Assessing New Construction Programs in Light of Advancing Standards: Where are the Opportunities for Deeper Savings?

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Introduction

The new construction market has evolved dramatically in recent years. The rapid changes in building energy efficiency codes combined with market expectations for greener, more efficient buildings has resulted in energy efficiency programs finding fewer savings opportunities to deliver upon.

Green building certification programs such as the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program, and the increasing stringency of the ASHRAE 90.1 standard and IECC code, as well as the overall availability of energy efficient equipment in the market, have lead architects, engineers and contractors to re-examine and improve their design and specification practices. They have had to learn and accept new design strategies, think in different or more creative ways, and ultimately adapt to meet market demand for energy efficient design.

This poster presents the perspective of supply-side market actors in Massachusetts on challenges and opportunities in the new construction market based on in-depth interviews with 31 architects, 11 mechanical engineers and 9 construction managers. The research team consisted of personnel experienced in building science and the new construction which allowed and the team to explore and understand the market issues more in-depth.

The goals of the study were to:

1. Characterize the design, engineering, and construction management firms involved with recent large commercial construction projects.
2. Characterize the design and specification practices with regard to energy efficiency.
3. Assess awareness and participation in new construction programs offered by the Energy Efficiency Program Administrators.
4. Assess changes in design and specification practices as a result of contact with the new construction programs.

In conducting the research, the research team developed the sample based on F.W. Dodge new construction market data from 2005 through 2010, and interviewed architects, engineers, and construction managers who represented firms of different sizes based on total construction value, and then analyzed the results of those interviews.

Findings and Conclusions

Key findings of the research in relation to market actor general practices, program awareness, the impact of energy codes, and equipment included:

1. Building professionals continue to face obstacles in designing and specifying energy efficient equipment including:

    - First costs
    - Diverse decision making practices
    - Reluctance to change established methods
    - Convincing clients to use unfamiliar technologies
    - Resistance to train personnel to use more complicated systems
    - Lead times, product availability, and constructability

2. Most respondents claimed to have only modest knowledge of the utility incentive programs, indicated that the time it takes to coordinate and apply for incentives can be a deterrent and that the time at which the utilities are engaged is generally inconsistent and leads to mixed results.

3. Equipment seemed to be keeping up with energy code changes; however some designers find themselves in a constant learning curve because of the rapid pace of changes to codes.

4. In relation to specific types of equipment –

Lighting:

- Strong interest in LED lighting fixtures presents good opportunities for additional savings
- While occupancy sensors are fairly common, daylight dimmers remain at a premium are generally not specified

HVAC:

- Variable Air Volume HVAC systems are becoming common practice.
- Evaporative condensing units, chilled beams, and co-generation systems are gaining wider acceptance
- While the benefits of advanced controls, monitors, and sensors are well recognized, some engineers are view these systems as more problematic than helpful

Envelope:

- According to the responses there is a general lack of understanding amongst design professions of what constitutes an energy efficient wall or roof assembly

Building Simulation Modeling:

- Opportunities to fully engage design teams with Comprehensive Design Assistance are lost when building simulation models cannot be obtained quickly enough to affect efficient equipment and measure selection.

Building Commissioning:

- While building commissioning was highly regarded, this effect of commissioning on operations is unclear making the cost of commissioning difficult to justify to building owners.