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## **Promoting Green Building in Private Development: A Strategic Assessment of Options for the Vancouver Region**



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## **Acknowledgements**

Generous funding for this project was provided by Natural Resources Canada as part of the Canadian Institute of Planners' *Promoting Adaptation to Climate Change in the Professional Planning Community* program, administered by the Association of Canadian University Planning Programs.

In preparing this report, several industry experts shared their time, insights, and expertise. Their support is gratefully acknowledged.

Particular and extended thanks go to Tom Hutton (Professor, Centre for Human Settlements, UBC) and Jay Wollenberg (Principal, Coriolis Consulting Corp) who provided ongoing guidance and support for this project from its inception through to its completion.

## **Disclaimer**

The views expressed in this report are those of the author and do not necessarily reflect those of the individuals or organizations consulted. Errors of fact or judgement are the sole responsibility of the author.

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## 1. Introduction

### *Purpose and Scope*

Buildings are consistently identified as a significant (and often *the* most significant) contributor to energy consumption and greenhouse gas production - without mentioning their further contributions to waste, pollution, and resource use. While exact data vary by study, recent estimations for Canada suggest buildings account for a third of the country's energy use, half its extracted natural resources, a quarter of its landfill waste, a tenth of its airborne particulates, and a little more than one third of its greenhouse gases (Lucuik et al. 2005)<sup>1</sup>.

It is not surprising, then, that the question of 'green building' has emerged in the last decade or so as a strong element of research as industry professionals and advocates seek to move towards more ecologically-sound policy and practice in the face of climate change. If implemented successfully, the widespread adoption of green building practices and standards would serve both to *mitigate* the causes of climate change (by reducing energy use, emissions, waste, and so on), and simultaneously to foster *resilience* to the potential consequences of climate change (through intelligent site design and location, reduced dependency on resources and traditional energy, and so on).

Encouragingly, green building has received growing support from all levels of government in the form of civic building policies. Both the governments of Canada and British Columbia have policies requiring minimum green standards for their own building infrastructure - as do a number of municipalities in the study region. In the local context of a region that has a long-standing interest and reputation for sustainability planning, green building can be thought of as the site-specific extension of the same kinds of policy goals that have been pursued at the municipal and inter-municipal levels for over a decade as part of a 'Livable Region'<sup>2</sup>. Without replacing the longstanding significance of land use planning and growth management in pursuing the region's sustainability goals, the emerging interest in green building reflects a growing recognition of the potential for design-oriented policies to contribute to wider planning agendas. In this vein, green building considerations today form an integral part of the region's most innovative, sustainability-driven projects, such as the Olympic Village in Vancouver or UniverCity in Burnaby.

However, in comparison to this growing public sector interest, the voluntary market uptake of green building has been relatively slow. As an indication of this trend, one could look to the case of LEED certified buildings in the study region, the majority of which were commissioned by and for public institutions. The Leadership in Energy and Environmental Design rating system devised by the US Green Building Council was originally adapted for use in Canada in the study region itself, and has become a widely understood industry reference standard. Indeed, the local success of the rating system is such that British Columbia is home to more LEED certified projects than any other province, accounting for 32 of the 95 nationwide, 21 of which can be found in the study region. However, using LEED as

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<sup>1</sup> The study points out that, given the energy used in the production and transportation of building products, these figures are actually under-representative.

<sup>2</sup> The Livable Region Strategic Plan was formally adopted by the Vancouver region's 21 member municipalities in 1996. It promoted four key 'smart growth' principles (protecting the green zone; building complete communities; achieving a compact metropolitan region; and increasing transportation choice).

a proxy to measure the relative distribution of green buildings between the public and private spheres, it can be noted that while the study region contains 21 certified projects, only 9 of these were commercial initiatives<sup>3</sup>. Given the overwhelming predominance of privately owned and developed buildings, particularly in the residential sector, the need to encourage and facilitate developer-instigated green building is evident.

Consequently, this report sets out an evaluation of different tools for promoting the wider adoption of green building practices in private developments, *specifically* in terms of the residential build-to-sell sector. This particular focus presents both the area of greatest potential gain and least direct control: greatest potential gain because most developments are in the residential sector (residential permits accounted for \$5,223,363,150 of the total \$7,455,928,833 value for all building permits issued region-wide in 2007<sup>4</sup>), and least direct control because unless required to by law, building green in the private sector remains the decision of the developer. To address this challenge, an understanding of how development decisions are made, and how they can be influenced, logically forms the basis of this study.

In pursuing this end, this report seeks to build on existing work conducted in the region. A series of recent studies have successfully raised awareness of green building as an area for municipal action and identified a number of policy tools available to local governments (Rutherford, 2006; Sheltair, 2006; Zeeg and Wilson, 2007). Moving beyond the more legislative focus of these reports, this current study seeks to evaluate some of these tools both in terms of their likelihood to influence the developer's decision to incorporate green building features in a given project, and in terms of their eventual practicality or desirability for the municipal authority involved. In producing a strategic assessment of policy options in the context of the region's market conditions, development practices, and planning norms, the intent is to identify the factors that should inform public decisions regarding green building policy and to indicate some of the potential consequences and tradeoffs of these decisions.

Such a strategic assessment is necessarily 'high-level', and is written by a third party from outside any particular development firm or planning department. It will not, as a result, seek to provide design-level assessments of which green building features or rating systems suit which particular sites or building typologies. Similarly, it will not seek to provide an evidence-based evaluation of existing public initiatives regarding green building in the region, a task which falls beyond the information and mandate of this current study. Rather, this report seeks to promote a more general understanding of how development regulation and development economics interact, and how this interaction can be used to encourage greener development outcomes.

### ***Method and Layout***

This study relies primarily upon insights and opinions gained from professionals working in different fields related to green building in the Vancouver region. As a preliminary step before consultations, literature reviews of previous studies from the policy perspective (Eisenberg et al. 2002; NAHB 2002; Syphers et al. 2003;

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<sup>3</sup> Figures for LEED certified projects accurate as of March 7<sup>th</sup>, 2008:

[http://www.cagbc.org/database/rte/LEED\\_Certified\\_Projects\\_in\\_Canada\\_Updated\\_080307.pdf](http://www.cagbc.org/database/rte/LEED_Certified_Projects_in_Canada_Updated_080307.pdf)

<sup>4</sup> See: <http://www.gvrd.bc.ca/growth/keyfacts.htm>

Carlisle et al. 2004; Lucuik et al. 2005; Zerkin 2006) and from the real estate perspective (Kats et al. 2003; Miller et al. 2007; NREIRT 2007; WBCSD 2007; Wilkinson and Reed 2007) were conducted to identify the significant issues likely to be in question.

More particular emphasis was placed upon recent work identifying the available policy tools given the legislative framework of the study region (Rutherford 2006; Sheltair 2006; Zeeg and Wilson 2007).

On the basis of these readings, three broad areas were identified as those most requiring in-depth consideration:

1. Issues of **capacity** relating to the political and market **awareness** of green building; and the available industry (developers and design professionals) and municipal **expertise** and **resources**.
2. Issues relating to the **financial implications** of building green, including its upfront **capital costs** for the developer, and the importance of its payback period for **consumer behaviour** and preferences.
3. Issues relating to the **regulatory means** of municipalities, in terms of how green building can or might be leveraged. A number of specific **drivers** and **policy tools** were identified.

These issues then formed the basis of discussion for a number of consultations with professionals working in the field. For the purposes of consultation, green building was defined as *high performance buildings that seek to minimize their ecological impact through intelligent site design, increased energy and water efficiency, reduced waste, and improved indoor environmental quality*. Representatives from the following sectors/professions were consulted (alphabetically):

- Development firm managers
- Green building and sustainability experts
- Municipal building permitting departments
- Municipal development planning departments
- Real estate sales
- Regional planning agency
- Urban development and planning consultants

All individuals consulted had an interest in green building and kindly provided expert insight into different means to promote its wider adoption.

To supplement consultations, the following two green building workshops were also attended:

- *Introducing Green Buildings and LEED to Contractors*, November 30, 2007, hosted by MetroVancouver and the Vancouver Regional Construction Association
- *Net-Zero Energy Home Forum*, February 26, 2008, hosted by the Net-Zero Energy Home Coalition and Light House Sustainable Building Centre

In addition to the presentations made at these events, extensive use was made of both plenary discussions with participants and informal breakout sessions with attendees to canvas opinion on a number of aspects relating to this study.

It is significant to indicate from the outset that these consultations were not extensive enough to claim to be an exhaustive representation of the field. Furthermore, a clear consensus on a number of issues did not emerge from this process. Insofar as there is neither a long-term nor widespread experience in constructing and marketing residential green building projects in the region, this is not surprising. As such, this report should be read as the early impressions of an industry sector that is currently in evolution. The purpose of the consultations was to conduct an informed survey to gain insight into the questions addressed by this study, for the author to be able to evaluate policy options that might accelerate and/or increase the uptake of green building. This was a highly discretionary and qualitative exercise involving a large degree of judgement. The judgements laid out in this report, and any errors in judgement, are the author's own and do not necessarily reflect the views of any participant or their organization.

The remainder of this report sets out the findings of the research. Consistent with the focus of this study, a significant editorial choice has been to organize these findings according to how they relate in generic terms to the principal variables of a developer's financial analysis, the pro forma. While no figures will be used, the rationale behind this layout is as follows: if the pro forma is the principal decision-making tool for determining the viability of a development project, and if an attempt is to be made to influence the developer's decision to incorporate green features into a project, then a clear understanding of where and how green building impacts the pro forma (or not) will be beneficial for determining which policy actions will be most germane.

To this end, the report is structured around a twofold evaluation. First, the question of how significantly the incorporation of green building features impacts the developer's pro forma is addressed (Chapter 2). Second, the question of how effectively policy tools can be used to intervene in this process is examined (Chapter 3). A summary analysis of the key findings follows these evaluations (Chapter 5). The report then concludes with a discussion of the implications of these findings and subsequent recommendations (Chapter 6).

## 2. Green Building and the Decision-Making Process

In seeking to understand a developer's decision to incorporate green features or not (and if so, how many), the first task is to assess the potential impacts green building might have on a project's viability. This viability is determined by conducting a pro forma analysis. The purpose of this chapter is to lay out - in conceptual rather than numeric terms - the principal components that comprise a development pro forma, and to assess which of these components could be affected by the incorporation of green features, and whether these impacts are likely to be significant or not.

In simplified terms, the contents of a development pro forma can be divided into two broad categories:

1. Components which relate to how much it will cost to build and finance the construction of these products. These components can be thought of as the **cost variables** in a pro forma as they translate ultimately to the outgoing figures on the balance sheet.
2. Components which determine what and how much can be built on the site in question, and what prices the development will be able to achieve (i.e. what product can ultimately be sold on the market and for how much). These components can be thought of as the **revenue variables** in a pro forma as they translate ultimately to the incoming figures on the balance sheet.

The profit margin, seen as the risk mitigation for undertaking the project, is calculated by subtracting the sum of the cost variables from the sum of the revenue variables. This amount determines the viability of the development. This concept of risk mitigation is important to understand from the outset: a key purpose in conducting a pro forma analysis is to minimize the uncertainties inherent in a development project, by assessing the market responses afforded by the regulatory system in place, and determining if these market responses are financially viable for the developer or investor. A schematic summary of the functional components of a pro forma is contained overleaf in Figure 1.

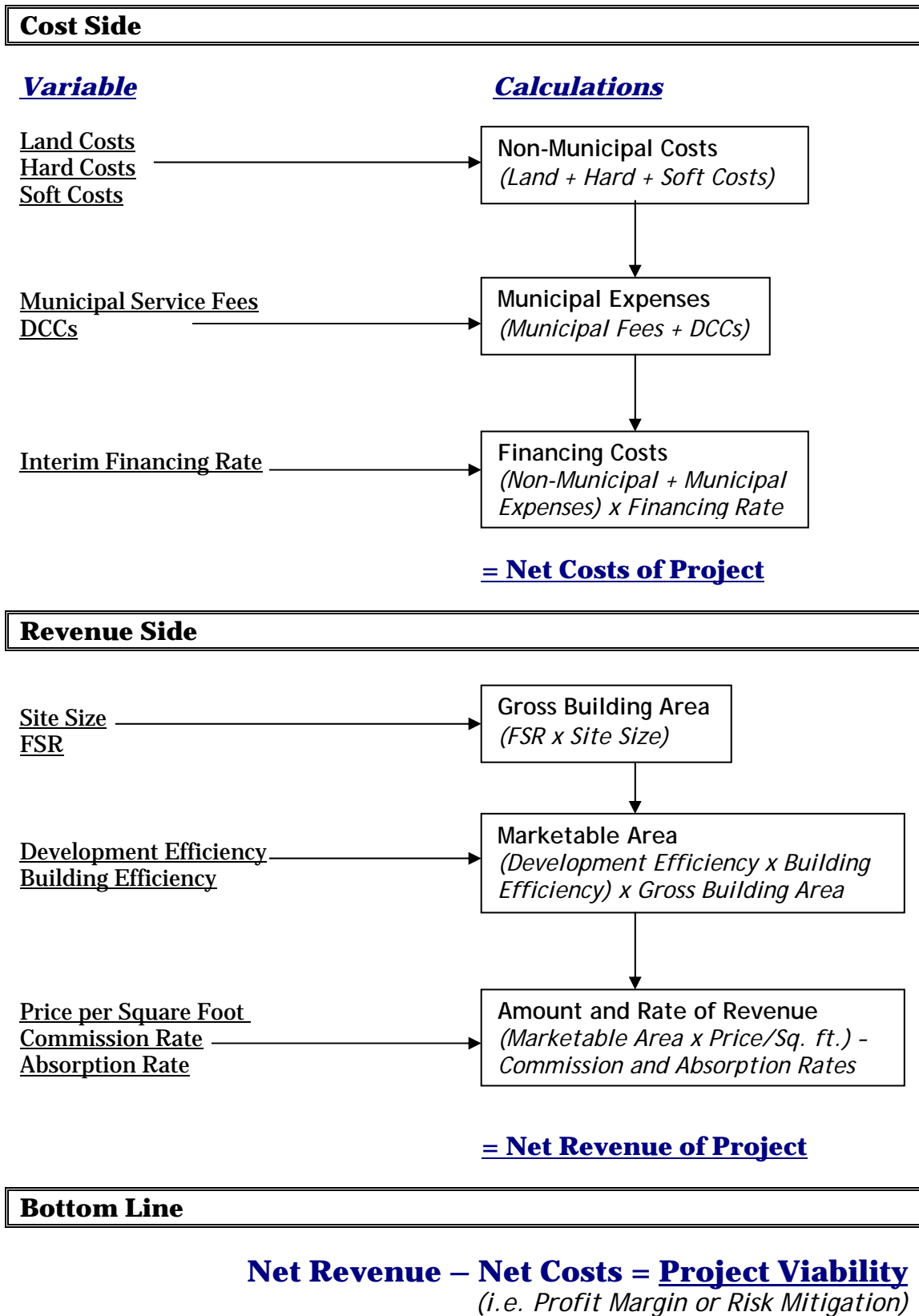
### **Impacts on Principal Cost Variables**

The ways the incorporation of green building features could impact the costs of a development, and the likely significance of these impacts, is described below in terms of the principal variables in question.

#### **Variables Dictating Non-Municipal Costs**

**Land Costs:** Though land (and potentially remediation) costs for sites that promote greener development patterns based on location considerations (for example, avoiding urban sprawl and greenfield development by locating in urban, brownfield or infill sites, located near to public transit, and so on) are often higher, they were not seen to influence or be influenced by the decision to incorporate green features as the acquisition of the site is generally separate from the design and construction phases of development.



Figure 1: The Pro Forma

**Hard Costs:** Hard construction costs were seen to be increased by green building practices. On the materials side, using greener products (for example, ones that are locally sourced, reclaimed, or certified, or ones that are made from recycled content, or rapidly renewable materials) was found to be more expensive. This cost is compounded by the scheduling challenges and delays created by using green, non-standard products (if onsite supplies of a particular product are depleted, and re-supply is not immediate due to the rarity of the product, construction is effectively interrupted).

On the labour side, green construction expertise was also seen to add to the costs of a project. As with the increase in hard costs, this is in a large part due to the additional time burden of managing the construction site in accordance with green building principles (for example, taking the time to separate waste into numerous recycling bins, or developing soil erosion control plans to stabilize and replace movement of earth)<sup>5</sup>.

Notably, current market conditions were seen to potentially exacerbate the significance of these increases. At time of writing, hard costs were very high in the study region, reaching around \$200/sq.ft. buildable (for concrete). Just as importantly, these costs have been rising at around 1% per month (10-15% per year), adding a strong element of uncertainty to the pro forma.

**Soft Costs:** Soft costs, typically conceived of as around 15%-20% of hard costs, were correspondingly seen to increase with the need to purchase green building expertise for almost all services (architectural, landscaping, modelling, engineering, and so on). Melding these diverse services into an Integrated Design Process requires more upfront time, and often the need for a designated green building consultant. A final additional burden relates to the time and cost of documentation that participation in green building rating systems such as LEED necessitate.

It should be recognized for increases in both hard and soft costs, that these costs were seen to be coming down as technologies, processes, and materials are all becoming less 'new'. Furthermore, certain increases in time-related costs were associated with the challenges of changing practices and relations in general (as opposed to being inherently related to changing towards green practices in particular). Innovating towards greener products or anything else was seen to require a certain time to develop new understandings with external relations (for example, architects and engineers) as well as in-house, across-the-board commitment to new ideas or practices.

For all these reasons, the impact incorporating green features has on overall project costs was judged to be significant. To provide consistency, the LEED rating system was used as a reference standard in consultations and discussions with regional practitioners. Strong consensus emerged that the net impact of building to LEED Silver standard or equivalent corresponded to a 2% increase in overall costs, while LEED Gold standard or equivalent would imply a 5+% overall net increase<sup>6</sup>.

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<sup>5</sup> Interestingly, there is one green feature – reducing onsite parking for residents – that has the potential to *lower* project costs. However, there were concerns that incorporating this feature would carry a risk with respect to the eventual marketability and value of the development (i.e. many potential homebuyers would be reticent to invest in a property without parking capacity).

<sup>6</sup> This consensus is further supported by studies into the costs of green building that have returned similar results (Katz 2003, Syphers et al. 2003), although other studies find such inconsistency in the

### **Variables Dictating Municipal Expenses**

**DCCs<sup>7</sup>, Permitting and Application Fees<sup>8</sup>:** DCCs and municipal fees are not currently calibrated on the basis of a development's environmental performance and therefore do not influence the decision to build green.

They were as such judged not applicable to the decision to incorporate green features. Changing these municipal fees to encourage green building (that is, to make them 'applicable' in the decision-making process) will be one of the policy options discussed in the next chapter.

### **Variables Dictating the Financing Costs**

**Interim Financing:** The increases in hard and soft costs were consequently seen to impact the capital sum to be borrowed and therefore to be paid interest on. Of equal importance, the expected increases in time to complete a green project (increases related to unfamiliar processes, materials or expertise requirements, or to the inherent installation time of certain features such as ground-source heat pumps) were correspondingly seen to increase the time of borrowing and hence the cost of servicing the debt.

These increases in borrowed capital and debt servicing were logically judged to have a significant impact on the financial analysis perspective of a decision-making process.

## **Impacts on Principal Revenue Variables**

With the expected increase in costs described above, the obvious implication in terms of financial analysis is that these increases in cost need to be at least reciprocated on the revenue side of the pro forma. An assessment of whether and how the incorporation of green features could impact the revenue of a development is described below in terms of the principal variables in question.

### **Variables Dictating the Gross Building Area**

**Site Size and FSR<sup>9</sup>:** Site Size and FSR are not a function of green building and were not seen to influence the decision to incorporate green features. However,

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variation of cost between green and non-green buildings as to suggest there is no inherent increase in cost associated with building green (Matthiessen and Morris 2004 and 2007).

<sup>7</sup> Development Cost Charges are levied to cover the incremental capital costs of servicing new development with sewer, water, storm drainage, roadways and parklands (and, in the case of the City of Vancouver, childcare facilities and affordable housing). They are calculated either as a function of the square footage of the building (floor space), or as a single calculation per lot or dwelling unit.

<sup>8</sup> The fees charged to process applications for different planning and building related services (principally, rezoning applications, development and building permits). Fees are set in principle on a cost recovery basis, typically calibrated on a sliding scale according to the value of the construction for building permits, and as a fixed amount for rezoning and development permit applications.

<sup>9</sup> Site size refers to the overall parcel of land the development occurs within, while Floor Space Ratio (FSR) determines the maximum density allowed on the site under municipal zoning. For example, on a 50,000 square foot site, an FSR of 1.5 would allow 75,000 square feet of floor space to be developed; while an FSR of 0.5 would allow a maximum of 25,000 square feet of built floor space. Site size and FSR determine the gross building area.

they would strongly influence the kind of green features that would be appropriate for a particular site. Large and densely occupied sites, for example, were seen to make features such as district energy or heating systems more viable.

Furthermore, larger sites were also seen to potentially enhance the marketability of green features. Green developments on the neighbourhood (as opposed to single site) scale were judged to provide the homebuyer with a more tangible and visible green product that could be more likely to influence their purchasing behaviour. The argument is that green infrastructure on a neighbourhood level would be associated more clearly with promoting a healthier lifestyle, and would provide a 'larger' green environment the buyer would be more inclined to invest in. This could provide an incentive for developers of large sites to adopt a more holistic approach, incorporating green initiatives at the neighbourhood scale (for example, area-wide stormwater management) as well as at the level of individual buildings.

However, these findings relate more to the marketability of certain green building features than the decision to incorporate them.

### **Variables Dictating the Net Marketable Area**

**Development and Building Efficiency<sup>10</sup>:** The incorporation of green features was not expected to influence the development's overall site efficiency. However, in certain circumstances negative impacts on efficiency remain possible, which would by definition be site and project specific.

A sensitivity to the ecology of the site could impact the potential to build out to the full FSR. Respecting natural gradients and features, for example, or leaving open spaces for stormwater management and habitat conservation, could reduce the proportion of the parcel able to be developed upon.

Similarly, at the building level, the inclusion of green features could impact the capacity to maximize the net marketable area. Onsite water treatment or power generation facilities, for example, could account for floorspace the developer was then unable to sell or lease.

Should the efficiency be negatively impacted in such ways, a variance procedure could be used to mitigate the impact so as not to penalize the developer for building green. This could involve adapting regulatory bylaws to take into account the particularity of the site or project, or designating context specific comprehensive development zones to explicitly enable a more discretionary approach to the demands of the site<sup>11</sup>.

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<sup>10</sup> Development efficiency refers to the proportion of the gross building area the developer can achieve. Topographical or geotechnical peculiarities of the site, for example, or other municipal regulations relating to parking requirements or setbacks or building heights, may combine to make it unviable to develop the site to its full FSR. Building efficiency describes the proportion of the building that the developer can ultimately sell to the consumer. This may, for example, exclude square footage taken up by elevator shafts, hallways, utility rooms, and so on. The development and building efficiencies determine the *net marketable area* of the project.

<sup>11</sup> It is also possible that the phrasing of municipal building-level bylaws implicitly penalizes green building. An example (Rutherford 2006) would be FSR calculations based on measurements taken from the outside of the building envelope, thereby encouraging thin (poorly insulated) walls to maximize the indoor floorspace available for sale or lease. These kinds of issues were seen to be on the municipal radar and to be subject to the ongoing internal audit bylaws receive through their constant enactment.

These more exceptional situations aside, because green building was not expected to generally influence site efficiency, it cannot be seen as consistently significant to the decision-making process.

### **Variables Dictating the Amount and Rate of Revenue**

**Price/Sq. Ft.:** The influence green building has (or might in the future have) on selling prices is fundamental to this study, and is arguably the hardest to ascertain. Given the numerous factors at play in determining a consumer's decision to buy a property and the price they are willing to pay, this is to a large extent a reflection of the inherent difficulty in isolating the influence of any single factor. Where green features could be a positive factor on prices, two main motivations were judged as likely to be determinant: consumers who might buy green because it is the right or desirable thing to do (for reasons of health, the environment, and prestige), and consumers who might buy green because it makes economic sense (for expected future savings in operating costs and/or an improved long-term disposition value).

In general, the study region was seen to have a very sophisticated real estate market, where buyers pay close attention to design and quality - aspects which green features would be seen to enhance. However, design considerations were not judged to be as significant as location, size or cost in determining consumer behaviour. One way of expressing this would be to say that consumers were not as a rule expected to *not* buy a property because it wasn't green, in the same way they might not buy a property because it was too small, or not located in the area the consumer desired.

In this sense, the incorporation of green features was judged to be a welcome 'extra' for the average consumer: something that would make the consumer happier with their purchase, but not something the consumer would explicitly seek out. As such, in terms of the impact of green building on prices, the consumer was judged to be generally unwilling to pay a premium for buying green. This statement, however, is made on a general level and must be placed in the context of extremely high housing prices in the region, where many purchasers struggle to enter the property market at all and would be reluctant to pay any further premium.

On a more disaggregated level, the consumer was seen to be more likely to respond to some green features over others. Features relating to occupant health (for example, interiors constructed with no off-gassing materials) were judged to be at least as attractive to consumers as features oriented towards benefiting the environment, particularly where these may be perceived to reduce occupant comfort (for example, low-flow shower fixtures or composting toilets). A more significant extension of consumer preferences with regard to building innovations relates to the potential concerns some consumers may have regarding technology they are unfamiliar with or feel is unproven. While consumers were not as a rule expected to be dissuaded from buying green for this reason, the study region's real estate sector is still 'scarred' to an extent by the leaky condo crisis, which has particular repercussions for home insurance. The incorporation of green roofs, for example, currently creates increased costs for - and even difficulty finding - home insurance.

A particular challenge for the green building industry concerns alternative energy or energy efficiency features, whose incorporation can be the most costly (for example, onsite alternative energy sources such as photovoltaic panels or geothermal pumps) or whose benefits can be the least visible or immediate to the consumer (you cannot see, for example, the energy savings in an improved building envelope). Insofar as reducing energy consumption, or transitioning to a non-fossil fuel based energy supply are generally seen as the most ecologically significant goals in green building and climate change adaptation as a whole, this was seen as a significant policy concern.

A key issue for such green building features is the extent to which the consumer is willing to accept higher upfront costs in return for long-term savings. There was a feeling that at present the consumer is more likely to push the developer for green building standards because it is the 'right thing to do' than because they are prepared to capitalize expected future savings into a higher initial purchase price<sup>12</sup>. Consumer behaviour, however, was expected to be subject to change according to factors such as education (raising awareness of climate change and/or confidence in green building technology), and increases in utility prices (that would correspondingly increase the savings potential of energy or water efficient features).

Interestingly, the fact that many consumers do not live in the same place for long enough to recoup the payback of some technologies was not expected to unduly influence purchasing decisions: more speculative homebuyers (buying to sell) were expected to pay as close attention to green features as a safeguard to the quality of their investment. In this, as in all attempts to evaluate the influence of green building on prices, it was seen as important to recognize the many different types of buyer, and the plurality of the region's numerous real estate 'sub-markets'.

Overall, while green building would be seen as an advantage on the marketplace (for example, between two properties that were identical in *every* other way), its current impact on prices cannot be judged to be persuasively significant. A certain tension characterizes the present situation: green building could be or become a purchasing factor for buyers, but it is a less influential factor than cost, hence if its inclusion increases cost then it risks undermining its own appeal.

**Commission Rate<sup>13</sup>:** Although reference to green building features could be included in any promotional materials, this would neither lower the actual costs of marketing, nor replace the need to market the product. As such, the commission rate - typically around 5% of gross sales revenue - would be unchanged and therefore cannot be judged as significant to the decision-making process to incorporate green features or not.

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<sup>12</sup> This touches on the crucial issue of what is frequently termed 'split incentives' in green building studies, where the developer is not the owner-operator in residential build-to-sell projects, so cannot afford to accrue additional upfront capital costs s/he will not be able to receive the long-term payback from *unless* these higher initial costs secure higher sales prices. In this sense, the problem is that build-to-sell developments apply a short-term financing model to a long-term asset (Wilson and Tagaza *No Date*), a model challenged by incremental financing schemes and green mortgages in Chapter 3.

<sup>13</sup> Commission refers to the money the developer spends marketing and selling the product to the consumer, normally represented as a percentage of the gross revenue of these sales. For this reason, it is conceived of as a revenue variable, as compared to the upfront or out-of-pocket costs of the design-construction phase already described.

**Absorption Rate<sup>14</sup>:** The absorption rates in the study region at time of writing were so strong that it seemed unlikely green building features could improve them. As such, while developers would be keen to incorporate green features to maintain a competitive advantage over other products, this would not as such be expected to necessarily increase the speed of sales with many new units being pre-sold before construction is even completed.

An interesting consideration to stem from this relates to the possibility of absorption rates actually being *negatively* impacted by the incorporation of green features: if greener homes achieve higher prices (as they need to do to offset the increased costs), this may in fact narrow the market segment for the product (with fewer people able or willing to pay the green premium), and potentially slow the rate of sales. Given the time value of money, such a combination of higher prices but slower absorption could mean the financial return for the developer in terms of net present value was actually reduced. While this was not expected to necessarily be the case, these kinds of concerns illustrate the challenge of achieving the optimal combination of rate and amount of revenue; there is at present insufficient market experience of selling green residential buildings to assess fairly the degree to which the incorporation of green features might further complicate this challenge.

### **Overall Significance of Impacts**

Evaluating the different impacts of incorporating green building features through the lens of a development pro forma illustrates why on a region-wide level there has been a slow voluntary market uptake of green building practices. Expressed most directly, increases were expected on hard, soft, and interim financing costs - increases which were not expected with a strong degree of confidence to be matched by corresponding improvements in the rate or amount of revenue.

To further characterize why this 2% marginal cost increase (taking LEED Silver as an achievable but reasonably aggressive green building benchmark) can represent a sufficient obstacle in the decision-making process, a number of inherent and contextual development factors are worth considering:

- Development is an inherently high-risk industry operating precisely at these kinds of margins. An expected 2% increase in costs is not negligible given the numerous uncertainties at play (a simultaneous 2% drop in prices, for example, would have serious implications for the final balance of the pro forma).
- Developers are not the only party to adjudicate over this additional 2%. Their lending partners (typically, financial institutions) input strongly as to whether this is an additional financial burden to be willingly assumed.
- Development in the study region is currently operating in a climate of extreme escalating construction costs (1% per month, or 10-15% per year). The uncontrollability of this variable in the pro forma makes it less attractive to add further costs or any innovative/unfamiliar feature that may be perceived to detract from the manageability of the project. Additional costs and/or risks may be seen as particularly unwelcome given the concern some have that the

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<sup>14</sup> Absorption refers to the rate at which the developer expects units to be 'absorbed' by the market; in the residential sector being addressed in this study, this means sold. The quicker homes are sold, the better for the revenue stream in a financial project.

real estate market may be about to soften with a decrease (or slowing down) of prices.

- With consumers expected (as a rule) to be unwilling to assume this additional 2%, developers will be logically cautious about pricing themselves out of the market against competing products. Unless and until all developers invest equally in green features, the additional 2% cost will remain a variable a green development can be 'beaten' on.
- If a greater profit is not expected, there is no inherent economic reason to build green. The fear of assuming more time and more unknowns (more risk), in addition to the extra costs, for only the same revenue weakens the business case for green building.

Notwithstanding these factors, developers want to stay ahead of the game and position themselves at the leading edge of their industry. There would also be a risk in not developing products of the highest quality, and the 2% increase is not large enough to render building green (to the level of LEED Silver or equivalent as a baseline) unfeasible. Developers were seen to be sensitive to a growing consumer and political interest in green building. Similarly, the discipline of green building was judged to be in constant evolution in economic (costs and prices) and technological (materials and features) terms. In response, the industry was judged to be moving as a whole towards greener practices and norms. Furthermore, many industry leaders who build green do so because they see it as the right thing to do, for ethical and environmental reasons the pro forma is unable to reflect.



### 3. Evaluation of Policy Tools

This chapter sets out an evaluation of the principal available means for 'intervening' in the pro forma to influence development decisions. While many of these policy tools relate to development regulation in general, the focus here is specifically on their relevance for green building. As such, they have been assessed according to both their desirability for the developer *and* the municipal authority concerned. The evaluations below assume a prior knowledge of the tools; for descriptions of the tools and their legislative basis, readers are referred to the following studies: Rutherford 2006; Sheltair 2006; Zeeg and Wilson 2007.

#### **Interventions On Cost**

In the context of the findings described in Chapter 2, relevant interventions on the cost side of the pro forma would do one of two things: lower *those* costs shown to be subject to an increase (hard, soft and financing); or lower *other* costs equivalently, so that the overall project costs are not increased.

#### **Tools Influencing Non-Municipal Expenses**

**All Actions That Increase Green Building Uptake:** Municipalities have no direct influence on the marginal hard and soft costs of building green<sup>15</sup>. This means costs can only theoretically be impacted through other actions that encourage/enforce green building uptake, thereby creating or increasing the demand for green building capacity (expertise and materials), and from there, influencing supply. An analysis of complex market forces falls beyond the scope of this study. However, at time of writing, the general impression was that although the costs of green building were experiencing an increase due to a spike in demand, the long-term the costs of building green have been and will continue to fall.

It is in this optic that the adoption of civic green building policies can be understood to impact the economics of private sector development. In addition to educating the public and development community about the benefits of building green, the ongoing demand for green building expertise and materials generated by municipal and provincial policies can be expected to lower the costs of building green. This, in turn, will perhaps make a more significant contribution to widening the uptake of green practices and standards than other actions.

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<sup>15</sup> Municipalities could of course theoretically directly impact the costs of green building through subsidies to green material or labourer suppliers, which this study has not envisioned as a realistic action. A more useful proviso for municipalities to adopt when requiring green building in any context would be to do so through performance targets rather than prescription. This would provide the developer with an elasticity as to how to meet the building performance requirements and thereby allow for market availability of certain materials to determine their choice of how to fulfil criteria (for example, not be obliged to use a certain material if doing so would unreasonably raise costs or create scheduling problems). The use of performance measures also provides both the municipality and developer with a greater degree of comfort with respect to liability: a municipality can indicate (for example) stormwater runoff management expectations and the developer can then decide to pursue these in the manner they prefer, be it via green roofs or permeable parking surfaces, and so on.

## **Tools Influencing Municipal Expenses**

**Reducing or Waiving DCCs:** The potential savings from reduced or suppressed DCCs would be financially sufficient to provide a strong incentive to the development community<sup>16</sup>. However, while there would be theoretical grounds for reducing DCCs according to certain performance related aspects of a building, to do so would be administratively problematic.

With DCCs levied to cover the costs of providing sewer, water, and storm drainage (as well as roadways and parklands) there would be a rational nexus where green building features were shown to reduce the costs of these services (for example, by reducing stormwater runoff). The difficulty would lie in fairly ascertaining the reduction in DCCs that any such technologies actually warranted and in applying these reductions consistently. Quantifying the gains and translating them to a lower DCC was expected to be an extremely complex activity. There would also be no guarantee the green feature would perform as expected over time, or be operated and maintained correctly by the occupant.

Further problems would relate to a loss of budgeting control. Financing effectively for upcoming municipal infrastructure expenditures would be considerably more challenging if DCCs and hence money received became a variable in development. With DCCs operating on a cost recovery basis, reduced or waived charges for green developments would mean the provision of infrastructure would need to be subsidized by 'non-green' developments; a practice which would become increasingly problematic should more and more (or ultimately impossible if *all*) developments met the required green standard. A fixed DCC rate arguably also benefits the developer in a similar way: as a known expense (one that is not dependent on what green features are incorporated and how these features perform) they can be factored into any land value assessments and bids.<sup>17</sup>

**Reducing Permitting and Application Fees:** Reducing the fees charged for municipal services was not seen as enough of a financial incentive in itself to incorporate green features<sup>18</sup>. It would, however, be seen as a means to signal municipal priorities to developers, as well as providing recognition to those developers who were proactive in this domain.

Nevertheless, there was also a feeling that to function equitably, fees should remain structured so as to recoup the cost of the service being provided, and that caution should be exercised when making any changes that would mean certain development services were to be subsidized by other means. As with other incentives, a problem would lie in establishing green building as a public benefit ahead of others: why should the fees for processing greener developments be

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<sup>16</sup> DCCs represent quite a significant cost and can be as high as \$20,000/unit, or \$6/sq.ft., though are typically lower than this at around \$5,000/unit or \$2/sq.ft.

<sup>17</sup> Interestingly, in his September 28, 2007 Address to the Union of B.C. Municipalities, Premier Gordon Campbell Premier supported this measure: "We're going to provide new authority to use development cost charges as a way to encourage green development [...] You should have the power to waive those charges for any development that you feel will help you meet your goals of a greener community". There was not a consensus this measure would be speedily adopted in the study region. The speech can be found at: [http://ubcm.ihostez.com/content/pdfstorage/B212E07021A74D67A44174416A370F0C-Premier\\_Campbell.pdf](http://ubcm.ihostez.com/content/pdfstorage/B212E07021A74D67A44174416A370F0C-Premier_Campbell.pdf). A full discussion of the rationale and legislative opportunities for reducing DCCs in relation to green building/development can be found in Coriolis 2003.

<sup>18</sup> Municipal fees vary, but typically have a relatively minor significance on the pro forma as one-time payments, often as low as \$2000-5000.

reduced ahead of, for example, developments that house social services or amenities?

**Fast-tracking Approvals:** There was strong support from the developer's perspective with respect to any actions that would reduce the time element in any phase of a project, which would include explicit fast-tracking programs for building and development permits. This is a reflection of the significance of time on financing costs: notably, a fast-tracked permit application would be much more of an incentive than a fee-free application.

However, although recognized as a powerful incentive, there was also significant reticence towards fast-tracking programs. Administratively, there is a sense in which 'the time it takes is the time it takes'. There could, for example, be no means of guaranteeing the speed of an application based on its green building features alone, as these in themselves do not guarantee the appropriateness or simplicity of the application. Complications or difficulties with the development proposal could always arise for other reasons (or indeed, because of the green features themselves).

Other concerns relate to the resources needed to provide a dedicated fast-tracking service. An allocation of municipal resources to ensure faster processing services would imply a reduction of resources elsewhere, thereby again raising the question of whether green building should be promoted ahead (and potentially at the expense) of other development goals or public amenities.

Moving beyond explicit fast-tracking programs, a related issue to emerge from the study concerned the relationship between building code approvals and green building technologies. Green features typically either go beyond the provincially set building code standards using innovative technologies, or meet existing standards via unconventional, more environmental means. As such, they require the granting of 'equivalency' status from the municipal building staff mandated to approve them.

There was a feeling that a consistent and expeditious process for granting equivalencies would be a benefit to all parties in the region. Universally understood standards for how to measure and recognize equivalencies, supplemented with a databank of referenced norms and good practices, would help ensure that innovative green building practices were not penalized via time delays.<sup>19</sup>

**Green Building Checklists:** The preceding three actions would all likely be combined with a checklist of sorts as a means of identifying which proposals qualified for the municipal incentive in question. Establishing criteria that could be used consistently and accurately to fairly ascertain which development proposals actually merited reduced DCCs or faster/reduced-fee permitting would in

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<sup>19</sup> At time of writing, the region is awaiting the release of the new provincial 'green' Building Code, which is expected to include minimum energy and water efficiency standards. These standards are expected to be relatively conservative at first, and be progressively increased with each subsequent building code update 'cycle' (typically five or so years). Insofar as codes by definition establish minimum standards, while green building technologies identify maximum possible ecological improvements, any incremental changes to the code will not change the premises of this study: there will always be a need to identify and evaluate mechanisms that can encourage developers to build above and beyond the existing code standards of the day. However, the fact that the existing code is currently being revised to make it 'greener' confirms again the degree to which green building is achieving a growing significance in all sectors and levels of government in the region.

fact be one of the principal challenges and potential weaknesses of these policy tools.

In addition to being a means to implement other municipal actions, a checklist by itself could be used to accompany building or development permit applications. There was some support for the educational benefits of such an action, as the drawing up of a checklist would require the municipality to clearly define what is meant by 'green building', and then to communicate this to the development community. However, the value of a checklist as an actual decision-making tool to inform staff and council as to the merits of particular proposals was judged to be less clear. There were concerns checklists would oversimplify the real nature of a development proposal, and would not guarantee the final product's real green benefits. At their worst, checklists could conceivably misinform council about what green building truly entails, and be susceptible to 'gaming' and 'green-washing' (configuring elements of a proposal in a way that appeared to conform to checklist requirements without bringing real green benefits).

Nonetheless, if used as an aid rather than the single tool for development decisions, a checklist could add some objectivity to the process and provide another means to assess developments against (alongside other policy statements and directives).

### **Tools Influencing the Financing Costs**

**All Actions That Reduce Time:** As discussed, a reduction in time has a very significant impact on the servicing of the debt accrued to finance a development. All actions within municipal influence that reduce time in a development process would work as strong incentives to incorporate green building. These can be identified on one hand as informal steering processes (for example, in rezoning applications) where staff support functions as a kind of reward for incorporating green features, or where administrative efficiency (for example, expeditiously approving code equivalencies) does not penalize the inclusion of such features. Or, on the other hand, as more explicit fast-tracking (building or development permitting) programs that could be established. Overall, with due evaluation and discussion of the pros and cons of each, greater support was shown towards the former 'informal' category of time reducing actions.

### **Interventions On Revenue**

In the context of the findings described in Chapter 2, relevant interventions on the revenue side of the pro forma would be actions that increased revenue sufficiently so as to offset the expected increase in costs.

### **Tools Influencing the Gross Building Area**

**Density Bonuses:** Additional density was found to be a very strong incentive from the developer's perspective. Indeed, in the context of the Lower Mainland, there are few instances or locations where additional density would not work as a

powerful development driver. However, a number of factors were seen to make the use of bonuses problematic from the public policy perspective<sup>20</sup>.

Administratively speaking, exchanging density for green building features poses the challenge of assessing the value of these green features to then calibrate them in a consistent manner against the market value of an increase in FSR. While this difficulty is inherent to an extent with all bonusing schemes (regardless of the amenity being levered), it is particularly compounded by the ever-changing technology and costs of green building, which together accentuate the risk of municipalities either under-selling ('giving' too much in return for not enough green gains) or over-selling the density (and thereby actually preventing the developer building green due to the unviable economics of the project).

As such, inscribing density bonuses in zoning schedules and Official Community Plans was seen as potentially problematic in a climate where the economics and technology of green building were seen to be moving so fast as to conceivably render these regulatory documents quickly obsolete and in need of constant amendment. For these reasons, a structure that allowed case-by-case negotiations for the amount of density offered would be preferable, though this would imply an administrative burden in addition to a strong technical expertise requirement (for example, calibrating precise energy efficiency improvements against FSR lifts). A further technical complication would reside in then measuring the gross ecological impact of the project to ensure the impact of additional density did not in fact outweigh the benefits of building green.

Other concerns relate to setting green building against other public amenities. Bonuses are most commonly used in the study region to secure non-market housing or social benefits such as childcare facilities. Given the acute situation concerning housing affordability in particular, there would be a certain discomfort in allowing green building to 'compete' with other much sought-after, primarily social, amenities.

However, these dual challenges of establishing a density exchange value for green building and of comparing its public good value to other amenities aside, density remains a powerful municipal tool that could be highly effective given certain provisos. If employed, it should be administered in a discretionary manner that ensures bonuses are used for real ecological value and leading edge features, to push the boundaries of green building in a way that benefits constituents and does not replace other amenities.

In this optic of using density to 'raise the bar' of development standards, a structure that established green building as a means to qualify for the full FSR has been judged to have a strong potential.

**Rezoning:** Insofar as applications for rezonings are often geared towards increasing the density allowed under existing zoning, the observations for density bonusing also apply here. Indeed, jurisdictions can strategically set their zoning schedules below the densities indicated in their Official Community Plan to both signal opportunities for rezoning to the development community, while also retaining control of when (and by how much) to lift the land value. For rezonings

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<sup>20</sup> This paper will not extend to discussing the more generalized challenges and limits of implementing density bonusing without compromising the urban design and livability of neighbourhoods. The issues identified here relate exclusively to using bonuses to lever green building.

relating to use, as these also are developer-initiated, there is by definition a potential economic incentive to apply from the developer's perspective. The key issue when rezoning for either density or use from the municipal perspective lies in ensuring any changes are in the 'public interest'.

The relation between green building and rezoning was found to be a grey area. In the sense that rezoning decisions are land use and density decisions, there is an argument that there is *no* relation between green building and rezoning applications. However, this is as much a conceptual obstacle as a legislative restriction: without making green building the criterion with which to approve a land use or density decision, green building standards can be thought of as a way to achieve a qualitatively superior embodiment of the approved land use or density, and therefore be promoting the 'public interest'.

As such, this stipulation that rezonings be in the 'public interest' emerges as a potentially more useful criterion than that of density bonuses being exchanged for 'public amenities', given the challenges of being able to quantify green building and 'buy' it with density as described above. However, given the looser legislative basis (municipalities cannot bargain for zoning as they can for density), a consistent and strong green planning culture is required for rezoning to be an effective tool. In this way, although planners cannot guarantee council approval for a rezoning based on green building features (or anything else - council cannot fetter their authority), staff support for a rezoning can impact both the chances of a rezoning being approved and the time this approval might take. This support was found to be a strong motivation for the developer to incorporate greener building standards as part of their applications.

If a consistent sustainable development policy framework is in place and green building is consistently raised in dialogues with applicants, the discretion to rezone can function as part exercise in suasion, part unofficial requirement for staff support - an area that has been judged to have strong potential in encouraging the developer to incorporate green building features in their proposals. The evident limitation of such a tool is that it only applies to rezoning projects and provides no leverage for developments occurring under existing zoning schedules.

### **Tools Influencing the Net Marketable Area**

**Building Bylaws, Variance Procedures and Comprehensive Development Zones:** As this area was not expected to be consistently impacted by the incorporation of green building features, and where that should arise for it to be for site specific reasons requiring ad hoc or remedial interventions, it was not possible to provide a meaningful evaluation of their relative effectiveness.

### **Tools Influencing the Amount and Rate of Revenue**

**Public Education and Green Promotion (Awards, Labelling, Demonstrations, Marketing, and so on):** Actions seeking to educate the public and development community as consumers and producers of green buildings were seen very positively, although their influence was judged to be hard to measure and indirect.

As has been said, a wider promotion of green buildings was not expected to lower individual projects' commission rates in any way, but receiving municipal (or other) awards and recognition would be seen to enhance the overall reputation of a developer. This would be a means to further stimulate competition and the desire to stay ahead of the game in the development community, as much as providing a marketing support.

Building labelling was judged to be an effective way of raising consumer awareness and development standards, with the more explicit the information the better (for example, energy performance expressed in terms of ecological and monetary gains). This would enable the buyer to select between available homes in the way cars and other major purchases are chosen (for example, their relative fuel-efficiency, or expected resale value after a certain number of years). While there is a strong regional awareness of green building systems (for example, LEED), there was not a strong enough consensus within the industry as to the ecological consistency of such systems, or a significant enough recognition of these systems as 'brands' for the consumer to invest in them with absolute confidence. They were judged as such to be contributory but not decisive factors in potentially raising sales prices or absorption rates, and this was raised as an area requiring more attention. Existing experience in the real estate sector is such that the consumer is not knowledgeable or interested enough in green features to place them on their 'shopping list' of requirements in buying a home. This, in turn does not encourage (or oblige) the real estate community to valorize or differentiate between products in these terms<sup>21</sup>.

A strong significance was placed on the public being made more aware of green building technologies and practices - of clearly establishing them as another way of being sensitive towards climate change and acting as an informed consumer who will recoup gains from investing in a green home. Demonstration projects were seen to play an important role in this respect by informing the public of the true costs and benefits of building green. This was seen to be equally the case for council members and the development community - to inform and familiarize them with green building technologies in a first place, and secondly as a means of stimulating civic and professional pride to be at the leading edge.

**Incremental Financing and Green Mortgages:** Innovative financing models that better enable the consumer to pay for properties that have incorporated green building features obviously differ from other interventions described in that they are not within the mandate of local governments. Their inclusion in this evaluation stems from the regional interest in these mechanisms, and also serves to highlight the extent to which other parties (here, financial institutions) also influence development patterns and consumer behaviour.

Incremental financing - used to distribute the marginal costs of green building over time - was pioneered on a project in the study region in what is to date (and to best available knowledge) a unique collaboration between developer, financier and purchaser<sup>22</sup>. The financial model works by removing the incremental costs of the project's onsite (geothermal and solar) energy features from the developer's pro forma and creating a separate mortgage for these features, to be paid off by the building occupants over time. This effectively removes the developer's concerns

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<sup>21</sup> This would seem to confirm the findings of other research that the benefits of green buildings are being undersold to consumers (Heap 2007).

<sup>22</sup> The model was innovated for the 'Verdant' residential development, part of the UniverCity sustainable community project on the Simon Fraser University campus, Burnaby.

with respect to recouping increased upfront costs with higher prices, as it renders the addition of green features cost-neutral. The purchaser also avoids the burden of upfront costs, with the energy features paid off over time as an additional item in the strata fees. The repayments are calibrated to an amount that is comparable to typical utility fee amounts, so occupants pay no more than occupants of other buildings, but have the dual advantages of eventual ownership of the features once the 'mortgage' has been completed and fixed energy rates (in an era where they are expected to rise) in the meantime.

This innovative financing model received strong support as a strategic way of bypassing the fundamental difficulty of persuading buyers to capitalize future savings into higher upfront prices. Such an approach requires progressive thinking on behalf of the financial institution in particular. The project in question is believed to be the first nationwide to use such a model, but a dozen or so are now in progress within the study region<sup>23</sup>, which will allow for the model's limits and extensions to be explored in the coming years. What is clearly addressed by the application of a long-term financing model to a long-term asset is the issue of 'split incentives', with the same person(s) paying the costs and receiving the benefits of the green asset - and this is rich in potential.

Green mortgages would function as a more straightforward adaptation of standard mortgage lending procedures between financial institutions and homebuyers. Here, the lending institution would consider the long-term economic gains of green features when assessing the borrowing amount the homebuyer qualified for and correspondingly increase the allowed principal. There was agreement that this would send a clear signal to consumer about the benefits of investing in green building, but this was not a financial model currently in practice in the region.

In general, innovative financing models - particularly the former example - were seen as potentially very effective bridging mechanisms until such a time as reduced upfront costs and payback times (effectuated, for example, by higher energy or water prices or improved technologies) alter the existing economics of investing in green.

## **Overall Potential of Tools**

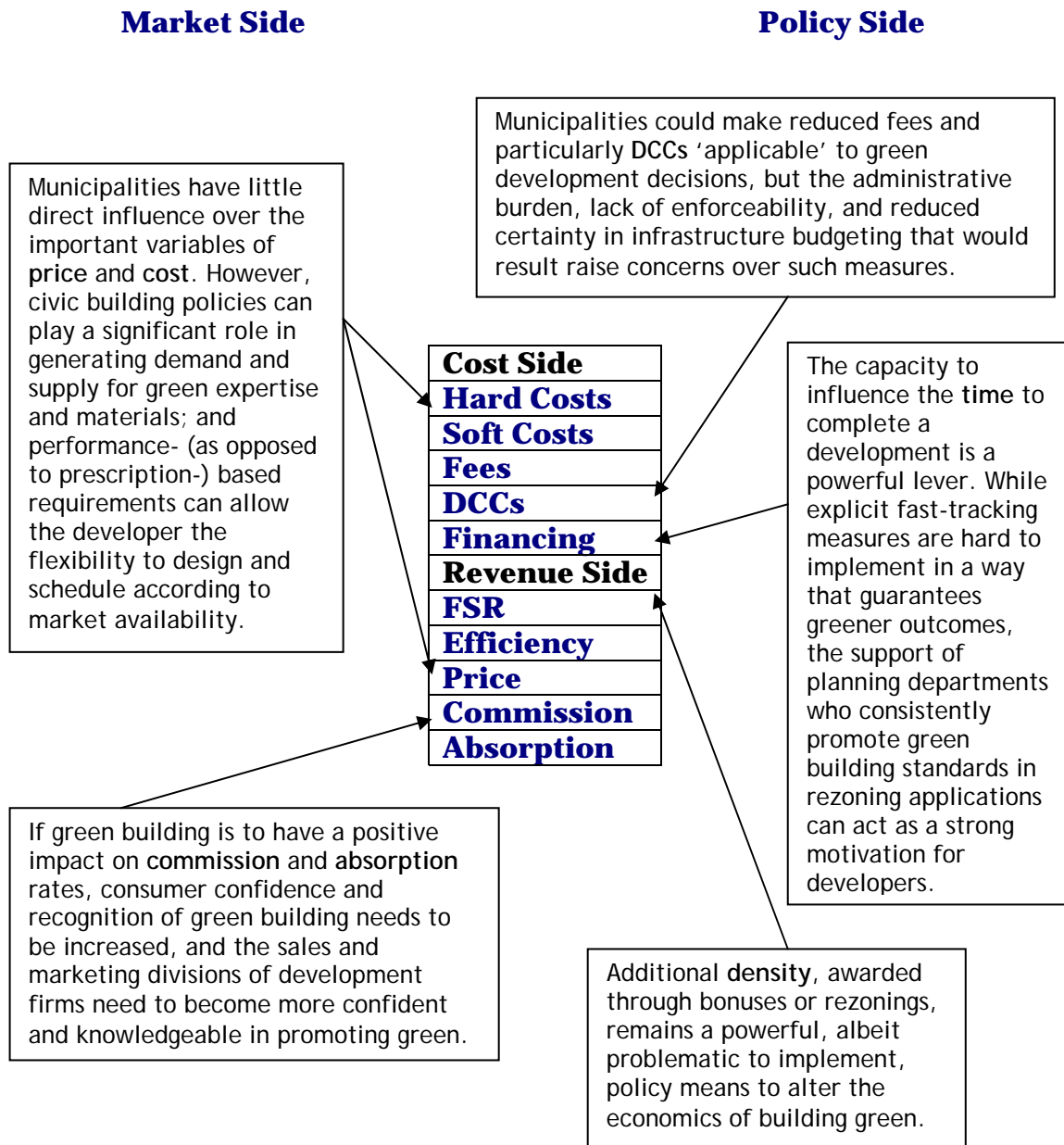
Evaluating the different options for influencing the decision-making process at the disaggregate level of pro forma variables makes explicit the challenges facing policymakers in the field of development regulation. Municipalities are in the position to offer powerful incentives to encourage green building. Although they have no direct control over the important variables of cost and price, they can influence the time required to finance these costs, lower other (municipally controlled) costs, and increase the overall potential for revenue generation (density). However, the implementation of these tools would imply trade-offs (potentially not pursuing other amenities) and administrative consequences (resources and capacity). In that light, seeking to indirectly influence market factors (for example, by establishing civic building policies, or playing a facilitating role in the marketplace through partnerships and demonstrations), or lobbying senior governments to render green building cost-neutral through mandatory

<sup>23</sup> Communication by Derek Gent, Investment Manager, VanCity Capital, at *Net-Zero Energy Home Forum*, February 26, 2008, hosted by the Net-Zero Energy Home Coalition and Light House Sustainable Building Centre.



requirements, remain attractive goals. A schematic representation of how these policy options relate to the pro forma variables is contained in Figure 2 below.

Figure 2: Summary of Policy Options



## 4. Summary of Key Findings

The key findings of this report have been divided into three categories of factors. In labelling them 'factors', the intent is to position them as the elements that should inform strategic decisions relating to green building promotion. Alongside findings relating to the policy and market components of this study, a number of other findings to emerge have been classified here as 'moderating factors'. These moderating factors have been seen to play a strong contextual role in the region and to moderate the significance of, and relations between, the different policy and market variables.

### *Policy Factors*

- There is an **uneven significance** of items on the pro forma, and municipalities have an **uneven capacity** to influence these items
  - Municipalities have little direct influence in particular on important hard and soft cost variables and price variables that are market determined
- Two major opportunities emerge for municipalities to influence green building, increasing **density** and accelerating the **time** of development procedures
  - Increasing density (through designated bonuses or as part of a rezoning) changes the distributive weight of variables in the pro forma
  - Accelerating development procedures (through rezoning applications or development or building permits) mediates the relations between variables in the pro forma by reducing the time of financing costs
- These incentives of density and accelerated procedures are largely **sufficient** to overcome the incremental costs of building green (estimated at around 2-5%), however this should not mask the **lack of regulatory teeth** municipalities have in this domain
  - There was concern that formal incentives should be offered sparingly and only for green building that went significantly above code
- Increasing density is currently used to lever **other public amenities** and fulfil **other policy objectives**
  - There would be a reluctance to put green building in 'competition' with pressing social needs (social housing, childcare, and so on)
  - There was no clear rationale as to why other potential levers (for example, faster or reduced-fee permitting) should be used to lever green building ahead of other publicly beneficial developments
- Several of the direct municipal tools would be **hard to calibrate consistently** or **hard to implement practically** for the purposes of leveraging green building (density bonuses, fast-tracking approvals, lowering DCCs)
- The **indirect influence** municipalities can exert on development decisions and consumer behaviour (via educational programs, demonstration projects, consistently environmentally-conscious civic messaging, and so on) is **potentially strong**, but hard to measure or codify

### ***Market Factors***

- The inherent (i.e. without policy interventions) **incentives** for building green **remain largely unproven** as yet and there is a concern additional costs may not consistently guarantee securing higher prices
  - Consumers as an overall group are not seen as willing to capitalize the future savings of efficiency gains and pay the necessary green premium
- Current market conditions may be acting to make **green incentives less pronounced**
  - Absorption rates and gross sales are consistently high in the study region, minimizing the capacity of green features to improve upon them
  - Real estate prices are so high they may outweigh other discretionary purchasing behaviours
- Current market conditions may be acting to **distort** the relative significance of the **additional costs** of incorporating green features
  - Given the phenomenal and ongoing escalation in construction costs, green features may either be reduced or suppressed because they may be seen as a cost that can be controlled in highly volatile conditions
  - An ambient anxiety that the market may be about to soften (that is, prices go down) may be reinforcing this effect
- At the same time, the region has a very **progressive and sophisticated real estate market** with environmentally aware producers and consumers
  - Developers look to exceed their competitors and stay ahead of the market
  - Consumers have come to expect high quality design features that go beyond basic standards
  - The marketability of green features is expected to continue to rise
  - Development is a high risk industry where practitioners want to distinguish themselves and retain a competitive advantage in the field
  - There is a growing expectation that all serious companies will begin to build green as standard, and for price to not then be a negative factor amongst quality products

### ***Moderating Factors***

- The pro forma is an **incomplete reflection** of a development project's decision-making process
  - As in all industries, outputs are in part determined by business habits and relations, so a history of producing the same building typologies and using the same professional supports (for example, architecture firms, or sales and marketing teams) can in itself be contrary to innovation or change
  - Experimentation and learning on a project takes time, which is a serious financial disincentive in itself
  - The economics of a green project are not the only motivation - many developers seek to build green because they believe it is the right thing to do (in addition to being the way the market and industry are going)
- The developer and municipality are **not the only inputs** to green building production or consumption decisions

- Financial institutions play a significant role in terms of how they respond to supporting or distributing additional costs on a pro forma
- Utilities have a strong leverage potential to act on the consumer from the 'bottom up' by creating increased incentives for green efficiencies and repositioning the economics (shorter payback periods, and so on)
- The insurance industry contributes to the relative attractiveness and perceived risk of various green features, which can potentially influence developers, consumers, and municipal building authorities
- Significant **regional differences** exist both in development pressures and patterns, and municipal planning cultures and resources
  - There are many sub-markets, buyers and building types which can combine to influence both the achievable prices of green buildings (for example, some areas attract buyers with a more speculative interest) and the green features appropriate to the project (for example, denser or multifamily developments make more expensive onsite energy features more viable)
  - Planning departments differ widely in their experience with green building and the resources they have to dedicate towards promoting it, as well as in their political cultures and in the relations they have with local developers and what they feel comfortable 'demanding'
- The area of green building is currently seen as a constantly **moving target**, in terms of market forces, as an area of policy and political interest, and as a technology or discipline
  - The findings of this report were judged to be highly mobile and hence susceptible to change (for example, the costs of building green were expected to fall, just as the willingness of consumers to pay a green premium was expected to increase, both of which would provide market incentives to developers)
  - As a discipline in evolution, there was not a consensus as to what green building is, what it costs, or how it should be best promoted
- Although there is an uneven expertise and awareness of green building, and a desire for consensus and clarity within the region, there was a universal recognition that there is **real momentum** in the field and that green building has firmly entered the **planning and development agendas and dialogues**
  - Green building is being successfully integrated to existing sustainable development and liveability policy work
  - Many green building techniques and features are becoming increasingly standardized practices

## 5. Conclusion: Implications and Recommendations

This report has identified the principal factors currently impacting the green building industry in the study region and how they relate to the developer's decision-making process. A discussion of the implications of these findings and their correlated recommendations will conclude this report.

### *Implications*

As a study that has investigated options for influencing private sector behaviours, a useful means of considering the implications of the findings is to conceptualize these policy options as potential responses to market failures, market barriers, and the market structure<sup>24</sup>. A market failure can be described as a flaw in the way a market is organized which means consumers and/or producers respond to the wrong signals. Examples of such market failures implicit in the findings of this report include the possibility of insufficient or incorrect information distorting decisions (developers potentially over-estimating the costs of building green; or homebuyers potentially underestimating the financial gains in terms of energy savings or resale value). Alternatively, one could point to the asymmetry between the person fronting the costs of green building and the person recouping the long-term benefits (the 'split incentive' issue). In such cases, the market would be said to fail because something skews the economic cost-benefit analysis of green building in a way that prevents the full environmental gain being realized, because the economics themselves are being distorted<sup>25</sup>.

Market barriers in contrast can be defined as unfortunate market preferences where consumer behaviour indicates that even a favourable (and undistorted) economic cost-benefit analysis is not sufficient to influence decisions. Market barriers implicit in this study include the influence of undesired attributes that matter to consumers irrespective of economic and ecological gains (for example, there was indication, if not consensus, that consumers may not appreciate green features such as low-flow faucets or composting toilets due to perceived impacts on their comfort). Similarly, uncertainty about performance (the reliability of innovative, non-traditional energy systems, for example) was also raised without consensus as a possible behaviour-influencing barrier.

The market structure can be described as a summary of the conditions that impact a particular aspect of an industry, a consideration which is particularly important when addressing questions of industry change, as this report does. Market structure influences implicit in the findings of this study include distribution channels and industry supply inputs (for example, the inconsistent availability of green building materials, services, and expertise that can create scheduling

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<sup>24</sup> Adapted from Jacoby's discussion of new technology and the marketplace (1998). Jacoby's other consideration for policymakers, that of Inter-Market Adjustments, cannot be addressed here. An examination of whether and how green building impacts particular regional sub-markets, or how greener sub-markets within the region influence those less green, or how green building markets outside the study region – for example, in Seattle or Calgary – impact those within the study region lies beyond the scope of this study.

<sup>25</sup> A further classic and omnipresent example of such a distortion that applies to green building as much as any environmental policy consideration is the non-priced externality of environmental pollution. This subject has been frequently addressed with regards to energy policy and the uncounted costs of the carbon emissions of fossil fuels (see, for example, Owen 2006). The BC Government has recently begun the process of 'pricing' this externality with its carbon tax: <http://www.bcbudget.gov.bc.ca/2008/highlights/>

problems or insufficient consulting availability), regulatory and legal-liability issues (for example, concerns with meeting building code equivalencies and securing insurance for untested technologies or features), and the internal organization of the industry and its partners (for example, the need for wholesale commitment in a development project running from the financial partners, to the contractors, to the sales and marketing teams). While such elements of the market structure are unlikely to determine the ultimate fate of green building, they can be expected to influence the pace of its adoption.

The findings of this study are that issues relating to all three (market failures, market barriers, and the market structure) are present and need to be addressed in the study region. The implications of this are worth considering, particularly the key distinction between market failures and market barriers. The distinction is significant and has ramifications for the policymaker, for if the slow market uptake of green building is a result of market failures, then the economics of building green need to be 'corrected' by mitigating or removing the interference that currently skews the balance. Whereas if, in fact, a slow market uptake is the result of market barriers, then the economics of green building as they currently exist are favourable and any intervention into the economics of the decision to build green needs to be clearly understood as a pure incentive that is not needed to make green building financially viable, but makes it desirable enough to override existing market preferences to not build/sell green.

Distinguishing between market failures and barriers is a real challenge for planners. Does a homebuyer, for example, choose a suburban single-family house ahead of an urban multifamily unit because s/he judges it to make better economic sense given the lower price per square foot whilst failing to correctly discount current and future gas prices for the commute to work (market failure), or because s/he prefers the quieter and safer living environment s/he feels suburban homes provide (market barrier)? As indicated, the findings of this report suggest both are in question for the case of green building in the study region, but the distinction is important to point out. Given the changing and interacting market forces, it may be significant and possible for planners to ascertain whether market failures or barriers are the object of their policy actions and frame them accordingly.

A final implication to highlight, one that exists over and above any particular circumstance, pertains to the interface between market mechanisms and climate change. This study has identified private sector development as an area requiring action in seeking to adapt to climate change, and policy options have accordingly been evaluated in this light. Nevertheless, a highly significant consideration for policymakers has to be that while market change is necessary, the market may move at a slower pace than climate change. In this respect, the only way to ensure the systematic and accelerated adoption of green building practices across the board is to require it through legislation. This correspondingly forms the first of the recommendations below; the remaining recommendations address the more particular findings of this study as ways to increase and accelerate the uptake of green building.

## ***Recommendations***

### **1. Require Greener Standards through Regulation**

**Rationale:** Because there has not been a widespread spontaneous market uptake of green building, because municipalities have no direct influence over the important market-determined variables of price and cost, and because many of the possible policy tools are either difficult to implement or are being used to lever other public amenities, minimum building standards should be continually raised to challenge industry potential and reflect environmental concerns. Universally applied higher minimum levels would mean developers who do seek to incorporate greener features would not be penalized in terms of cost relative to those who do not, while additional incentives would in turn be used specifically to raise the bar and reward or encourage exceptional innovation. While moving towards making green building a non-discretionary activity will help mitigate the impact of market failures and barriers, it will need to be done progressively yet insistently to enable and oblige the market structure to adapt.

#### **Actions:**

- Support proposed changes to the BC Building Code and lobby the provincial government for further incremental changes.
- Establish region-wide norms for interpreting code and code equivalencies and ensure in-house capacity to provide effective approvals and advice to developers.
- Explore opportunities to regulate green standards beyond code requirements through area-specific bylaws and design guidelines.

### **2. Promote the Value of Green**

**Rationale:** Because a pro forma seeks to reduce uncertainty in development decisions, and because price is a highly significant variable on the pro forma, increased consensus and appreciation for the value of green would enable an upward pressure on the developer and create a business case for green buildings. Given the issue of split incentives in residential build-to-sell development, the promotion of green value would encourage consumers to capitalize any additional costs of buying green and encourage financial institutions to provide incremental financing or green mortgage solutions to finance their long-term value. While seeking to influence development practices via influencing consumer preferences may appear an untraditional role for municipalities, informing constituents so they are able to act in their and/or the community's best interest is an established principle, and green building can be integrated into existing environmental discourses (alongside, for example, recycling waste or utilizing cycle lanes) as another option for constituents to choose in the face of climate change. Insofar as this strategy implies collaboration with the development sector, the question is one of expanding the emphasis of this collaboration to include sales and real estate agents. The explicit fostering of a 'Sustainability Vision'<sup>26</sup> for the 2010 Olympics serves to highlight not only that there is a political awareness that promoting the value of green can enhance the region's reputation, but also that marketing opportunities exist to help encourage greener home-buying expectations.

<sup>26</sup> See: <http://www.vancouver2010.com/en/Sustainability>

**Actions:**

- Ensure educational programs (from newsletters to demonstrations and workshops) target the sales and marketing divisions of development firms, the realty sector, and the consumer *in addition to* the development and design communities.
- Undertake research to identify/quantify the benefits of green buildings for the homeowner (for example, seek to provide evidence of their higher resale values or lower operating costs, as well as their positive environmental contribution)<sup>27</sup>.
- Consider promoting the value of green through placing a higher price/cost on the resources being valued: for example, municipal water metering.
- Include green building promotion in civic and community messaging (newsletters, municipal mission statements, etc), and where appropriate seek to involve green building brands and developers in that association.

**3. Play a Facilitating Role in the Market Structure**

**Rationale:** Because there is an uneven awareness of green building, because there are many components and inputs to the building and development industry, and because habitual practices and relations prevail, market structure change should be facilitated. With many potential barriers lying outside the reach of conventional policy tools, such as the supply of green materials and the implications for construction scheduling, or the response of the insurance industry to particular green features, municipalities need to broker the transition to a greener building industry.

**Actions:**

- Establish a civic building policy requiring green standards for municipal infrastructure to kick-start the market, create awareness, and demonstrate the true costs and benefits of building green.
- Use performance-, rather than prescription-, based green building regulations to allow the developer flexibility to respond and design according to market availability (materials and expertise) and habits (insurance preferences) when meeting green targets/requirements.
- Foster cross-sector partnerships involving financial institutions, insurance industries, utilities providers and development firms.
- Provide basic in-house green building expertise in a consulting capacity for developers, and/or contribute and refer to existing regional expert services<sup>28</sup>.

**4. Use Appropriate Incentives**

**Rationale:** Because there has not been a widespread spontaneous market uptake of green building, and because accelerated activity in the industry would facilitate

<sup>27</sup> Existing research into the advantages of green building have ignored residential buildings and focussed on the ICI sector (Industrial-Commercial-Institutional), thereby documenting benefits that do not relate directly to homebuyers (for example, increased office worker productivity, improved student concentration in schools, reduced hospital recovery times, and so on). Equivalent research – and targeted dissemination of the findings to realtors and consumers – is required for the residential sector.

<sup>28</sup> Two excellent resources exist in the study region: the regional district MetroVancouver's Build Smart website (<http://www.gvrd.bc.ca/BUILDSMART/index.htm>) and the non-profit Light House Sustainable Building Centre (<http://www.sustainablebuildingcentre.com/>).



increased future uptake, incentives should be used to encourage developers. Given the uncertainties and lack of consensus that currently characterize the green building sector, incentives would be an effective means to offset the real or perceived risks of building green, raise interest and knowledge, and create better opportunities for industry leaders to emerge. While many incentives imply consequences and trade-offs, they can remain effective levers provided they are employed in a manner appropriate to the municipality in question.

### **Actions:**

- Identify means to control incentives offered: for example, include sunset clauses in outright bonusing bylaws to insure against obsolescence; establish CD zones to tailor green building features to the site; underzone schedules against the OCP to send a signal to developers to apply for rezoning, while retaining control of when to lift the land value and be able to lobby applicants to build green.
- Incorporate green building consistently into the planning framework (from the OCP through to individual dialogues with developers during permitting applications) to establish a precedent for supporting rezoning applications that provide the appropriate land use built in the appropriate (green) way.
- Consider using tools developers would respond to, however problematic (reduced DCCs, fast-tracking), and identify ways to make them effective, if only as short-term incentives to kick-start market activity.
- Establish municipal priorities, position green building within these priorities, and protect other amenities: for example, if using bonuses, designate green building as an incremental increase in density, available once other amenities have been secured through initial increases.

### **Conclusion**

The green building industry in the study region has been shown to be an industry in evolution, with high levels of activity and interest from planners and developers alike. In the context of adaptation to climate change, there is a strong argument for capitalizing on the existing momentum, particularly where most gains can be made: in the field of residential development. By examining the decision-making process for private developments, and evaluating policy options for influencing this process, the following four opportunities emerge as the most strategic options for moving the green building industry forward:

- 1. Require Greener Standards through Regulation**
- 2. Promote the Value of Green**
- 3. Play a Facilitating Role in the Market Structure**
- 4. Use Appropriate Incentives**

It is believed that pursuing actions in these four domains in a collaborative fashion with the numerous partners in the development and real estate sectors will lead to an accelerated and increased market uptake of green building practices.

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