Charrette Outcomes

The Impacts on Buildings' Environmental Performance: Multi-Unit Residential Buildings

A Research Report Prepared for

Natural Resources Canada

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Disclaimer

Sustainable Buildings Canada is pleased to provide the following Report providing the results of research undertaken in 2006 aimed at identifying the impacts on buildings of participation in integrated design “Charrettes”. The research focused on interviews with a series of multi-unit residential building developers. Any views expressed, errors or omissions are solely the responsibility of Sustainable Buildings Canada.

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1.0 Introduction

Sustainable Buildings Canada (SBC) has undertaken a number of integrated design workshops and activities, generically described as “Charrettes”. These Charrettes aim to showcase the environmental and energy efficiency improvements that can occur through the use of the integrated design process (IDP). Typically, SBC uses actual (planned) buildings and facilitates 1 to 2-day workshops where building professionals and specialists aim to improve the environmental performance of the building through a series of facilitated brainstorming sessions. Modeled energy and environmental performance is tracked and reported as the building iterates through a number of improvements. Significant environmental and energy efficiency improvements are usually demonstrated and the developer/owner is encouraged to consider the inherent improvements as part of a revised design.

While the modeled results have always been impressive, it has never been clear what the actual outcome for any given building is. As a rule SBC does not follow up with developers to determine what, if anything, was actually done to the building. As part of its support for energy efficiency in the buildings sector, Natural Resources Canada (NRCan) contracted SBC to re-visit a sample of the multi-unit residential (MURB) projects that participated in SBC sponsored Charrettes to determine the various outcomes. The following report details the results of that research.

2.0 Approach

SBC undertook a series of interviews with owner/developers of MURB projects that had participated in SBC sponsored Charrettes. A total of 4 interviews were conducted with developers. Each interviewee represented a senior representative of the organization who was able to speak to all facets of the development, including the organization’s perspective on the Charrette. The interviewer followed a pre-determined series of questions, however the interview was intended to be free flowing. As indicated, the interviewees were senior representatives of four organizations that had undertaken design Charrettes on MURB buildings in the past 4 years:

- Minto Urban Communities
- Tridel Ltd.
- Windmill Developments
- Context Developments

The interviews attempted to identify the specific actions (and related costs) that were undertaken as a result of information that was learned or developed at the Charrette. As well, the research aimed to collect more qualitative information including how business operations and decisions might have been impacted within the various organizations, and whether owner/developers now had a different perspective on energy and environmental performance of buildings.

Section 3 presents a synopsis of the research. Due to expressed concerns about confidentiality, individual comments are not attributed. As well, it should be noted that

most participants were un-willing to share information regarding the costs of equipment or some of the specifics regarding the improvements that were made. This speaks to the highly competitive nature of the marketplace – particularly with respect to Multi-Unit Residential Buildings (i.e. condominiums).

3.0 Research Results

Section 3 presents the results of the research. The results are organized into separate components:

- Context and developer background
- Benefits and shortcomings of the Charrette
- Organizational changes and changes to Process
- Potential improvements to the Charrette process
- Ways to encourage more green and energy efficient building projects

While the comments are not attributed to individuals, they are reported "as is".

3.1 Context and Developer Background

Championing green buildings and the desire to participate in the Charrette was typically driven by principals at the organization – champions who recognized that green buildings may offer unique value added opportunities.

The drivers were essentially market forces including,

- The provincial government of the day was considering the deregulation of electricity,
- Rising fuel prices, particularly expected electricity price increases focused attention on the benefits of energy efficiency
- Rising condominium fees were (and are) an issue and better control of fees through energy efficiency was seen as a marketing advantage

Much of the focus for green buildings started in the design areas. Ultimately, the interest has expanded to other operational areas. For organizations that own and operate buildings, this has meant new interest in energy efficient retrofit opportunities.

3.2. Benefits and Shortcomings of the IDP Charrette

<u>Benefits</u>

A number of Benefits were identified, including,

Modeling: One of the main benefits identified was building modeling and energy simulation. Developers reported that responsiveness of the simulation was particularly useful. Modeling had never been done before by some; the design team had relied on

mechanical engineers and rules of thumb resulting in larger-than-necessary equipment. A 3rd party model helped to predict payback on various components. For one developer, the post Charrette result is that modeling was applied to all new projects and the developer eventually hired a modeler. The modeling also helped in the understanding of the CBIP program.

Showcasing capacity in the market: Developers felt that the Charrette accomplished a lot in a very short period of time and illustrated the level of knowledge and experience in the consultant community. It also showcased the effectiveness of the modeling process and the capabilities of the modelers in particular.

Demonstrating the potential: One value of the Charrette was in the way it illustrated how design decisions impact life cycle costs. In today's Toronto condo market, large areas of glazing are used to compensate for small units. The Charrette helped to illustrate the huge impact that so much glazing has on energy consumption. In this context, the Charrette met expectations. It also showed that a small adjustment in business-as-usual (building envelope decisions geared to better energy efficiency) can result in improved performance without increased capital cost. The willingness of the client is critical- the improved performance is easily worth the incremental consultant cost.

Linkage to Marketing: There is an opportunity to up-sell the development using the outcome of the Charrette. (SBC Note: To our knowledge, few developers that have done Charrettes have really leveraged the marketing potential).

Shortcomings

Length and focus of the Charrette. Developers were unanimous in their belief that a 1-day event is too short for their purposes. They feel that the next step is to take the focus off demonstrating the potential for integrated design and put it on actually doing the integrated design on projects.

Consultant Expertise. Developers noted that there were some limitations in the expertise of consultants in terms of condo development. That has since improved.

Focus on payback. One developer felt that the costing and payback component was un-necessarily large. This information is of only limited use to a developer.

3.3 Organizational Change and Changes to Process

In general, the shift to green buildings, energy efficiency, CBIP and LEED has affected the development of a new condo. Whereas "lifestyle" marketing was concerned more with architectural design, amenities and finishes, green buildings have resulted in a closer relationship between marketing and engineering as well as having an impact on working drawings and specs, largely to satisfy LEED requirements. It has also resulted in an emphasis on the green elements of buildings as part of specific marketing strategy. This represents a major shift from the typical marketing efforts. Engineering decisions are now required earlier in the process as engineering becomes more closely tied to marketing. Even modeling has become linked to marketing priorities.

Two of the developers have made steps towards “in-graining” green in their culture within the organization. Energy efficiency and sustainability are receiving greater attention and the themes are being championed by those at the highest levels of the organization.

There is much room for improvement in the process of developing green buildings. Traditionally, consultant fees are a percentage of capital cost. Incentives like linking fees to performance metrics of the building would help move consultants (particularly Mechanical) away from being in the linear design hierarchy toward the mentality of being a team member with a responsibility for meeting performance targets.
The fee system needs to be better aligned with delivery of high-performance buildings. Sharing CBIP money was one strategy but does not address the fundamental issue.

One developer identified the Charrette and related activities as the impetus for considering a more holistic approach to design. In particular, prior to the Charrette, the focus was purely on energy savings and efficiency. After the Charrette, the company took a more holistic approach that included all resources and environmental impacts.

Project management.

Consultants. There is pressure on consultants to provide information earlier in the process - modelers need information earlier to 1) show CBIP compliance and 2) validate the performance of common areas and elements of the building (which relates with marketing).

Generals and Trades. This remains an area of concern with respect to market capability. Developers noted that significant education is still required for the various trades on green buildings. LEED certification has resulted in changes to the language in the scope of work for trades. The result has been higher quotes from trades as a response to the deviation from business-as-usual. Trades are also stuck in traditional approaches and need to be educated in green buildings and the goals the design team wants to achieve.

3.4 Potential Improvements to the Charrette process

Developers were unanimous in supporting an “as early as possible” approach to engaging the integrated design. Some buildings were too far along to affect major change, however the developer did note that even in these cases, the recommendations were put to use in later developments or were used as part of an internal validation process.

The IDP requires more balance and focus. Whereas conventional wisdom / academic theory requires all team members to be present for IDP sessions, there is a case to be made for disciplines to break out and deal with some of the detailed discussions. Such streamlining would reduce time wasted by the other consultants who can lose focus as details are discussed. A finer balance between the creative problem-solving group approach and the detailed nuts-and-bolts would improve the process.

There needs to be more buy-in from more consultants, to encourage them to go beyond their comfort zone and strive to learn, to conduct research into green buildings and to question their traditional approaches.

One developer has been continuously improving the process (eg becoming their own project manager) and the IDP results in better costing decisions such as the ability to decide on sustainable concepts earlier in the process. The IDP now carries greater weight because it influences decision-making at a much earlier stage in the development process.

Input from non-traditional participants including trades representatives would be beneficial. They represent a potential "grounding" of the process.

3.5- Improvements needed to encourage green buildings

Municipal Support.

Even though they say they want green buildings, municipalities need to put more effort behind their words, at least in the Toronto area. Victoria Harbour is the best Canadian example of a municipality driving the green agenda. Developers felt that Municipalities should do much more to reward green buildings. They also need to adopt third party standards to keep "light green" buildings from claiming rewards.

There are many creative means available to municipalities that are not being used such as:

- Fast tracking green projects
- Calculating infrastructure benefits and reducing development charges
- Giving density bonuses for green buildings
- Environmental initiatives in developments need to be quantified in terms of their monetary benefit to the city. This value can then be translated into incentives like bonusing and reduced development charges

Building massing is critical to good performance – municipal design guidelines should consider massing and performance. At the macro scale municipalities need to direct density to the right places (subway stops) and think of land use in terms of sustainability.

Reluctance at the municipal level is due to risk of liability concerns. The new performance based codes make approvals more difficult in that municipal staff are unwilling to approve the interpretations for fear of exposing the municipality to liabilities. There is buy-in at senior levels but less so at the approvals level. A dedicated coordinator for green buildings (like Chicago) would be useful. Shared risk between municipalities and the province is one solution. The two bodies should embark on pilot projects with the goal of achieving acceptable solutions- eg on-site treatment of waste water.

Code officials need education to understand the value of sustainability and energy efficiency. Education and green knowledge is also needed at the approvals level. The

dis-connect between the uptake of green technologies and the Code based approach to traditional design was noted as a potential barrier.

Material supplies can be problematic and regionality (lack of widespread supply) is an issue – particularly for advanced systems such as building integrated renewable energy.

3.6 Other General Comments

Materials: A clearing house of green materials and equipment by division would help consultants save time and money on sourcing.

Envelope: Building envelope and ventilation are big determinants of efficiency- more R&D in these areas would help. As well, and to a larger extent than before, the building envelope is driving design and marketing (to maximize efficiency, glass needs to be kept to a maximum of 40%)

Finance: Green Loans (or similar ESCO model) for better equipment would be beneficial.

Support from Natural Resources Canada: Developers often aim to be 25-30% better than the MNECB. There is a need for NRCan to continue in its role as validator of efficiency.

Support from Trades and others: Translation from concept to reality depends on contractors and subs understanding and buy-in. They are the ones who will make it work and can give some good input, but are resistant and have little knowledge (at the moment). Ideally the knowledge and input from trades would come earlier in the process and indeed they should be included as part of the Charrette. The general contractors are on the same path as the consultants and have an understanding of the green building concept. The subs are suffering from a knowledge gap and currently have no LEED presence to guide them. All disciplines in the lifecycle of a condo need to commit to continuous learning. Suppliers need to understand the needs and goals of designs driven by sustainability. There also needs to be more R&D effort put into the building elements.

During project management, one developer found his belief in the viability of sustainable design reinforced. Architects and engineers have an understanding of green buildings and some are open to going back to first principles to achieve improvements in performance. Green buildings would benefit with general contractors and trades involved as early as possible in the process. They should have a role akin to construction managers where their expertise is used to address green design concepts (are they doable?) early in the process and thereby avoid complications later on site. This is a beneficial strategy for any building, green or not. It is much better than trying to apply value engineering later in the process.

Marketing: Marketing is also an area that needs to adjust to the change in emphasis from “lifestyle” to green and efficient. It faces a tougher challenge in the delivery of the message of sustainability where the “amenities” are less visual than before.