and due to CWI influence

CWI Interviews

Comments made by the Alliance program manager and the president of West Wall Group are summarized in this section.

The Alliance’ program manager feels that the primary objectives of the Initiative were met. He was satisfied with the design community outreach results including training sessions and other events throughout the region. The WWG level of effort was beyond what he had anticipated.

He is neutral on whether the “*Step Up to the Plate*,” wine tasting, and other events are worth the goodwill, team building, and other positive connections that it creates. He isn’t sure they really work, but trusts the program implementer’s judgment.

The current Alliance plan is to continue to support the improved commercial window efficiency through BetterBricks as described in Chapter 2. In regard to market impacts, the long-term goal of getting to a national ENERGYSTAR® label for commercial windows is looking less likely because there won’t be the same focused manufacturer liaison work. Additionally, it’s unlikely that long-term

change in the Pacific Northwest market has been achieved because it takes a long time to build the momentum and the Alliance made the decision to eliminate market support after just three years.

The new goal is to get the CWI elements implemented in the larger Commercial Sector Initiative (CSI) program. The challenge is to not lose the expertise, goodwill and interest generated during the three years of the CWI program implementation. The Alliance now runs the risk of losing manufacturers' interest. When the manufacturers plan their next marketing campaign and strategy they may shift gears since CWI gave them their marketing focus and CWI is no longer there.

According to the Alliance program manager, the president of West Wall Group told the manufacturers that CWI is not going away, but going to a broader target in a new way. The president affirmed that WWG told manufacturers that "a lot of the activities of CWI with developers and designers are being rolled into BetterBricks," but that there is going to be less money, so there will be less effort.

He also indicated that he thought one of the greatest strengths that the CWI team brought to the Initiative was their understanding of how fenestration products are actually bought and sold. They brought a unique approach to training design teams and working with manufacturers that began with an understanding of "the pace of business and the kinds of trade-offs that have to happen" in the design process. WWG staff made sure that when manufacturers, architects or developers had a question about efficient glazing that they did not have to wait even half a day for a CWI response. The WWG president is concerned that with windows being added to the design labs' already full agendas, responses to questions may not be as quick. If that happens, the information will not be relevant because design decisions will have already been made. He is looking forward to being a resource for the labs and hopes that he can instill in them a sense of the "speed of commerce."

One of the issues critical to WWG is that CWI was in the process of addressing high-performance specifications for site-built products in the Northwest. The original CWI specification applied to manufactured products – specifically disregarding site-built products. Efforts begun by CWI in 2004 and continued through 2005 were bringing manufacturers toward an agreement on appropriate U-factor and SHGC specifications for site-built fenestration. It is not clear what lasting effect this work will have given the limited outreach to manufacturers that will be available in the future. The WWG president also stated that initially separating site-built products out from the focus on manufactured products reduced the appeal that CWI specifications could have had for architects. Architects tend not to think of these two classes of products as distinct, but rather, they think of the full range of glazing solutions as one continuum. Additionally, some manufacturers only offer site-built glazing systems and CWI therefore had no immediate relevance to them while it only considered manufactured products. This is discussed in more detail in the first MPER.

One of the responsibilities that the WWG president will continue to fulfill for the Alliance is representation to NFRC. He feels that the NFRC is now pretty close to resolving the few remaining issues standing in the way of implementing a viable commercial, site-built fenestration rating system, but that continued representation of the Alliance's interests will be important to the quality of the rating and certification program.

Among the successes of CWI that he cited was a very significant advance in the understanding, among the design community of the performance differences of different low-e coated glazing systems or different types of aluminum frames. CWI imparted this knowledge in a manner that was consistent with the way architects and developers do business – rather than expecting them to change their basic business practices for the sake of energy efficiency.

Another significant success that he pointed to was a clarification of certain manufacturers' business interests in energy efficient commercial fenestration. For example, one manufacturer "did not even think they were in the commercial market, because they did not have brochures targeted at the commercial market." CWI was able to use manufacturers' own data to show them how much of their business actually is in the commercial building sector. For one component manufacturer whose primary products help window manufacturers meet the CWI-specifications, CWI helped them understand their data in a way that has helped them increase sales in the Northwest commercial window market.

The WWG president felt that several large manufacturers who were not directly affected (at least while the specification only covered manufactured products), could "see the potential" for higher sales of more efficient product. WWG stated that "it got them to design new products to meet the CWI specification. Because of completely unrelated circumstances, they each were less involved in the CWI process and marketing efforts than might have been expected. For example, a large national commercial window manufacturer shifted their attention to the more lucrative "blast resistant" products after September 11, 2001, and the fairly small energy efficiency market in the Northwest, with its much smaller profit margins, fell away.

WWG expects that manufacturers and architects in the Northwest really want to have window energy efficiency experts they can call on, and that they will miss the level of service that CWI has been able to give them in this regard.

When asked if they thought that CWI had been responsible for any code changes in the Northwest, WWG said that no jurisdiction changed their commercial window requirements as a result of CWI activities. WWG does believe that CWI was directly responsible for a change in fenestration specifications within the City of Seattle's historic building renovation program.

On the other hand, before CWI, Northwest code change discussions were largely a debate about whether U-factors of 0.45 or 0.48 were appropriate. Now the discussions focus more on 0.35 or 0.42 – the CWI specifications for non-metal and metal windows, respectively. The discussion is now focused on how

buildings really work and re-examining the savings assumptions – particularly those built into DOE2. The WWG president sees this development as particularly helpful.

He also stated that decisions about windows, HVAC systems, refrigerators and other building materials and equipment are often purely commercial transactions. Programs that recognize this and are able to provide input “at the speed of commerce,” can have a significant impact. Programs that cannot simply will not be participants in those crucial decisions.

Supply Side

In the fall of 2005 we conducted seven interviews with members of the commercial window industry – window manufacturers, component manufacturers, DOE staff, and national lab staff. The DOE representative plans and directs the Department’s national fenestration efforts and has worked alongside the WWG president on the Board of NFRC. Likewise, the national lab staff interviewed worked with the WWG president at NFRC. Each window or component manufacturer interviewed had worked with CWI on outreach and educational efforts.

One remarkable and surprising conclusion from these interviews was that the interviewees do not expect any significant negative impacts from the reduced scope of CWI. This is not to say they thought CWI had little impact in the past, nor that it wouldn’t have an impact if it continued. Rather, the general feeling was that CWI did have an impact, but that if CWI stopped, there was enough momentum in the market that something else would emerge to help continue the march forward.¹⁴

The DOE staff member at first indicated that with CWI less able to push a local specification, and then work on making it a national effort, there would definitely not be a national commercial window program similar to the Residential Energy Star® Window program. But on further probing, he readily offered that there probably wouldn’t have been anyway – as much because of Washington, D.C. political realities as because of the difficulty of getting a consensus among window manufacturers nationally.

One very active component manufacturer indicated that although it certainly helped to have WWG so active in the CWI effort, even if CWI were to entirely end, progress toward more efficient windows would still continue because “something will fill the void.” His contention was that codes help increase overall efficiency more than anything else and that CWI helped set the stage for higher code levels – but that now *somebody* else will come along and do something else that continues the inexorable movement.

A Northwest commercial window manufacturer who stated that he was “very sad” to see the scope of CWI significantly reduced, predicted that there will not be any

¹⁴ In fact the West Wall Group reformed the CWI as a non-profit entity (501C3), and has secured funding from several sources to continue the education and training work.

reversal of the progress toward higher performance windows because those architects who were educated by CWI, and who have incorporated what they learned into their designs, will continue to specify to those levels. On the other hand, he does not expect the market to continue progressing without either CWI or major improvements to the local codes. He thought the greatest benefit CWI provided was a pool of expert information for architects. He stated that there were no projects he could point to where CWI's *direct* assistance helped them to up sell to a more efficient product, but that CWI's outreach and training for architects had clearly impacted the bid specifications. He also indicated that his company is in the middle of designing a product specifically to meet the CWI specifications.

Another Northwest window manufacturer said that he does fear there will be a reversal in the energy efficiency trend without the same level of CWI effort as there has been. As an example, he cited a project his company is now involved in where the first call about windows from the architect went to WWG. WWG then brought his company in and together they caused a shift to a more high-performance product. Without the assistance of WWG on this and other, similar projects, he believes it is highly unlikely that these buildings would have achieved the level of energy efficiency they did. This window manufacturer also suggested that CWI should have spent more time educating architects and could have had an even greater impact than it did. (It should be noted that WWG had education sessions with hundreds of architects over the course of the program.)

All with whom we spoke were very complimentary about the work of the CWI staff. Praise for the quality of the training they did was consistently offered by all interviewees. Several listed it first when asked whether they thought that CWI had made a difference. There was general agreement that the design community in the Northwest knew too little about high-performance windows before the CWI and that the various types of CWI training sessions did a lot to improve their knowledge.

Demand Side Interviews

In the fall of 2005 we contacted four demand side market players who had been extensively involved with CWI. Some of these people were designers who specified window products; others were individuals who influenced the design community. We spoke to one architect, a manager of a utility commercial new construction program, a city Office of Housing staff, and the Seattle AIA Director. We asked each of them what CWI had provided to them, what had worked for them, and whether they could point to any projects that had been impacted by the CWI efforts. Additionally, we spoke briefly with them about the future direction of the Alliance windows effort and asked them whether they thought anything would be lost due to the change in emphasis.

Nearly all of the people interviewed felt that the Commercial Window Initiative and the WWG had done a good job of educating the market, and working to find solutions for specific situations. Only one of the interviewees was able to provide information on a direct influence of CWI.

We spoke with an architect in Boise who incorporated the CWI specification into several projects, including their own office building. He was very happy with the solutions provided by CWI. His firm uses their office as an example to show their clients. They have been able to incorporate the specification into several other projects and plan on proposing it for future projects.

We also spoke with the manager of the Idaho Power commercial construction program. In the spring of 2005, CWI conducted training in Idaho Power service territory in conjunction with other BetterBricks training. Most of the attendees were designers (architects and engineers). There was also utility program staff in attendance. The commercial construction program was just being designed, so Idaho Power staff was able to benefit from the CWI support. Idaho Power staff was very impressed with the CWI presenters and presentation, because they were able to provide technical knowledge at many different levels and tailor their presentations to the audience.

The CWI work resulted in a high efficiency window specification as one of the program requirements. Idaho Power did not have to do the research because CWI brought the technical expertise and all the information that they needed. The interviewee indicated that there is a significant likelihood that there would not have been a window requirement at all, because there was no other specification available. The program requirement would most likely have been lower without the CWI support.

He felt that it is hard to tell right now whether anything will be lost with the proposed program changes. With CWI it was very clear what was being presented. With CSI there are no specific or concrete offerings. The service is not as clearly spelled out. It will make it more difficult for people to know what services to request.

We also interviewed a former Seattle Office of Housing employee. CWI connected with the Office of Housing through Seattle City Light. CWI was able to promote good decisions for replacement windows, particularly for historical buildings. CWI provided educational tools and information and contacts for specific products. CWI helped in educating policy makers and decision makers about windows and facilitated a greater understanding of the issues. The interviewee could not give any examples of projects that were directly influenced by CWI. He felt that the projects will continue to use CWI-qualifying products even without further involvement from CWI.

We spoke with the Seattle AIA Director. She was very pleased with the CWI support. CWI teamed with the AIA Chapter to provide training sessions specifically for commercial windows. She felt that the training worked very well in providing information on specific window products and solutions to specific design issues. She could not say directly whether specific projects were influenced by the CWI presentations, since the goal was to educate people in general, not deal with specific projects.

She feels that having CWI as a resource has been a real benefit. The training sessions they provided led to good information dissemination. The training

sessions will not continue unless there is some other funding available. AIA has other collaborations with the BetterBricks, besides just the Commercial Window Initiative, so it is possible that the information can continue to be provided through a similar forum.

3.2.3 Assessment of Alliance Cost-Effectiveness (ACE) Model

The first MPER contained a thorough assessment of the ACE model inputs. No further work was done for this MPER. Without more reliable sales data such an effort would have been fruitless.

3.2.4 Summary of Progress Indicator Information

In Section 3.2.1, we stated that several progress indicators were analyzed. This section briefly summarizes what was found for each of these.

- *Increased awareness of the Initiative's specifications and associated products.* CWI staff had over 150 meetings with individual manufacturer representatives and met with approximately 150 different architects. The Seattle AIA Director stated that training sessions provided by CWI led to good information dissemination.
- *Increased total production and sales of qualifying products.* As stated below in Section 3.3, HMG was not able to assess this progress indicator.
- *Increased numbers of (commercial building) projects with punched openings specifying qualified products.* Though a market analysis was not in the scope of this MPER several interviewees indicated that the CWI *specification* was beginning to be used:
 - An architect in Boise incorporated the CWI specification into several projects, including his own office building, and plans on proposing it for future projects.
 - Idaho Power's commercial construction program included a requirement for CWI-based high efficiency window specifications after a presentation by the CWI team.
 - CWI helped policy makers and decision makers at the Seattle Office of Housing (SOH) understand more about windows, and provided them with educational tools, information and contacts for specific products. While the interviewee from SOH could not provide specific examples of projects that were directly influenced by CWI, he felt that projects in SOH's programs will continue to use CWI-qualifying products even without further involvement from CWI.
- *Increased availability and number of qualifying products.* At least four manufacturers said that they have developed or are developing products specifically designed to meet the CWI specifications and capture a piece of the Northwest commercial window market.

3.3 Program Impacts

Energy impacts of the Commercial Windows Initiative were not possible to estimate because neither WWG nor HMG were able to locate reliable sales data for either the overall market or the number of efficient windows. However, that does not mean that there were no impacts. There may have been a shift in sales to higher performing windows. We simply could not verify it. There were other impacts that appear from the data we reviewed and the interviews we conducted. Based on that data, we were able to identify at least five other positive market influences of CWI:

- Northwest code discussions focusing on a higher performance target than before CWI
- New products designed to meet the CWI specifications
- New sales efforts for high-performance products based on manufacturers' better understanding of the market specifically fostered by CWI¹⁵
- An increased level of understanding among the architectural community about high-performance commercial windows
- Improved the glazing requirements of existing commercial energy efficiency programs

Before the advent of CWI, the performance levels (U-factors) that were under discussion for the next iteration of commercial building codes in the Northwest were 12%-20% higher (worse performing) than the CWI U-factor specifications. Specifically, the discussion focused on 0.45-0.48. Now the discussion is focused on 0.35 to 0.42. While several things may have contributed to this change, CWI's efforts in the market as well as their direct code involvement were significant factors.

At least four manufacturers designed or are designing new products specifically intended to meet the CWI specifications. Another manufacturer designed a new product indirectly intended to meet the CWI specs. Although they were not working with or focused on CWI, their new product was designed to take on their local competition, and their competitors were working with CWI and selling CWI qualified product.

Several manufacturers gained a valuable understanding of market data that led to them selling more high-performance commercial fenestration products or components. A couple manufacturers learned that they have a presence in the commercial window market that they had not realized before, and consequently changed some of their strategies to sell more CWI-qualified product. Another gained a new understanding that their (component) product was being purchased

¹⁵ For example, one insulated glass unit manufacturer thought their product was only being used in the northwest for residential windows. They did not even market to the commercial window manufacturers. When he found out through CWI that his company had significant sales of glazing for commercial windows, he launched new efforts to gain an even larger share of that market.

to help Northwest manufacturers meet the CWI specifications; thereby learning about a path to greater sales in the Northwest.

Finally, perhaps the most important impact is that CWI has significantly increased the level of architects' sophistication related to fenestration performance factors, fenestration components, and the impact of fenestration on building performance. Everybody with whom we spoke in the Northwest pointed to the training that CWI provided architects as being the number one benefit to the Northwest fenestration market. Several provided examples of how this new level of understanding has changed project specifications.

4. FINDINGS & RECOMMENDATIONS

4.1 Key Findings

4.1.1 Progress Toward the Program Goal Of Increasing Market Penetration of CWI-Specified Windows Could Not Be Reliably Measured.

A key finding for the task of estimating market share and energy savings is that the foremost performance criterion for the Commercial Window Initiative could not be reliably measured. West Wall Group and (in preparation for the first MPER) the HESCHONG MAHONE GROUP both collected data from manufacturers on their sales, both of qualifying products and of all products. The data from manufacturers led to untenable conclusions and it became clear that manufacturers' data alone would not be sufficient to establish CWI progress.

In the first MPER, HMG provided two alternative solutions. One was to consider other metrics for evaluating the effectiveness of the CWI program efforts such as new product introductions or manufacturers' and architects' awareness of features of high-performance windows. The other option was to design and implement a data collection and analysis strategy that would be significantly more expensive than this evaluation. The first of these options was easily measurable but required assumptions regarding the relationship between these metrics and overall market penetration for which the Alliance had no basis. The Alliance decided not to pursue the second option both because of its expense and because there was no guarantee that the results would be conclusive. The evaluators therefore can draw no conclusions regarding the main program goal of increasing market penetration of CWI-specified products by 38%.

4.1.2 CWI's Impacts on Other Programs and Codes

While this evaluation was unable to determine direct energy impacts, there was evidence that CWI activity influenced other programs and organizations such that energy impacts will occur. Specifically, CWI had a positive influence on the Northwest code discussions and on glazing requirements for commercial energy efficiency programs. Stakeholders reported that before CWI, discussions centered around U-factors roughly 15-20% higher than those under discussion now.

4.1.3 Products Developed to Meet the CWI Specifications

At least four manufacturers said that they have developed or are developing products specifically designed to meet the CWI specifications and capture a piece of the Northwest commercial window market. Even without knowing how successful these manufacturers are or will be in acquiring market share with their

new products, their commitment to meet CWI specifications is a clear sign of market impact.

4.1.4 Stakeholders' Attitudes

Virtually everyone we interviewed declared that CWI had done great things for the industry (primarily in educating architects), and stated their appreciation for the CWI staff's efforts. Most felt that a significantly reduced scope for CWI represents a loss to the Northwest fenestration community, though they generally felt that it would not mark the beginning of a retreat from the use of high performance products. Some even expressed a hope that CWI, or something like it, would re-emerge before too long. Notably, one of the interviewees making this statement was also among those who had originally questioned the appropriateness of or the need for the CWI intervention and plan when interviewed for the first MPER.

4.1.5 CWI's Approach to Market Actors

WWG learned that the architectural community, and even most of the manufacturing community, is much less aware of energy performance issues than had been thought at the program outset. Perhaps more important, they learned that the energy efficiency community and the architectural community do not speak the same language. WWG initially assumed that the window and glass sales representatives that call on architects would have educated and informed the architects about high performance glazing systems, but discovered that this was not the case. Consequently, WWG spent a lot more time educating architects and manufacturer representatives about the technical specifications of windows than they had originally planned.

4.2 Long-Term Tracking

The Alliance does long-term, post-contract tracking for projects expected to generate savings over time. CWI is currently slated to have long-term tracking. Given the difficulties encountered by program staff and evaluators in tracking sales and determining current savings, the Alliance's ability to establish long-term savings will be problematic.

Three pieces of information will be needed: baseline market information (e.g., size of market and market penetration), a per-unit energy savings estimate, and the market penetration of CWI-qualifying windows over time. The first of these may be available late in 2006 from the commercial new construction survey the Alliance is conducting. Though the survey protocols are not final, the current thought is that they may provide statistically valid regional data on window U-factors of installed product¹⁶. The survey will include buildings permitted

¹⁶ Since CWI specifications also included solar heat gain coefficient (SHGC), the survey should provide statistically valid regional data on window SHGC as well.

between 2002 and 2004. These are good dates for a baseline as CWI may have had little or no influence on buildings by then. Depending upon how much and how quickly building design practices changed due to CWI's educational outreach efforts (which began in 2003), designs of a small number of the "baseline" buildings might actually represent CWI influences.

A second project, conducted by Lawrence Berkeley Labs and Ecotope, Inc. is slated to provide per unit savings estimates during the second quarter of 2006.

That leaves market penetration, the area in which the evaluators were unable to make any headway. However, the following recommendation was made in MPER #1:

If the Alliance decides that changes in market share of CWI-qualified products (one necessary element for estimating the energy impact of the program) must still be tracked, then HMG recommends that the data be gathered by Ducker Research. Ducker, through its strong pre-existing reputation and connection to the fenestration industry, has the best prospect for success in obtaining reliable market share data.

Preliminary discussions with Ducker indicated that this work could be done for approximately \$100,000 and would have to be repeated every few years. While we still believe this is the best method (among the alternatives considered), there is still no way to know how accurate the resulting data would be. It would provide credibility, however, as Ducker has a long history of data collection in the commercial windows market.

A final area of difficulty will be in attributing influence to CWI over an extended period. The program existed for less than three years. While it has had an influence in the market (as documented in this report), the intended market transformation is not very far along. If the president of WWG succeeds in maintaining the funding he has secured from outside sources (see Footnote 12), and if broader, national influences such as LEED continue to grow, it is not clear what percentage of the savings the Alliance will be able to claim.

4.3 Recommendations

Although CWI will no longer be a stand-alone program, there are some important lessons that can be applied in its new incarnation within the BetterBricks Integrated Design Labs:

1. The Alliance should ensure that education for architects on high performance windows continues. Program experience makes it clear that this is a necessity if they are expected to understand the benefits of high performance windows and specify them.
2. The Alliance should take necessary steps to ensure that analysis and advice requested of the Integrated Design Labs (IDLs) by window

- manufacturers, developers or designers is provided within a time frame that meets the expectations of the industry (“at the speed of commerce”).
3. The Alliance should continue providing regular communication to the commercial window industry in the northwest, to forestall an impression that the Alliance is no longer interested in high performance commercial windows. The communication should focus on accomplishments through the IDLs as well as any other Alliance supported activities related to the fenestration industry.
 4. The Alliance should participate strongly in the building code adoption processes throughout the northwest. Several participants interviewed advised that the most significant savings from high performance windows flow from code requirements.