

Green Buildings Policy: An analysis of three market-oriented innovations

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Introduction

"Green," "sustainable," "environmental," "smart" or "progressive" are terms used to refer to buildings that unconventionally apply techniques that affect the building and/or building process in a manner that minimizes the adverse effects on the environment. There are innumerable techniques considered to be "green" or "sustainable" and an inventory of them goes beyond the scope of this report. For the purpose of this inquiry, it should be important to note that anything that meaningfully reduces the amount of pollution that a building introduces into its environment is considered to be green. Increased awareness of the business case for sustainability has prompted interest among all stakeholders in the real estate industry. However, there are a number of barriers inhibiting the mainstream diffusion of these practices. Developing policies that address these barriers is the next step in achieving a more efficient industry and promoting public sector environmental objectives.

In the province of Ontario, the Smart Growth Panel was formed to report on and make a wide ranging set of recommendations (CENTRAL ONTARIO SMART GROWTH PANEL, 2003). This report discusses three innovative applications that address the barriers to sustainability in the design, construction and real estate sector. Each case proved difficult to research objectively because of the highly politicized stakeholder groups active in these industries. Most data related to these cases are from non-peer reviewed sources or directly from the organizations responsible for their implementation. Where available, academic literature has been reviewed. However, since these three specific examples are relatively recent, both forms of literature were important resources for the development of this report.

All three approaches originate from programs developed in the USA. Recent European policy advancements are not discussed here due to the abundance of unique market-oriented approaches found within the USA. Despite a huge number of effective programs being implemented in Europe at the time of writing, approaches developed in the USA tended to adequately reflect the market-oriented nature of this inquiry.

The criteria for analyzing these approaches have been adapted from two OECD reports (OECD, 1999; OECD, 2003). These cri-

teria discuss the quantitative and qualitative impacts of each case. The criteria are:

- Environmental effectiveness;
- Economic efficiency;
- Administrative and compliance costs;
- Incentives for innovation;
- Competitiveness implication;
- Soft effects;
- Viability and feasibility.

The three case studies discussed are:

- Leadership in Energy and Environmental Design (LEED);
- Residential Energy Conservation Ordinance (RECO);
- Time-tranching.

Background

The total value of 2004 construction permits in Ontario was \$23.9 billion (STATISTICS CANADA, 2005). Every new home or condominium generates 2.8 jobs. Nearly 250,000 person years of employment will be linked to the residential sector alone (VALELA, 2003). It is clear that the construction industry is an enormously important segment of Ontario's economy, providing livelihoods and homes to millions. Ontario is in the midst of a huge residential construction boom. The value of annual residential building permits in Ontario rose from \$8 billion in 1998 to \$15.2 billion in 2004.

Buildings in Canada represent approximately 38 percent of energy usage and 30 percent of total greenhouse gas (GHG) emissions. However there are a number of barriers preventing widespread uptake of green building techniques and the adoption of innovative construction, financing, and policy programs (MOORE, 1997; HABITAT DESIGN + CONSULTING & ARCHEMY CONSULTING, 1998; PECK AND ASSOCIATES, 2000; POMEROY, 1999). The impediments to achieving a more sustainable building policy mix can be broadly classified into five categories:

- Administrative – related to building code, official plans and the systemic barriers in large bureaucratic organizations.
- Financial – relating to the "green premiums," investment issues, and insurance liability.
- Psychological – relating to the inherent conservatism and risk aversion among building professionals.
- Experiential – problems associated with inexperience or lack of highly trained professionals capable of executing sustainable development.
- Market structure – relating to the large number of small firms that dominate the design and construction industries.

Administrative

Building codes and planning restrictions are geared to speedy approval of conventional buildings only and generally do not have

the capacity to address innovative designs in a timely manner. This additional time adds cost and frustrates many genuine attempts at green development. There is often little capacity for regional land use or transportation planning to support Smart Growth development. The fact that projects with innovative designs take considerably longer to gain approval makes it more difficult to convince investors of the project's financial viability, severely limiting the investment potential of sustainable development in Ontario and raising affordability concerns.

Financial

Until recently, the financial costs of green building were the critical deterrent to uptake in the industry. Recent evidence suggests that the 2 to 5 percent "green premium" associated with green building is now less costly than the future savings in energy and health associated with a 25-year life-cycle costing timeframe (KATS, 2003). Also, the variability in reported green premiums is high enough to discount many conservative investors from entering into green business ventures.

Green retrofitting has limited incentive for a lessor who generally transfers the operational costs on to the lessee. Furthermore, while a government institution should feel accountable for the future benefits that its building may have for society, private developers would be less likely to perceive environmental impacts as a financial incentive to building green. Also, higher capital costs and hurdle rates are discounted more heavily by businesses than government.

Developers often cite difficulty in acquiring investment backing for riskier projects (i.e. projects that involved innovative "unproven" technologies or took longer to gain approval) as being more difficult to finance (POMEROY, 1999). Investors are reluctant to finance a product that had not been proven in the marketplace. They want a clear demonstration that a project will earn money. There is also a perception among developers that there is an inherent lack of demand for compact development and that there is almost zero demand for environmentally responsible buildings (POMEROY, 1999).

Psychological

Risk aversion and a deep-seated conservatism in the building sector restrict the diffusion of green building.

Conservatism is inherent in the unwillingness of engineers to adopt new technologies to consumers who are conservative in their housing purchase decisions and financiers who want two thirds of the proposed project sold before advancing funds for construction. This conservatism is related to the fact that it is very difficult to "test the product," as is possible with other industry sectors, without significant up front investment risk (PECK AND ASSOCIATES, 2000).

There exists a stifling attitude toward sustainable building in the industry. A report by the U.K.-based Building Research Establishment (BRE) comments on how green buildings are branded by investors:

The image is of natural materials, green roofs, radical passive design, and technological gizmos. They are seen as a potentially short-term fashion trend with a narrow market place appeal that runs counter to longer-term appeal to long-term investment planners. There is a perception amongst building professionals that more sustainable solutions inevitably result in increased capital costs and/or reduced market/staff appeal. (YATES, 2001)

Experiential

The construction industry is characterized by a large number of small firms. Green buildings are characterized by a diverse array of techniques and require an integrative approach to their application. As a consequence, the diffusion of knowledge and first-hand experience is another obstacle for a more sustainable in-

dustry. Currently, the development community is unaware of the less radical options available and the benefits they can bring to a project.

Industry structure

The dominance of a large number of small firms in both the design and construction aspects of the building sector significantly slows the diffusion of technical and experiential knowledge. There are 3,691 firms in the Canadian Architectural industry and only 7,500 registered architects. Though the trend toward sustainable development has greatly influenced architecture, the profession is small in numbers and cannot influence decision makers as effectively as it should. Despite architects being recognized as leaders in the construction industry, the built environment and society in general, their impact on policy has traditionally been limited (INDUSTRY CANADA, 2002).

Green rating systems: Leadership in Energy and Environmental Design

Leadership in Energy and Environmental Design (LEED) is a green building rating system created by the United States Green Building Council (USGBC). The USGBC is a coalition of building industry participants across the United States. LEED defines the basic intent, requirements and documentation needed to qualify a building under LEED's four tier rating system. LEED qualifies green buildings with a classification based on the number of credits the building has satisfied out of a possible 69 (70 in Canada).

LEED operates on a voluntary basis by providing a project checklist to inform the design of a building and by awarding the finished building a rating. The ratings are: Platinum, Gold, Silver, and Certified. The rating is based on credits in six categories. The GBC charges a fee based on the size of the building and the number of audits required to qualify.

Analysis

● **Environmental effectiveness:** Energy efficiency is the largest category of credits under LEED v2.1 and the LEED-Canada system. It is also the most identifiable measure of a project's environmental effectiveness. LEED evaluates the quantity of improvements measured against a business-as-usual, built-to-code scenario. USGBC data on 33 LEED rated buildings reported average energy reductions of 28 percent (KATS, 2003). As to be expected, higher rated buildings were more energy efficient than those with a lower rating. The LEED rating system has other credits that indirectly affect environmental conditions although these criteria and their prerequisites are difficult to measure quantitatively.

● **Economic efficiency:** The additional costs of building green compared to conventional building was, on average, about 2 percent (KATS, 2003). The aforementioned reduction in energy consumption lowered operational costs and increased economic efficiency. This can provide a competitive market advantage to businesses and is a major selling point for the LEED rating system.

LEED has had a considerable impact on the building industry in the United States and Canada. Furthermore, many incentive programs in the U.S. now reference LEED. In effect, LEED has become the "image" of green building in the United States. Being the leader in green building makes LEED a significant player in raising awareness of environmental architecture. It has also put pressure on manufacturers to produce green building products to satisfy the new demand. A review of the trade literature (U.S. and Canada) has recovered an increasing frequency of references to LEED (BOAKE and PROCHAZKA, 2004).

From a policy perspective, LEED is a very cost-efficient means of effecting change in the building sector. Applicants are buying

an environmental label that can be used to improve operational expenditure and a building's marketability.

● **Incentives for innovation:** LEED has been credited with substantially increasing the industry's familiarity with environmental issues in the North American market (THOMSON, 2003). Awareness of LEED amongst building professionals is widespread – more so than competing green rating systems (GREEN BUILDING INDUSTRY AWARENESS STUDY, 2003). Recent building sector conferences in Toronto have included a CaGBC information booth and have featured specially highlighted environmental products or services. Increased environmental awareness has heightened the demand for more sustainably manufactured products and innovative building techniques. Though difficult to quantify, the momentum from LEED has contributed to awareness of green building, particularly in the United States. For example, a review of the trade literature shows a preponderance of environmentally minded product advertising, many with specific references to LEED.¹

Of all the policy instruments available, a market-based voluntary information tool such as LEED is probably the most cost-effective way of promoting innovation.

● **Administration and compliance costs:** Administrative costs refer to the burden imposed on the public authorities responsible for applying the policy instrument. LEED is unique among the instruments discussed in this report because it is a product developed entirely by the private sector. It is a commercial product administered by a not-for-profit organization (USGBC or CaGBC). LEED does, however, demand payment to cover the costs of the USGBC. A typical commercial development may expect to pay less than 0.5 percent of total construction costs toward gaining the LEED label. Although certification may represent a small cost, more substantial overheads are usually incurred for the design in the form of increased professional person-hours. In the case of Natural Resource Canada's C-2000 program, this averaged an additional 30-45 person days.

Lack of experience and systemic barriers are partly responsible for these higher design phase costs of the development. However, considerable more work is required to integrate the myriad systems necessary to design an efficient building.²

● **Competitiveness implication:** Since LEED is a voluntary program it cannot depress the market. Evidence suggests that buildings with LEED certification have a higher market value than the business-as-usual scenario.

The financial benefits of green buildings include: lowered operational costs; reduced insurance premiums; and savings from increased productivity and health. Operational costs are predictable and can be accounted for in demonstrable tests. Productivity, however, is less quantifiable and its benefits remain uncertain. Increased productivity/health benefits, though proportionally smaller in relation to operational costs, represent a far larger potential gain because the direct and indirect costs of employees are the largest expense to a business. Figure 1 shows a breakdown of green building financial benefits. These benefits are estimated to be almost \$50/sq.ft for Certified or Silver rated buildings and \$75/sq.ft for Gold or Platinum buildings. This is over 10 times the average green premium of 2 percent or approximately \$3-5/sq.ft for the 33 buildings analyzed (KATS, 2003).

● **Market impacts:** Although there is a lack of hard data on the market impact of LEED, anecdotal evidence suggests that LEED has played a significant role in popularizing the tenets of sustainable construction, particularly in the United States. LEED has been adopted by a number of regional and state governments and has influenced the building patterns of many other organizations.

Being a voluntary program, LEED cannot realize complete market transformation. As with any voluntary program, there must be a "want;" otherwise applicants can fall into the "LEED trap," where merely following the checklist will not guarantee the

product. The problem does not lie with principles that LEED promotes, but with the method by which it is marketed. By promoting social responsibility as a market advantage only, LEED may also be producing a "loophole mentality," where builders start to look for shortcuts in the system. Of course, this sort of behavior is more common with regulatory instruments and atypical of voluntary systems. Still some designers are becoming disillusioned with LEED's "rigidity and bureaucracy" (SULLIVAN, 2004).

Once the first set of environmentally minded clients have signed onto LEED, the real challenge is convincing the mainstream to adopt LEED principles. An architect and environmental advocate commented that LEED has tremendous potential and has generated a lot of noise but has to be very persistent to pull the industry up the learning curve. Once the "low hanging fruit" has been picked, the real challenge lies in bringing conservative and risk averse builders on board.

Evidence suggests that green architecture has moved out of the "trend" phase of its development. High profile projects such as the reconstruction of the World Trade Center in New York City incorporates on-site wind generation. Another sign is that some of the most institutional, owner-occupied or build-to-suit projects are now incorporating green elements into their developments.

"Some REITs (Real Estate Investment Trust) and others in the industry are realizing the importance of getting beyond pure commoditization of space and pure rent. High performance green buildings can be seen as a measure of quality and a way to lead in the market" (SEAL and BROWNING, 2003).

Liberty Property Trust, one of the United States' largest Real Estate Investment Trusts, has four LEED projects under development. Furthermore, many of Canada's provincial or municipal governments have committed to large scale LEED projects.

● **Viability and feasibility:** LEED has become an industry leader in 10 years. Politics in North America is strongly supportive of market-based alternatives to government spending. In this atmosphere of fiscal restraint and government cutbacks, LEED manages to affect positive change without any development cost to governments. Although this may be LEED's greatest strength, it may also be its most profound weakness.

● **Barriers to LEED:** Barriers to the widespread adoption of LEED include investor awareness, lack of experienced practi-

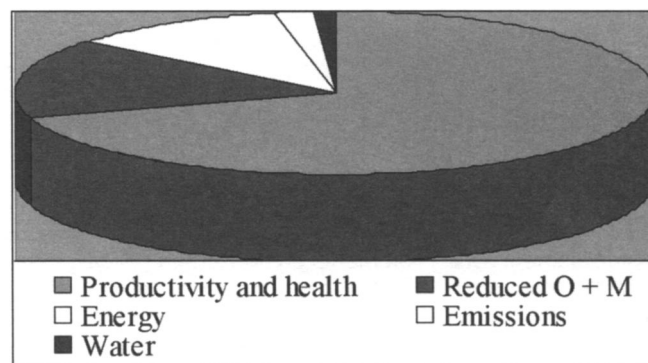


Fig. 1: Percentage breakdown of green building financial benefits (LEED certified and silver rated). (Source: G. Kats, 2003, p. 85).

tioners, and competition from other rating systems. Decisions to use LEED must be made by developers very early in the design process to be cost-effective. A poorly motivated investor decision to go ahead with a LEED project may impede the ability to achieve a green building. Above all else, the client must want an environmental building. LEED cannot be viewed as a checklist nor is it a surrogate for improved building codes.

Another potential barrier to the spread of LEED in Canada is the limited number of experienced practitioners. Though this number will probably increase over the next few years as LEED procurement increases in Canada, this may pose a problem at the more immediate stages.

LEED has some competition in Canada. BREEAM Green Leaf, Energuide, CBIP, BuiltGreen Alberta, and the C-2000 program have all enjoyed considerable success in Canada. This competition, coupled with LEED's narrow focus on large commercial development, may marginalize LEED in the Canadian marketplace. Furthermore, the costs associated with a LEED assessment may be prohibitory for smaller firms. It is unclear whether LEED will spread as quickly or with as much hubbub as in the United States.

• **Conclusions and recommendations:** LEED has enjoyed support and growth in the ten years since its inception. Whether or not LEED becomes the main player amongst the various green rating systems in Canada is yet to be seen. This may rest, in large part, on whether or not a residential version is developed for Canada's booming housing market and whether federal, provincial and regional governments move on sustainable building issues.

Being a market-based instrument, LEED has both strengths and weaknesses. It has zero administrative costs for government and does not require subsidy. However, this limits it to the whims of the market and it is unclear how much influence LEED can exert in an industry characterized by a large number of small firms. Being a voluntary program, LEED could provide an outlet for innovative building approaches and may produce a receptive environment that can ease the process of pioneering new standards (VINE, 1990).

An inherent conservatism and healthy skepticism among Canadian building professionals may reduce the impact that an "American-style" marketing system can have on the Canadian real estate industry. Nevertheless, empirical evidence on LEED-rated buildings shows promising results. A small green premium of about 2 percent can incur savings ten times the capital costs over a 25-year period. Though the data for these is somewhat unconventional, energy savings alone report to be a significant savings beyond federal or provincial baselines. Furthermore, NRCan's C-2000 program reports that energy savings of 35-50 percent can be achieved with zero or a very modest additional construction cost. This is achieved through an integrated design process (IDP).³

LEED has prompted a tremendous outpouring of support in the United States. Approximately 4 percent of all new commercial square footage in 2002 was LEED registered. A dramatic increase in the number of references to LEED in the trade literature is evidence of its momentum. Furthermore, a number of regional and state governments have adopted LEED as guidelines for building in both Canada and the United States.

The next few years will present a number of challenges to the LEED rating system. Once "easy" clients (i.e. those whose propensity to build green preceded LEED) have finished building, it is unclear if mainstream organizations will opt to use LEED or simply "greenwash" their buildings.

Residential Energy Conservation Ordinance (RECO): Retrofitting homes at the point-of-sale

The residential sector in Ontario represents a significant proportion of energy end-use. Ontario's 2.48 million dwellings used 512 petajoules of energy in 2001, almost three-fifths of which was used to heat homes (NATURAL RESOURCES CANADA, 2005). Ontario's cold winters are responsible for the disproportionately large energy expenditure on heating. New homes in Ontario are considerably more energy efficient than homes built a few

decades ago. The fact that over 67 percent of Canada's homes are over 20 years old suggests that policies aimed at improving the energy efficiency of older housing stock should become a priority (CMHC, 2003).

With modern retrofitting, many older homes can be easily renovated. The improvements required to meet these standards generally include:

- attic, wall and basement insulation;
- furnace and appliance upgrade;
- draft-proofing and/or window improvement;
- ventilation upgrades; and,
- low energy lighting.

The capital costs associated with these renovations are considered to be the primary hindrance to further retrofits. Nevertheless, according to *Statistics Canada*, three quarters of homeowners reported at least one repair or renovation expenditure in 2001. The average amount spent by homeowners across Canada in 2001 was \$2,065 (CMHC, 2003) with the largest proportion expended on repairs and maintenance followed by renovations and alterations. Strangely, homeowners spent, on average, more money on homes built in the 1980s than on homes built before 1946 (CMHC, 2003).

Canadians may need a further incentive to reduce their energy use at home. Traditional thinking suggests that increased energy costs are the single most effective method of reducing energy usage (OECD, 2003). Energy is a highly politicized issue in Ontario and the subject of endless debate. Based on the public uproar that de-regulation received when Ontarians were faced with energy prices actually reflecting its true market value, further taxation may not be the most fashionable solution for policymakers. Voters may be more open to a market linked regulatory mechanism that promotes modest conservation than they are to a fiscal mechanism such as increased taxation.

One such mechanism was designed and implemented in San Francisco in 1982. The Residential Energy Conservation Ordinance (RECO) requires owners to upgrade their buildings to a certain standard at the point-of-sale before a transfer of a deed can occur. This tool has been widely accepted into business-as-usual practices and has resulted in an estimated 15 percent decrease in residential energy use (VINE, 1990; SUOZZO, WANG and THORNE, 1997).

Policy triggers and requirements

RECO requires buildings to undergo energy conservation retrofits when the buildings are sold or have a substantial renovation. RECO is triggered at the point-of-sale and is designed to upgrade older housing stock. It is run by the Office of Building Inspection in San Francisco and the Energy Office in the Housing Department in Berkeley. Both programs use computer tracking to enforce compliance. In order to reduce administrative costs, San Francisco has private licensed inspectors who are responsible for carrying out some of the necessary inspections before and after the upgrades. Berkeley uses a non-profit organization, Community Energy Services Corporation (CESC), for all inspection work.

RECO is triggered by one of four factors:

- point-of-sale;
- metering conversion;
- major improvement; or
- condominium conversion.

RECO stipulates upgrades that include insulating attics, caulking around windows and doors, weather stripping and insulating piping. RECO also requires installation of low-flow taps and water efficient toilets. Certain limits have been placed on the amount of money that must be spent to comply with the ordinance. These costs typically cannot exceed 1 percent of the sale price. Since these upgrades have been incorporated into the newer building

codes, it is therefore unnecessary for buildings after 1978 to prove compliance.

Although the seller or buyer is responsible for enacting the upgrades with the ordinance, awareness is widespread and not a barrier to compliance. Non-compliance results in a fine of \$300-400 in order to recoup the costs of enforcement and for an Order of Abatement (similar to a lien) to be placed on the property. Prior to the transfer of title, owners must arrange for a licensed inspector to visit the property to determine the necessary upgrades. After the conservation measures have been completed, a re-inspection ensures compliance and a certification form is issued. Certification is a requirement for transfer of title to occur unless an arrangement is made to transfer the responsibility to the buyer. An energy inspection must be filed with the city and an escrow account is established to hold 1 percent of the purchase price to implement the conservation upgrades. If the upgrades are not undertaken within 180 days of title transfer, then the city will proceed with non-compliance measures.

Analysis

● **Environmental effectiveness:** A lack of precise data limits an exact assessment of the environmental effectiveness of the RECO program, although one estimate suggests that since 1982, residential energy use has declined by 15 percent as a result of RECO upgrades (SUOZZO, WANG and THORNE, 1997). Similarly, RECO reduces water consumption and its associated environmental costs. By increasing the standards of existing buildings, this regulatory instrument probably also affects the likelihood of it being occupied for longer. Although it is difficult to quantitatively measure the environmental benefit of extending a building's service life compared to building a new environmentally efficient structure, it is important to note that a RECO program may be useful especially from a historical preservation perspective. More research on environmental impacts of renovation versus demolition/re-building should help clarify this gap in the literature.

● **Economic efficiency:** In the two municipalities where RECO is active, two approaches were identified as options for managing the administrative costs of enforcement: private-sector inspectors operating in a supply and demand market; and a not-for-profit inspection agency regulated by the city. San Francisco's Office of Building Inspection is responsible for about half of the inspections undertaken in that city. The other half is done by private inspectors trained and licensed by the city. Often, the private inspectors are also contractors or builders who perform the work after having identified what is necessary under the ordinance. This integration of inspector/contractor is considered an efficient alternative because it reduces the steps in achieving compliance. In San Francisco in 1997, approximately 70,000 properties had been inspected by the Department of Building Inspection, at least 65,000 of which were known to be in compliance. Private companies reported another 90,000 inspected properties. The compliance rate of these buildings was not exactly known, though the Department of Building Inspection classified the rate as comparable to that of the municipal inspectors.

Berkeley's approach has been to require that all inspections be undertaken by CESC, a non-profit arms length organization, and authorized inspector. CESC also provides a list of approved contractors to complete the work for RECO. Both in San Francisco and Berkeley, RECO was not considered to be a barrier to the housing market (MACKENZIE, 2003; SUOZZO, WANG and THORNE, 1997). These cities have undergone sustained housing booms and the addition of a small cost to doing business has not perceptively affected the market. However, no quantitative studies have been undertaken to support this statement.

RECO has created a specialized labor market in San Francisco where the integration of inspector/contractor allows for further efficiencies. It is likely that RECO also stimulated the

local construction and retail hardware economy although no empirical data exists on this subject.

Seventy percent of San Francisco' population lives in rental units and principal agent problems historically reduced the market impact that energy conservation would have on renters.⁴ This approach to enforcement has an uptake rate based on the turnover of properties. Figure 2 approximates the increase in compliance over time. Consequently, RECO achieves higher efficiency standards without large administrative investment in capital and training expenses typically equated with the outset of a program. Furthermore, because of the small staff requirement, only small costs are associated with the learning curve period of the project. The OECD's (2003) report entitled *Environmentally Sustainable Buildings* identified RECO as an important policy tool for addressing energy efficiency in old residential buildings:

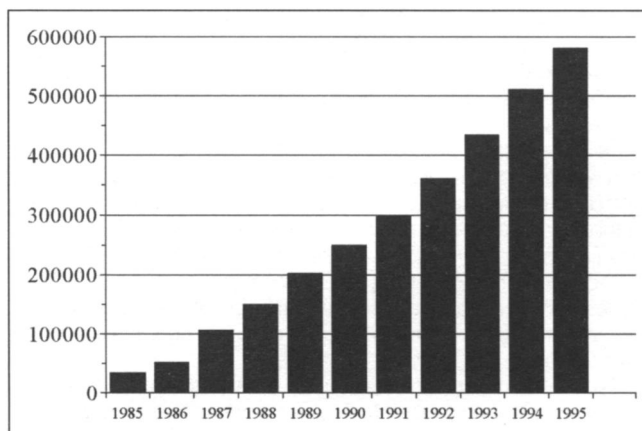


Fig. 2: Cumulative number of buildings in compliance over time. (Source: Suozzo, Wang and Thorne, 1997, p. 513).

"When considering the diminishing returns on investment in energy efficiency measures, relatively old and not very energy efficient building, which are RECO's main target, could potentially improve their energy efficiency in a very economical manner. It should be noted that there are not many options for upgrading the low level of energy efficiency of old buildings – in particular of old residential buildings – to the minimum standard" (pp. 83-84).

● **Incentives for innovation:** RECO's modest, uniform and specific minimum standards have made it palatable for stakeholders. However, the ordinance eliminates any stimulus for innovation (OECD, 2003). This is because RECO demands specific upgrades such as window caulking, extra insulation, etc. instead of performance-based requirements like an overall reduction in energy consumption. This severely reduces this policy's ability to promote new and innovative approaches to achieving energy conservation.

● **Administration and compliance costs:** The administration of RECO falls under the jurisdiction of the San Francisco Department of Building Inspection/Housing Inspection Services and the Berkeley Energy Office and Community Energy Services Corporation (CESC). San Francisco also authorizes private inspectors to perform inspections as well as retaining between 25-30 of their own staff inspectors. Every year the San Francisco Department of Building Inspection offers a training course for people to attain certification to complete a RECO inspection and the Department has developed a training manual and examination process. Private licensed inspectors can determine their own fees. However, the fees set by the Department's officers are designed to cover the administrative costs associated with RECO.

In Berkeley, inspections are undertaken by a non-profit corporation and inspection fees are also nominal. These costs cover a small administration staff and computerized tracking program for recording properties in compliance with the ordinance. For a single family dwelling, the CESC fee for initial inspection is \$100 plus a \$15 filing charge. In San Francisco, the inspection fee is similar. Non-compliance fees are between \$300-400 which covers the cost of the issuance of delinquency statement, and, if necessary, a hearing and lien.

Inspection fees are considered to be a self-sustaining charge which eliminates the need for external funding. This was found to be true in both the San Francisco and Berkeley cases. In terms of the outlay that must be absorbed by the public, the compliance costs associated with RECO are never more than 1 percent of the value of the building.

● **Competitiveness implication:** In order to satisfy the interests of all the various stakeholders, the RECO standards had to be set to meet the requirements of the lowest common denominator (SUOZZO, WANG and THORNE, 1997). In this case, it is an example of "sacrificing breadth for depth" (VINE, 1990). Since RECO is so modest in scope, it does not have any discernable depressing effect on housing markets where it has been enacted.

Realtors and title companies, which do not want to be responsible for selling properties burdened by RECO liens, are relied upon to promote compliance (SUOZZO, WANG and THORNE, 1997). In effect, attaining RECO compliance is a competitive advantage in those housing markets and has been actively promoted by realtors.

In San Francisco, private inspectors can also perform the upgrades to buildings that they have inspected. This promotes integration and efficiency in that it reduces overlap and facilitates faster compliance. These private contractors are awarded a competitive advantage in the home renovation market from their investment in the certification course. This contributes to the local economy, stimulates continued education as well as market differentiation.

● **Soft effects:** After reaching its saturation point, the long-term effects of the RECO program could result in an eventual decline in building energy efficiency. The number of buildings reaching compliance will eventually decline (previously inspected buildings do not need to be reassessed) as the sale and resale of properties exhausts the finite number of "older" housing stock. Although, undoubtedly, building code amendments and social acceptance of energy conservation will demand more advances in efficiency, it may become necessary to update RECO by forcing post-1978 buildings to achieve re-compliance. Furthermore, as newer more energy efficient homes age, reinvestment may be necessary to bring them back up to an energy efficiency standard. Having an existing RECO in place already provides the technical and administrative infrastructure on which to build these future programs and to contribute to historical buildings' retention of market value.

It is unclear whether RECO will achieve higher energy efficiency in the long-term. RECO compliance offers no incentive to outperform the standard and may disincline further investment in conservation and energy efficiency once the minimum has been met (VINE, 1990).

● **Viability and feasibility:** Any sort of regulatory policy must be coupled with an intensive educational campaign. As the RECO experience attests, there is significant reluctance to accept a change in the status quo. Despite the best intentions of the policymakers and the obvious benefits to the common good, the reluctance to invest capital into energy conservation is a real barrier to conservation policy enactment.

Another issue is the difficulty in assessing RECO's impacts. Data for the programs is either based on estimates or cannot be readily accessible (MACKENZIE, 2003). This limits the ability of policymakers to assess the effectiveness of the program and doc-

ument its benefits to the homeowner. Furthermore, this lack of formal data tracking makes it difficult to garner the support of stakeholders and proceed with defending the policy's effectiveness or applying modern requirements in the future.

● **Barriers to RECO:** RECO was conceived amidst the energy crisis during the 1970s oil embargo. Policymakers were faced with the growing realization that a fundamental mismatch existed between those people who were being targeted by conventional energy conservation policies and those who were actually paying to use the energy. RECO was subsequently developed to address energy conservation issues in San Francisco's existing housing stock.

The primary barriers that were encountered in the process of implementing RECO revolves around the aversion to further regulation and fears that it would depress the market. This would add an unnecessary additional cost to the already high transaction charges associated with the real estate business.

In order to get the ordinance passed, the municipal government was forced to tone down RECO. This resulted in a compromised version of the ordinance. The city initiated a targeted campaign to win over the gatekeepers of real estate transactions (i.e. realtors) with the assumption being that the information would filter down to the building owner. Although anecdotal reports suggest that these barriers were overcome by the eventual realization of the financial savings and social benefits of RECO, it was difficult to measure the temper of the times because few of the people involved in RECO's startup were available for comment.

A discussion with a city official revealed that the ordinance has since been normalized and even expanded to commercial buildings (MACKENZIE, 2003).

● **Conclusions and recommendations:** Despite the lack of precise data supporting RECO's achievements, the ordinance continues to be a widely accepted part of doing business in both San Francisco and Berkeley. RECO's innovative trigger mechanism has been successful in improving the energy efficiency of a substantial number of older buildings. Furthermore, it has done so without requiring additional funding and in a cost-effective, sustainable and socially acceptable manner.

RECO should not, however, be regarded as a panacea for energy efficiency in existing housing stock. The minimal standards delineated in California are not easily transferable to Canadian circumstances. In fact, the benefit of 1 percent of the value of a home for energy efficiency upgrades may not result in a proportionately similar decline in energy usage in the Canadian climate. Further inquiry is recommended before a decision to implement a RECO program is made. Specifically, data linking the quantity of capital investment in energy efficiency required to reduce a certain amount of energy use could provide a baseline for a future energy conservation ordinance.

Still, RECO is a good starting point for the design of a Canadian program for existing housing stock. If anything, the Californian experience demonstrates how successful the point-of-sale trigger is in enforcing regulatory measures. By adding a proportionately small amount to the already large real estate transaction charge, policymakers may be able to mitigate the traditional disdain for government mandated capital investment.

RECO produces further specialization in the trades and generates economic benefits in the form of long-term employment in the construction and the promotion of awareness and skills development.

RECO is particularly effective at addressing issues associated with principle agent problems and affordability in rental housing. There are 1.3 million rental dwellings in Ontario many of which are in older buildings. What economists refer to as "market failures" must be tackled by innovative policy measures. With a looming energy crisis in Ontario and a large number of renters, it is becoming increasingly evident that new policy must be developed to deal with rental housing and existing housing stock.

A regulatory measure such as RECO could be built upon the already existing Energuide for houses or GreenSaver programs. These evaluators use HOT 2XP software and a blower door test to identify leakage points in the home. The assessment costs run between \$102-192. By tying this system to a mandated point-of-sale trigger and enforcing it through realtors, private and not-for-profit sector, Ontarians could likely achieve similar results with minimal outlay.⁵

However, it is important to emphasize that the success or failure of a regulatory tool largely relies on the bureaucracy's ability to generate support for the policy. Industry stakeholders should be involved in the development of any point-of-sale triggered energy retrofit program right from the beginning. Bringing a fully developed regulation to the table will undoubtedly alienate the people who will ultimately be responsible for its success. This aspect of policy formation should be quintessential for the prospect of meaningful regulation to succeed.

A policy such as this should be timed to begin at an appropriate point in the real estate cycle. For instance, it is less likely to be accepted during a slump when the market is suffering from low sales. It also should not be initiated at a market peak because of the probability that it will be blamed for the inevitable future downturn. Again, a roundtable advisory panel should be responsible for informing all the terms of this kind of policy. In this manner, it is increasingly likely that a sustainable process of implementation will be realized.

Time tranching – Varying rates of risk and return over time as a method of financing environmental development

One of the most important barriers to the advancement of sustainable building is the inflexible accounting methods used to evaluate an investment. These methods tend to reward conventional development and penalize innovative projects (LEINBERGER and DAVIS, 1999; PECK AND ASSOCIATES, 2000). It is increasingly evident that a paucity of financing alternatives may be the limiting factor for progress toward greener developments. In many situations, imaginative methods of financing may be needed until the approach becomes commonplace (TAYLOR, 2000).

Typically, a developer will seek a mixture of debt and equity to cover the land, materials, labour and marketing that is required of a large scale residential development. A developer acts on a series of assumptions about the market before seeking investors to finance the project. A financier's decision to invest in a project revolves around a quantitative analytical procedure. A standard analysis technique, Discounted Cash Flow (DCF) is used to determine the risk involved in financing the proposal. If the analysis shows the project to be too risky, then conservative financiers will not invest. In many cases, DCF analysis automatically precludes certain types of projects.

Forty years ago, DCF analysis became the standard method of evaluating the potential of a specific investment (RUSSEL, 2003). Simply put, DCF can tell an investor what someone is willing to pay today in order to receive the anticipated cash flow in future years. It is the method most often used by large investment banks and consulting and accounting firms.

DCF and its derived valuation techniques, such as internal rate of return (IRR) and net present value (NPV), are means by which different projected cash flows can be easily compared over time. These valuation systems aim to assist investors in selecting the highest yield investment.

The assumption behind DCF is that a future dollar is worth less than a dollar today. The decline in value of a real estate investment is a factor of its "discount rate." The discount rate is determined by the cost of capital (the interest charged by a lender) and an investor's expected return on the investment. A typical discount rate is expressed as a percentage and, for real estate,

is around 15 percent. This assumes an interest rate of 7 to 8 percent on the capital, and an expected profit of 7 to 8 percent. The discount rate is a measure of the risk of a particular investment; the higher the discount rate, the higher the risk.

IRR is a DCF methodology used to assess a specific percentage value of a projected cash flow. IRR is the discount rate where cash flow is equal to the initial investment in current dollars. A typical moderate-risk real estate development has an acceptable IRR of between 15 to 20 percent. A high-risk development will have an IRR of around 35 percent. Perceived risk will increase the IRR value for two reasons: first, lenders may choose to charge more interest for unproven developments; and second, innovative projects are, by their very nature, unique. Lenders attach a higher marketability to these projects because of their potential for higher return premiums. If the two components used to calculate IRR are examined (interest and expected profit), it is evident that IRR favors standardized low-risk development (LEINBERGER and DAVIS, 1999). Faced with two investments, one with an IRR of 35 percent and one with 15 percent, most investors will choose the lower IRR. In effect, the "catch-22" that arises from conventional financing has severely limited the opportunity for innovative projects to acquire financing.

Because DCF analysis' emphasis is on cash flow at the onset of the investment term, it is biased against any losses early in the development's life and tends to favor short-term conventional investments over all others. These projects tend to have a low IRR. As a consequence of DCF valuation, it naturally follows that the primary way of ensuring high short-term gains is by minimizing the costs of construction. This almost always translates into lower quality buildings (RUSSEL, 2003).

How time-tranches operate

Developed by real estate analysts Christopher Leinberger and Robert Davis, time-tranching divides real estate investment into tranches, which are different classes of risk/return that have a specified payback period (LEINBERGER and DAVIS, 1999). The concept of time-tranching is borrowed from the commercial mortgage backed securities industry. This technique distributes the cash flows to different classes of investor according to the levels of risk/return that appeal to each investor. Each "tranche," or investment class, will have a different level of risk associated with it related to the "piece" of the investment chosen.

Leinberger and Davis have particularized this system according to the assumption that a well-planned mixed-use development will continue to appreciate long after the conventional peak used in DCF analysis.

Each tranche is also assigned a time period where it receives a prescribed percentage of the cash flow for those years. For instance, the first tranche, 'A,' receives 90 percent of the cash flow for years one through five while 'B' receives the other 10 percent. Table 1 shows a breakdown of the cash flows for the three time-tranches.

Table 1
Time-tranche distribution

Tranche	Cash flow distribution		
	Year 1-5	Year 6-11	Year 12+
'A'	90%	20%	10%
'B'	10%	70%	45%
'C'	0%	10%	45%

(Source: Arcadia Land Company in Leinberger, 2001).

This scheme allows investors who use DCF methodologies to get their investment off the books quickly. This scheme also per-

mits patient investors, or those with vested interests in the project (i.e. municipalities, social institutions or regional governments), to earn a return while, at the same time, enjoying the social benefits of compact, mixed-use development.

The percentages in table 1 are determined by the amount required to achieve an acceptable IRR of, for example, 20 percent on the investment. Unconventional developments tend to peak in value in a much longer timeframe than conventional sprawl. As can be seen in figure 3, the line going all the way up from left to right represents capitalization of a regularly maintained mixed-use development. The line going up and then down from left to right shows the value of a conventional development as peaking in years five through seven and then depreciating unless another capital infusion maintains the value.

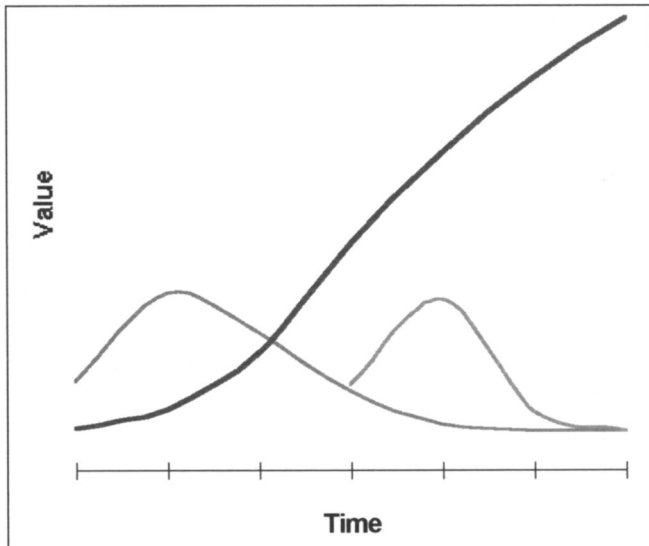


Fig. 3: Sustainable mixed-use development vs. Conventional real investment model. (Source: Leinberger, 2001, p. 6).

Analysis

● **Notes on the analysis:** Time-tranching is a financial instrument developed by Christopher Leinberger and Robert Davis, which is designed to diffuse the risks associated with high end residential New Urbanism (NU). At this point, it is primarily a theoretical scheme. Only a few situations exist in the United States where time-tranches have been used to finance developments. One such urban revitalization project in downtown Albuquerque, New Mexico, has piloted a time-tranching funding scheme. This scheme, because of its very nature, cannot be analyzed in the same manner as the previous case studies. New Urbanism is a highly contentious program and is criticized as being merely a representation of the complex web of social and economic networks that makes a diverse downtown neighborhood actually work (FOWLER and HARTMAN, 2002; EPPLI and TU, 1999). Furthermore, smart growth strategies, or alternative development strategies (ADS) are also widely debated and unresolved (CISCEL, 2001; CARUTHERS and ULFARSSON, 2003; JOHNSON, 2001). It is beyond the scope of this paper to discuss these issues in anything other than general terms. Although the primary analysis revolves around the financing tool developed to reestablish investment in mixed-use and walkable cities rather than ADS themselves, it is also important to look at why these ADS are more appropriate than conventional development.

Much of the literature on time-tranching is in popular or industry journals and offers a limited and often subjective analysis of its impact. At the time of writing, no peer-reviewed economic anal-

ysis exists on the potential impact of time-tranches as an alternative to conventional real estate financing and very little formal analysis of New Urbanism exists at all (SONG and KNAPP, 2003).

● **Environmental effectiveness:** The current DCF valuation model promotes short-lived, poor quality construction and is not a sustainable system. Aside from the inefficiency of resource use attributed to frequent demolitions, there is mounting evidence to suggest that urban sprawl has many diverse impacts on the environment (JOHNSON, 2001). These impacts are so numerous, varied and interrelated that a complete discussion is beyond the scope of this paper.

● **Economic efficiency:** The addition of more participants into a market translates into more liquidity and less risk (MIRON, 2000). A higher diversity of investor types may exhibit increased resilience in the event of a market downturn. This is reflected in the ability of a secondary market to spread risk among many smaller investors. The development of the secondary mortgage market is largely responsible for the increasing diffusion of risk in real estate and has made it accessible to more investors. Time-tranching is, in effect, another market innovation to further distribute the risk associated with real estate. However, time-tranching is best suited to certain types of investors.

Time-tranching operates using DCF analysis in order to improve the IRR of a specific investment. Gyourko and Rybcynski (2000) showed that financiers may have no inherent bias against a concept like NU or mixed-use development, though they must be shown to generate enough cash flow in the short-term. Similarly, Peck and Associates (2000) found that, among building professionals, the perception was that lending institutions looked for a certain set of criteria and are unwilling to give much leeway on programs that offer lower return or more financial risk. This suggests that financiers would respond favorably to the introduction of a mechanism that made innovative real estate investment more palatable.

Using DCF analysis, green building is not an economically efficient alternative to conventional construction. This is because initial capital costs in the design and construction phase of the project only pay off over long periods of reduced energy consumption. However, time-tranching can offset this by reducing the risk associated with unconventional developments, especially when vested social interests are valued. This opens the door for higher capital cost construction (i.e. higher quality materials and techniques and more person-hours spent on the integrated design process) and diversifies the number of investors available to finance a project. In this sense, it is a low cost means of realizing an environmental objective.

● **Incentives for innovation:** Time-tranching has the potential to significantly alter the real estate investment market by creating opportunities for innovative capital-intensive developments. DCF methodologies, on the other hand, promote standardization and reduce the acceptability of unconventional urban forms.

In the real estate market, the move toward standardization has been a recognizable trend for the past half century.

"Risk mitigation has spurred standardization in design of buildings, planning approvals, the methods of financing of new construction, the quality and kinds of construction materials, and the fittings and equipment these buildings incorporate. Planned suburban communities and their individual components – from homes to shopping malls and business parks – reflect the importance of standardization in today's real estate market." (MIRON, 2000, p. 154)

One reason for this is the rise of Real Estate Investment Trusts (REITs). REITs are publicly traded and have a fiduciary duty to operate in the best interests of their shareholders; therefore, REITs tend to perpetuate this conservative bias toward low-risk standardized real estate development (LEINBERGER and KOZLOFF, 2003).

Investors are biased toward trading similar products because investment bankers have been trained to think of standardization as a way to minimize risk (LEINBERGER and KOZLOFF, 2003). As well,

"The lending industry is increasingly characterized by standardization and routinization. (These trends are most pronounced in single-family underwriting.) Making capital a commodity contributes to the efficiency of the current mortgage industry and explains such recent trends as automated underwriting with credit scoring" (BURCHELL and LISTOKIN, 2001).

Time-tranching may actually increase the capacity to produce innovative architecture. This is achieved through the division of the investment into the tranches. The first tranche represents the initial five years of the cash flows and covers about 65 percent of the costs of the total project. This 65 percent represents the costs of construction and is usually financed by a bank's short-term construction loan. Since the actual costs of the development are also financed by the investors in the second and third tranche in the form of equity, there is a larger amount of money available to spend on design and construction. This can result in more durable materials and construction techniques, higher quality labor, and/or the premiums associated with green building technology.

The reduced reliance on debt to finance a development increases the possibility of the construction loan being justified as non-recourse. Non-recourse lending means that the individual or corporation promoting the development will not be liable for debt if the project goes into default (LEINBERGER, 2001). Non-recourse lending further reduces the risk associated with a progressive venture.

● **Administration and compliance costs:** Because it is a new system, it is unclear what additional administration costs time-tranching might add. In the immediate context, it is likely that time-tranching will accrue unforeseen costs associated with the learning curve period of the scheme. It is also likely, however, that this extra complexity and the additional need for careful assessment and planning will increase the cost of profit in the long-term. This is due to the additional time and expertise required to evaluate and coordinate mixed-use development and the partnerships involved in the scheme. Furthermore, because it is untested and non-conventional, high administrative learning curve costs may be a barrier to widespread implementation in the immediate future.

Leinberger associates time-tranched developments as being characteristically unconventional. Deviating from the norm requires new approaches for equity, land acquisition, leasing and sale. He suggests that his approach may require what he calls "backward integration," which refers to the substantial amount of networking required to float this new system of financing.

Patient equity for the second and third tranche or even for the first tranche is not something found by a conventional equity or mortgage broker. Obtaining unique local tenants for an infill project is not something many retail brokers know much about (LEINBERGER, 2003).

● **Competitiveness implication:** From the few examples where time-tranching has been used to finance real estate developments, it is evident that these developments attract market premiums averaging between 4 to 25 percent (FRANKEL, 2001). This is due to the higher quality of construction and reflective of an unsatisfied demand in the market. This demand is probably fueled by a number of interacting issues (FLORIDA, 2002).

● **Soft effects:** The success of time-tranching largely depends on how the Albuquerque, New Mexico downtown revitalization project unfolds. Many Ontario cities have been experimenting with innovative financial techniques such as tax increment financing (TIF), reduced development charges, and/or grants (MINISTRY OF MUNICIPAL AFFAIRS AND HOUSING, 2000).

Whether or not time-tranches become a normalized method of public/private development partnerships may be a function of its success in Albuquerque.

Time-tranching could reasonably contribute to the growing awareness of the problems associated with conventional financing. At the very least, Leinberger and Davis' scheme should stimulate more formal investigation into alternative financing methodologies and possibly lead to a re-evaluation of DCF analysis.

● **Viability and feasibility:** With the growing trend moving away from interventionist policies in favor of market-based approaches, time-tranching may be a viable alternative to conventional financing. Despite there being reasonable evidence to suggest that mixed-use and compact development is in demand, the market has failed to satisfy that demand in the United States. In Toronto, this demand has been at least partially supplied by developments funded, in part, by private companies. These types of investors could satisfy the requirements of patient, long-term investors for second tranche positions.

Overcoming DCF analysis' short-term bias using a non-interventionist approach could redefine how real estate financing influences the urban environment. This approach may be an acceptable alternative to regulatory intervention for the influential stakeholders in the financial and building professions. However, it is evident that long-term strategies to encourage or regulate compact urban development must eventually augment any market function to the extent that it places a disincentive on sprawl.

Evidence from Leinberger's experience as CEO of Albuquerque's revitalization suggests time-tranching is being accepted by the professional community. For instance, Phoenix Properties, the urban affiliate of Lincoln Properties (one of the largest and oldest apartment development companies in the United States) was happy to take a second tranche position on a 169-unit project in downtown Albuquerque.

Recent declines in inner-city manufacturing districts may represent an opportunity to experiment with time-tranche financing. There exists tremendous potential gain in supporting long-term sustainability strategies in the form of municipally-backed third tranche positions for Ontario's de-industrializing downtowns. This could also be developed as an alternative approach to subsidizing brownfield remediation.

● **Barriers:** Professional conservatism continues to be one of the most challenging barriers to the diffusion of time-tranching. Time-tranching may not be able to satisfy the investment community's need for standardized method because it is inherently a more integrated procedure than the conventional mortgage broker/client relationship. This may result in the rejection of time-tranching, especially since the trend toward standardized-thinking has been such an influential paradigm in this profession. In this scenario, time-tranching could continue as a marginal financing activity until standardized "alternative" development strategies become financially proven (i.e. less risky) and are more widely adopted. However, until that wall is breached, time-tranching might be a useful scheme to help reach that critical mass.

● **Conclusions and recommendations:** It is evident from this discussion that time-tranching should be viewed only as one option in a sequence of measures needed to affect the capital lending market. It is clear that the failure of markets to equip cities with a sustainable urban form is not easily remedied using a non-interventionist approach.

Time-tranching may be an important first step in developing a critical mass toward market transformation. Although a widespread adoption of this tool could have a far-reaching effect on the real estate industry, it is unlikely that time-tranching alone will transform the market. It may however, contribute, along with a host of other sustainably-minded innovations, to the increased quantity and quality of green or alternative development. As the

perceptual barriers are reduced by a larger stock of working green buildings and Smart Growth projects, a point should be reached where sustainability becomes a normative practice and is properly integrated within the entire building process.

As a result of the systemic disinclination to adopt more complicated and less standardizable procedures in an advanced market economy, it may be more appropriate to regulate ADS in order to achieve widespread compliance and reduce urban environmental impact. Still, this is not an acceptable option for the stakeholder community and it is recommended that a market-based alternative be explored alongside increasingly stringent and properly balanced regulatory mechanisms.

Current conventional valuation techniques actually discourage ADS on the grounds that they are unproven and therefore high-risk. Developers are pressured to achieve higher cash flows in the form of market premiums. This necessarily prices-out lower income households, further reducing affordability and choice in the market. Any future policy development must take these social issues into consideration; otherwise, a shortage of adequate housing and increased homelessness are likely outcomes.

Encouraging the market rather than regulating it may be the most appropriate means of building stakeholder acceptance in the largely private real estate development industry. However, since markets currently externalize most of the environmental costs associated with business-as-usual practice, it is apparent that market transformation must start by resolving this oversight. Until this time, however, developers inclined to Smart Growth, ADS or NU projects should be granted preferential financial treatment as an incentive. Municipalities can reward innovative development by assuming the third-tranche position in projects demonstrating balanced and detailed Smart Growth criteria. Special guidelines at the regional or provincial level must be delineated to ensure municipalities' proper involvement. Provincial participation should be limited to regulating the terms of general agreements, particularly in determination of an objective definition of Smart Growth, green building and brownfield or infill development. The terms that municipalities may enter into a public/private relationship with a land development firm should be designed to reward efforts toward sustainable development.

Municipalities should be responsible for the implementation of the specific proposals that ought to help diffuse risk. An arms-length, not-for-profit development corporation may be the most appropriate means of overseeing these projects. This body should represent all the provisions of good governance, transparency, etc. and should mediate a diversity of inputs from all stakeholder groups.

Tranched investments can be viewed as high-yield and long-term and are alternative sources of municipal income while developing an increased property tax-base. Time-tranching could be provided as an alternative to, or in conjunction with existing financial tools to promote sustainable practices.

Summary discussion

The intent of this paper was to identify a variety of policy options that can act alone or in collaboration with a voluntary rating system such as LEED. It is important to evaluate the efficacy of promoting a stand alone green rating system compared to a broader application of an integrated green building program that addresses a variety of barriers using a range of approaches. Any such program must consider the strengths and weaknesses of LEED. LEED only addresses large institutions and buildings designed to be occupied by the developer. LEED does not have an accessible residential component nor does it effectively address the entire built environment. RECO and time-tranching are two instruments capable of "filling in the gaps" that a voluntary green rating system would leave in a green building program. RECO's strategic use of the point-of-sale trigger mechanism allows for gradual compliance in the residential market. This ap-

proach slowly decreases energy consumption, particularly among segments of the population that the market cannot reach. This mild regulatory instrument can effectively augment LEED's inability to address the residential sector, especially related to issues of tenancy and marginal social groups.

Furthermore, RECO has been demonstrated to be a highly successful mechanism in reducing energy consumption without enormous public costs. Time-tranching's retooling of conventional valuation methods could allow municipalities to partner with innovative developers and more adequately direct growth into efficient urban forms. Again, LEED fails to address the financial barriers that inhibit green building. A green building program that encourages municipalities to experiment with time-tranched growth and development could complement an incentive program based on a set of green rating criteria.

It is the intent of this paper to address barriers to green building and promote integrative approaches to augment those already addressed by the Smart Growth Secretariat. The establishment of new networks and the development of creative and innovative solutions should be fostered in order to keep all the actors involved in the process.

Excluding RECO, the instruments discussed in this report favor non-interventionist policies. These may be effective means of establishing precedents for regulatory reform but do not represent a sustainable approach to long-term growth and should not be viewed as such. The intent of this report was to provide an in-depth understanding of the best instruments that could be applied in Ontario. These three tools do not represent the whole range of options (OECD, 2003). In fact, the three cases emerged from the United States and may represent inappropriate methods of affecting long-term and irreversible progress in the Canadian political system. Policymakers should include a review of European, Japanese and Australian initiatives into any thorough discussion of green building programs to complement those already undertaken.

Notes

1. For instance see: *Architecture, Azure, Construction, Architectural Record, Canadian Architect, The GTA Construction Report*.
2. According to the CANMET Energy Technology Centre of Natural Resources Canada, "the C-2000 Program for Advanced Commercial Buildings was a small demonstration program for high-performance buildings, developed and sponsored by the CANMET Energy Technology Centre (CETC) of Natural Resources Canada. The emphasis of the program was on energy performance and water conservation, but criteria was also developed for maintenance of site ecology and improved levels of indoor environmental quality" (http://www.buildingsgroup.nrcan.gc.ca/projects/c2000_e.html).
3. For more information on C-2000 and IDP see: http://buildingsgroup.nrcan.gc.ca/projects/idp_e.html
4. "Principle agent problem" refers to the reluctance a landlord may have to upgrade his rental properties when it is the renter who benefits from the reduced energy costs. Renters rarely upgrade their units because, as renters, the perception is that they have nothing to gain from sinking capital into someone else's property as the renter probably does not gain the full benefit of their investment.
5. NRCAN does not allow its Energuide evaluators to integrate these two services because of impartiality issues; however, non-profits like Green\$aver, integrates these two services. Source: <http://oee.nrcan.gc.ca/>

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