Building Towards Water Efficiency: Policy Innovation and Education in New and Existing Homes

Final Research Report

for the

Walter and Duncan Gordon Foundation
Alberta Real Estate Foundation
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Summary Recommendations

Related to Policy:

1. Use new legislation and regulations judiciously.
2. Interventions in support of green building (including water efficiency) should focus on opportunities for continuing education, networking and collaboration.
3. The use of effective marketing materials and 'labels' provide legitimacy.
4. Builders' relationships with municipal regulations and authorities are important, constantly evolving and often in conflict.

Related to the Building Industry:

1. Relationships with industry professional associations need to be proactive, rather than reactive, on issues of environmental innovations.
2. Harness the power of the professional associations and their membership.
3. The industry has a latent and untapped environmental ethic that should be capitalized upon.
4. Green Building interventions need to target a wide demographic because all realtors and builders are potential innovators.
5. Informal and formal education opportunities need to be created, readily identified, and more easily incorporated into the business cycle.
6. More education is needed within the building industry specific to the diverse range of water efficiency opportunities.
7. Use the 'belief in new technology as a solution' judiciously and recognize its constraints.

Summary Recommendations

General Recommendations:

1. The "risk-recognition interaction" is a powerful force in support of market innovation.
2. Municipalities need to price water appropriately.
3. Collaboration and networking opportunities change peoples' perspectives.
4. Harness the sense of social responsibility.
5. Create a community vision.
6. Consumer education of water efficiency and innovation needs to be the responsibility of all stakeholders.

Introduction

The pressure on water and wastewater infrastructure in Canadian municipalities continues to rise with the need for increased capacity and upgrades. Demands to extend and maintain municipal infrastructure means that capital costs threaten to swallow municipal budgets. And the questions about resource availability – who is going to pay, for what and how much – is needed to resolve this pressure. This could quite quickly become economically and politically overwhelming.

A water efficiency strategy has helped some municipalities to maintain or reduce their residential and commercial water consumption. This demand adjustment then allows the municipality to defer some capital investment. More recently, there is a growing acknowledgement by municipal governments that a demand-focused strategy can support a more environmentally sustainable balance within their watershed.

Relying solely on municipal governments to see that water demand (or efficiency) policies are implemented, and enforced, is risky. Government priorities and responsibilities change, citizen interests evolve and funding programs can be cut.

Yet the private sector's contribution to promoting and sustaining residential and commercial water efficiency initiatives represents an untapped opportunity for collaboration. But for this collaboration to occur, new and innovative partnerships are needed between municipalities, citizens, residential realtors and the builders.

Unfortunately, residential realtors and builders have been neglected in the water efficiency and governance research. Conventional explanations for this neglect are that the private sector has been slow to embrace efficiency innovations because they are not economically viable and because buyers are not interested. Water efficiency research tends to have focused on the public's consumption rates and the tools – e.g., pricing or awareness campaigns – designed to decrease that demand.

Green Building in Canada

Yet buildings consume one-quarter of the global wood harvest, one-sixth of its fresh water, and two-fifths of material and energy flows (Schendler and Udall 2005).

Municipalities and Regions can effectively delay water and sewer expansions and reduce municipal energy costs by promoting water and energy efficient home building (Maas 2009; Pleasance 2008).

In an economy of rapidly increasing energy prices and uncertain access to resources, interest in more efficient and innovative buildings is both timely and essential. The International Builders' Show, despite lower attendance in 2008, had a record number of vendors featuring green products while the heated product competition continues to lower costs (Veiga 2009).

The green building trend seems to continue as builders take advantage of resource-efficient homes niche (Veiga 2009). And this trend continues despite the early signs of an economic downturn in late 2008. While these numbers will need to be updated as the recession conditions evolve, the TD-Canada Trust Green Home Poll found that 57 per cent of Canadians are prepared to pay five to 10 per cent more for a green home (Langston 2008). The green building trend has also been popularized through the national print press with their articles on green real estate homes and construction or renovation trends. One developer, featured in a Globe and Mail article suggested that he thought "we have hit the point in marketability where [sustainability] actually matters. We've crossed over" (Ireland 2008).

The greening of the residential home market has also been described as "the way the industry is moving" by the vice-president of a large building firm in Ontario (Participant E 2008).

However, the green building trend is still considered to be in its early stages. To help impel the industry toward the longer-term perspective, consumers and government need to ensure that policy extends beyond just innovative best practices. Some pockets of the Canadian residential building industry are evolving from the conventional, resource-intensive building practices. These early adopters are considering variables such as site and structure orientation, energy performance and efficient resource use (water, energy). Concurrently, and likely to influence those more conventional builders, regulations and consumer demand continues to change. This evolution can help to ensure that the level of competition between builders will continue to add momentum to the green building trend (Hart 2008).

The building and plumbing codes provide the framework and minimum safety requirements for the building community. And while many provinces are making significant changes to the codes to accommodate better technologies and building practices, participants indicated that the building code provides only the benchmark in safety. In their opinion, the codes did not serve as a tool to promote best practices (English 2008; Kenward 2008; Participant B 2008; Participant R 2008).

One research participant placed the building code and green movement in this context: "The building code is what governs our industry. Every other green tool is a choice tool, voluntary" (Participant B 2008). The important distinction is between basic safety standards and best practices (green or otherwise) found in the industry.

According to one industry leader in water efficiency, the adoption of off-the-shelf, residential technologies could reduce indoor water use from approximately 200L/day to 150L/day (Veritec Consulting 2008).

The challenge has been how to assess innovative builders and their companies and then translate the findings for policy-making actors in Alberta, British Columbia and Ontario. This research study used the 'tacit knowledge' variable as a point of investigation. We consider tacit knowledge to be a critical factor in the nature of innovative realtors and builders.

But just talking to builders was not sufficient: we also assessed the legislative environment, as well as the builders' organizational cultures, in an attempt to generate new and proactive policy for residential water efficiency. By understanding the professionals' learning processes, their rationale for action, and the organizational cultures in which they operate, it was possible to generate more informed policy recommendations at multiple levels.

Case Studies

British Columbia

The province is socially, geographically and economically diverse. There are snow-packed mountain peaks, kilometres of ocean-front and access to surface and groundwater.

Yet a secure water supply is not necessarily guaranteed or protected through legislation. Water supply concerns include the substantial population growth in identified water-stressed areas such as Vancouver Island, Lower Mainland, and the Southern Interior. Statistics Canada (2003) reported that the BC growth rate has consistently been faster than the national average since the province joined Confederation.

B.C. builders have previously focused their new housing starts on multi-unit buildings in response to a very strong market over the past five years. There is a well-supplied resale market. And while the BC residential market 'softened' in the 2008 (a trend that is expected to continue through 2009 given the global economic recession) high home prices are expected to continue to support a shift towards denser build.

The government's 'greening initiatives' are helping to transform the residential building industries approach. According to the Lighthouse Sustainable Building Centre (LSBC), the value of green building in the Greater Vancouver area alone grew from $396 million in 2005 to $700 million in 2006 (2007:9). Despite the softening residential market, 70% of residential architects active in green development believe their green expertise will help them endure the slowing economy (LSBC 2007). Alternatively, 77% believe it is a good time to enter the market (Tomasulo 2008).

Alberta

During the past decade Alberta has experienced a period of economic prosperity due to the gas and oil industry's contributions to the provincial economy (Alberta 2008b). This economic boom has sustained rapid population growth and an increase in demand for housing. These factors intensified the strain on the Alberta's already overextended water supply (Alberta 2008f). The provincial government is concerned over the sustainability of Alberta's water supply at current consumption rates, and with projected economic and population growth. Compounding the water resource-stress of Alberta's growth is that most of the water that flows through the province has already been allocated.

In 2007, the residential home building sector fed $16 billion into the Alberta economy and employed more than 110,000 people in the province (CHBA-Alberta 2007). During the period of 2000 to 2004, housing starts showed an increase in many communities. Housing starts peaked in 2006, with almost 50,000 homes started across the province, and at which time Alberta reached a peak in prohibitive prices. From 2005 to early 2008 the market was considered a "seller's market" (Galt 2008) with the affordability of homes decreasing consistently until that time. In addition, the rapidly increasing demand and urgency to push production rates has meant market saturation and a decrease in home construction quality (Twohig 2008).

While Alberta's economy and housing market are considered to be among the more robust across Canada, a cooling effect has been documented. In 2007 the Alberta housing market was showing signs of this cooling; housing starts dropped 1.7% that year from 2006 and similar trends were expected in 2008. Housing starts have decreased and this is reflected in dropping housing prices and an increasingly more buyer-friendly market (Royal Bank of Canada 2008). The most significant effects in the housing market are expected in Calgary and Edmonton – the areas that had the greatest levels home development.

Ontario

Ontario has a long history as a growth centre, which is expected to continue for at least the next twenty years (Statistics Canada 2005). In 2001, Ontario contained roughly 38% of the Canadian population (Statistics Canada 2003a) and between 1996 and 2001 Ontario experienced a growth rate of 6.1% (the national average growth rate is 4.0%).

The Greater Golden Horseshoe Area (the Region) in the southern part of the province contains 59% of Ontario's population and 22% of the total Canadian population and contains six of twenty-five of the fastest growing Canadian municipalities (Statistics Canada 2003b). The subsequent sprawl has meant losses of agricultural and green space and placed significant pressures on natural resources, particularly fresh water.

The Growth Plan for the Region acknowledges the need for water conservation and efficiency by employing water demand management and water recycling techniques (Ministry of Public Infrastructure and Renewal (MPIR) 2006). Environment Canada (2007) estimates that water efficiency systems can reduce residential demand by at least 40%.

The volume of new building to accommodate the expected population increase for the Region and the need to maintain water ecosystems gives considerable opportunities to examine residential water efficiency innovations to ensure policy promotes sustainable residential building.

Research Framework and Methods

Tacit knowledge consists of deep beliefs and values about the way the world works and what in the world is important. Usually grounded in practical experience, tacit knowledge is informal (i.e., not written down), unspoken, and sometimes fundamentally difficult to articulate. People are often not even consciously aware of their tacit knowledge; rather, their deepest beliefs and values operate as a kind of implicit and unquestioned background understanding that shapes the way they see the world and act within it.

For conservation-minded individuals operating in the private sector, tacit knowledge shapes:

- Why they are concerned about water conservation;
- How they act on that concern in their day-to-day business practice; and
- What they say about the issue when they talk to their peers.

To the extent that tacit knowledge can be explicitly articulated at all, it is conveyed using ambiguous language that must be carefully assessed and interpreted. In this research, we consider tacit knowledge as an individual's capability to make changes within the organizational environment. To understand the individual's tacit knowledge as it relates to water efficiency and innovation, the researchers also recognized that an individual's capacity both influenced and was influenced by their organizational environment. This organizational environment – or what we called the capacity – was understood as the individual's ability to act in the context of political process, regulation and economics.

Eighty-nine participants were interviewed across the country. Participants came from six sectors including realtors; land developers, residential builders, architects, government and others. "Others" encompassed participants working as water saving technologies distributor, individuals involved in building education, individual's part of professional associations, urban planners or consultants. A break down of participants by province and sector can be seen in Table 1.

Table 1: Participants by Province and Sector

	Realtor	Land Developer	Builder	Architect	Government	Other
BC	4	4	13	2	1	5
AB	5	3	7	0	2	14
ON	0	0	21	0	2	6
Total	9	7	41	2	5	25

While the majority of participants were professional residential builders we pursued all potential interviews across all sectors. Participants in other sectors such as land developers, government, and realtors provided context to industry and highlighted influences of the overall organizational environment.

Conclusions and Recommendations

Even with the current economic changes – including lower new housing starts annually and decreased prices in the resale market – there is a significant opportunity to shift green building innovation beyond niche market practices. The green building industry is focused on better building and more efficient resource use. Water and wastewater systems are interdependent with the other systems – such as energy – in a re-conceptualized residential system. As such, water efficiency technologies and approaches cannot be separated from the broader green building industry and agenda.

There is increasing awareness of these opportunities in the residential building industry but less so in the resale industry. Even with this increased awareness – largely due to recent energy price spikes and supportive media coverage from national news outlets -- this trend is still in the early adopter phase. Green building remains a small niche in a highly competitive market. However, for those builders (and some realtors) who have shifted to green building approaches, they indicated that they were motivated by the economic success and peer recognition. While much of this motivation is economic, many builders indicated that they just wanted to be recognized as "ahead of the pack" in the housing market with green products.

Innovators, however, indicated that a key constraint was the availability of collaborators or municipal support to reduce the – perceived or actual – economic risk associated with environmental innovations and new technologies. Participants indicated that they would appreciate greater collaboration in dismantling barriers to green building and water efficiency and transitioning the green market beyond the early adopter phase.

Because residential infrastructure concerns extend across the country, and as municipalities try to fund their aging or insufficient infrastructure capital – collaboration between water efficiency experts, municipal official, builders and realtors represents an opportunity to promote change.

To realize this goal – and even though some municipalities are trying to play more of a supportive role – significantly more collaboration between municipalities and the supply chain of the building industry will be necessary.

Policy Recommendations

Recommendation 1: Use new legislation and regulations judiciously.

Participants agreed that regulation alone would not change industry's priorities and its deep cultural norms. While the details varied, all participants agreed that the Canadian building code is a high standard. They also agreed that voluntary approaches with incentives would be a more effective motivator to effect change within the industry. Yet when participants described how to implement water efficiency changes in the industry regulation was almost always suggested. For example, the majority of builders recommended

that low-flow toilets should just be legislated. Overall, the industry will discourage additional regulatory requirements but would support the inclusion of well-researched, affordable new technologies in the various Codes they subscribe to.

Recommendation 2: Interventions in support of green building (including water efficiency) should focus on opportunities for continuing education, networking and collaboration.

Three characteristics defined builders and realtors who were considered "innovative" in their relationship to water efficiency or green residential building. These characteristics were:

1. Continuing education: Participants doing innovative projects were eager to learn and pursued opportunities for continuing education. Informal and formal learning approaches were recognized as a core strategy within their building practice.

2. Networking: Participants who were considered the most innovative were active within their professional communities and networked consistently with the local, national and international levels.

3. Collaboration: Innovative participants also assumed volunteer positions within their professional associations or within their communities (e.g., Board or committee positions; project leaders). Ongoing interactions with other professionals were considered an important component in their development and business strategy.

Recommendation 3: The use of effective marketing materials and 'labels' provide legitimacy.

Recognized certification programs have helped to provide legitimacy within the emerging – and rapidly evolving – green building movement. The consumers' and governments' recognition of certification labels was identified as a key motivation in early adoption of technology.

Recommendation 4: Builders' relationships with municipal regulations and authorities are important, constantly evolving and often in conflict.

These personal relationships were identified as the most important factors in residential building success.
Unfortunately, participants from all case studies expressed skepticism about the process, specifically the municipal development approval. Healthy relationships between municipalities and builders must be transparent and the challenge is to balance inclusion of new knowledge, planning approaches and technology and maintaining a high degree of safety.

Industry Recommendations

Recommendation 5: Relationships with industry professional associations need to be proactive, rather than reactive, on issues of environmental innovations.

Our participants were surprised that we were interested in their perspectives and the roles that they might play in promoting an environmental agenda. They considered themselves to be the "black sheep" of the environmental movement and, at times, "misunderstood" for their priorities. Early innovators also expressed frustration about stereotypes associated with the industry and the lack of acknowledgement for the progress that was being made. Simultaneously, their professional associations represent a huge, and largely untapped, opportunity to instigate environmental change.

However, the defining characteristics of the industry are – according to our participants – fear of liability and risk aversion.

For this culture to be changed, the industry needs to be targeted with information that is appropriate to their needs and that is presented in an accessible manner.

Participants also recommended that the associations' representatives needed to be actively included in discussions without prejudice (i.e., putting aside the stereotype of the "big bad developer") and throughout the planning cycle.

Recommendation 6: Harness the power of the professional associations and their membership.

Participants indicated that ongoing collaborative relationships – fostered through and between the various professional associations – would be a significant intervention and help to change the current culture. Collaborative relationships were considered to be most effective when they were based at the local and regional levels and were also considered to be a viable method to reduce early innovator's perceptions of risk. Not only could the professional associations provide support for those attempting new projects, they could also serve as powerful lobby groups to instigate (positive) change in governance structures and to also disseminate information about new technologies and other environmental innovations.

Recommendation 7: The industry has a latent and untapped environmental ethic that should be capitalized upon.

The industry should capitalize on the participants' strong expression of an environmental ethic. A ready intervention point would be to highlight the value and aesthetic of Canada's unique ecologies and outdoor experience. Rather than instilling fear of climate catastrophe, the emphasis should be on environmental pride, protection and privilege of access.

Other intervention points include focusing on the future and ensuring the environment – based in the recreation and leisure imagery – and its resources are available for our children.

Recommendation 8: Green Building interventions need to target a wide demographic because all realtors and builders are potential innovators.

In contrast to the usual 'early adopters vs. conventional' descriptions, our results did not indicate any explicit characteristics delimiting these categories. Younger professionals were as eager to innovate as more established professionals. More formally educated professionals sometimes lacked the creativity and expressed greater risk aversion. In contrast, builders who were informally educated in the trade (e.g., through a family business) often expressed more confidence and willingness to shift from standard construction practice to green building.

Recommendation 9: Informal and formal education opportunities need to be created, readily identified, and more easily incorporated into the business cycle.

The pursuit of formal and informal continuing education was a key characteristic among the innovative participants. It was considered a priority for those trying to overcome regulatory challenges, risk factors, and resistance to technological change. Associations are encouraged to add green courses or content to their curriculum, create a central on-line repository for curriculum materials or course and event notifications.

The creation of additional "bricks and mortar" certification programs – such as the B.C. effort to establish a professional builders institute, which require mandatory training for members – would also be helpful. But we suggest that a more flexible and voluntary approach may be more effective and appropriate. Simultaneously, professional associations should not underestimate the potential power and influence of membership mentorship programs for knowledge transfer.

Recommendation 10: More education is needed within the building industry specific to the diverse range of water efficiency opportunities.

Residential water efficiency is more than just the installation of low flow toilets. A comprehensive education curriculum would be helpful to expose the community to the range of possibilities within water efficiency innovation.

Recommendation 11: Use the 'belief in new technology as a solution' judiciously and recognize its constraints.

There is a strong belief in the industry that technology is the solution. While we would argue that this solution has its limitations, the belief itself, if it is used correctly, can help to increase consumer acceptance of newer technologies and trends. Technological interventions need to be placed within the larger context of society.

General Recommendations

Recommendation 12: The "risk-recognition interaction" is a powerful force in support of market innovation.

This is the idea that risk can be reduced by positive reinforcement and recognition. This perceived risk reduction subsequently influences the desire to create – or maintain – one's corporate market niche. The use of professional recognition of leadership can be influential in catalyzing innovative practices.

Recommendation 13: Municipalities need to price water appropriately.

Participants strongly recommended the correct pricing of water at the municipal level. They believed that only by changing the pricing structure to more accurately reflect the cost of water supply, distribution and treatment, would innovations in water management be possible. Simultaneously, they argued that municipal pricing structures would help them promote water efficient technologies in their building practice by educating the consumer and to provide economic incentives for the consumer to include a "green" package in their homes. For realtors, municipal pricing structures could have a similar influence and provide the realtor an externally defined incentive for niche packaging of some home characteristics. Whether a house has water efficient appliances also provides a small, but easily recognizable, negotiating point.

Recommendation 14: Collaboration and networking opportunities change peoples' perspectives.

Collaboration and recognition are the most effective ways to encourage change in behaviour or mitigate fear of a cultural shift in the industry.

By supporting leaders the industry will become more welcoming to evolving ideas and trends; this will eventually mitigate some of the fear related to innovation risk and the adoption of new technologies, sales niches or building practices.

Recommendation 15: Harness the sense of social responsibility.

There was a strong sense of social responsibility from the existing and established work forces. As these individuals shift toward retirement, the demographic (and its norms) of the workforce will evolve. It would be beneficial if the current interest in social responsibility and intergenerational mentorship could be harnessed.

Recommendation 16: Create a community vision.

Evidence of municipal leadership and the establishment of a community vision are important influences on the residential building and resale industry. There must be a willingness to create and implement that vision for a community's long-term plan and environmental development.

Recommendation 17: Consumer education of water efficiency and innovation needs to be the responsibility of all stakeholders.

By including an education component from all stakeholders (realtors, land developers, municipalities, builders) consumers can better make the link between environmental awareness and achievable residential goals. Realtors hold an untapped role as consumer educators and as the critical link between the builder and the consumer. This relationship remains an unrealized opportunity to promote the value of green technology and efficiency issues.

Research Engagement

The BTWE research team has participated in multiple outreach activities.

Publications and Postings:

We submitted an academic article to the *International Journal of the Urban and Built Environment* based on the research results. This paper is currently under review.

In our attempts to target specific stakeholders within the residential building industry, we have had an article accepted with the trade magazine *Water Efficiency* -- an American publication directed at municipal officials, builders, technical product developers with specific interest in water efficiency -- for publication in June 2010.

We are also directing an article to the national Municipal World publication. An article will also be submitted to the *Clean Calgary* newsletter which will be distributed through out the Greater Calgary region. Clean Calgary Association is a non-profit urban environmental organization working towards creating healthy homes and communities through environmental education, products, and services.

Our research will also be featured in an article posted on www.waterbucket.ca an online magazine. The waterbucket.ca website is an initiative led by the Water Sustainability Committee of the BC Water & Waste Association and is the key to the communication

strategy for the Water Sustainability Action Plan for British Columbia. Finally, we are distributing our Final Research Report to all of our partners for posting on their websites and distribution through their networks. These partners include: Built Green BC - CHBA BC, Built Green Alberta, Lanarc Consulting and others.

Events and Partnerships:

The BTWE research results have been presented at multiple events. These have included the Canadian Water and Wastewater Association (Waterloo, Nov 2008); the Canadian Water Resources Association (Quebec City, June 2009). Upcoming presentations include the Canadian Water and Wastewater Association's Water Efficiency Committee (Victoria, Oct 2009), the Water Innovations Conference (Las Vegas, Oct 2009) and the A.D. Latornell Conservation Symposium.

In collaboration with the POLIS Project on Ecological Governance the Blue Builders project was awarded a grant through the Federation of Canadian Municipalities Affordable Choices Today (ACT) program. The purpose of the award is to host a workshop in the Comox Valley Regional District (CVRD) on Vancouver Island.

The Blue Builders team presented research findings directly relevant to municipal practitioners and engage participants around increasing the role of the residential industry in working towards water efficiency. Blue Builders Team has developed a module, "Working with the Residential Industry". This module discusses findings of the research and provides examples of best practices of blue builders. Response to this module has been terrific.

Reactions have ranged from, "I never thought of it this way. It's a really innovative way of addressing the issues" to "This is the type of information we need to convince our politicians" to further queries on specifics of the research and requests for advice on the use of labeling and which labels to use. The impact of this presentation was significant because the CVRD is in the process of fine tuning their draft water efficiency plan creating the ideal opportunity to ensure tacit knowledge factors are considered in implementation.

We continue to seek out opportunities to present and promote our research findings. For example, we are currently investigating presentation and publication venues in Alberta through the Alberta Real Estate Foundation. We are also contributing to the Built Green Society of BC as they began to shift their attention to water matters.

Several queries have been made to the research team regarding how to build the argument for water conservation to sell to builders municipalities.

We have helped one builder in particular make the case for water conservation on Vancouver Island and we have also been asked to speak on a panel at the annual BC Built Green Society conference.

This final research report will also be provided electronically on a USB stick which is provided to the approximately participants as part of their participant packages. Future research will include focused policy development collaborations with the building and, specifically, the residential and industrial, commercial and institutional plumbing, sectors.

Thank you to our partners:

References

1. Alberta. (2008b). Draft land-use framework. Retrieved October 20th, 2008, from http://www.landuse.alberta.ca/
2. Alberta. (2008f). Water for life. Retrieved November 7th, 2008, from http://www.waterforlife.alberta.ca/
3. Albett, Kevin. Realtor, Canmore, Alberta, Interview July 2008, Calgary, Alberta.
4. Ambrosini, V. and C. Bowman. (2001). Tacit Knowledge: Some Suggestions for Operationalisation. Journal of Management Studies, 38(6), 811–829.
5. Chayer, Roger, Green Building Specialist, Calgary, Alberta, Interview – July 2008, Calgary, Alberta.
6. CHBA-Alberta. (2007). About CHBA-Alberta. Retrieved November 30th 2008, from http://www.chbaalberta.ca/about-chba-alberta/
7. Canadian Mortgage and Housing Corporation (CMHC). 2008. Housing market outlook Canada. Ottawa, Canada, Canadian Mortgage and Housing Corporation retrieved November 25th, 2008, from http://www.cmhc-schl.gc.ca/en/hoficlincl/homain/foan/index.cfm
8. English, Gordon. President of Genco Construction Ltd., Victoria, British Columbia, Interview – June 2008, Victoria, British Columbia

9. Environment Canada. (2007). Municipal water use statistics. Retrieved March 18th, 2008, from http://www.ec.gc.ca/water/en/manage/use/e_use.htm
10. Galt, V. (2008). Canada's housing boom is over, bank says. Retrieved December 1st, 2008, from http://business.theglobeandmail.com/servlet/story/RTGAM.20080626.whousing0626/BNStory/Business/home
11. Hart, Lenard. Green Building Management of Minto Group Inc, Toronto, Ontario, Interview – October 2008, Toronto, Ontario.
12. Ireland, C. (2008, November 21). Market crosses the green line: Buyers aren't going to give up their creature comforts. The Globe and Mail, Retrieved November 21, 2008 from http://www.theglobeandmail.com/servlet/story/RTGAM.20081121.reRetrofit1121/BNStory/RealEstate
13. Kenward, John. Director, Canadian Home Builders Association, Ottawa, Ontario Interview - February 2008, Ottawa, Ontario.
14. Langston, P. (2008, October 4). Paying a green premium. The Ottawa Citizen, Retrieved October 4, 2008 from http://www2.canada.com/ottawacitizen/news/homes/story.html?id=e26ef270-49d5-4cec-b62a-407c30a4770f
15. Lighthouse Sustainable Building Centre. (2008). Market Insights. Retrieved December 1st, 2008, from, http://www.sustainablebuildingcentre.com/market_insights_0

16. Maas, C. (2009). Greenhouse Gas and Energy Co-Benefits of Water Conservation. Victoria: British Columbia, POLIS Research Report 09 01 POLIS Project on Ecological Governance. Water Sustainability Project. Retrieved from http://www.poliswaterproject.org/nexus
17. Ministry of Public Infrastructure and Renewal (MPIR). 2006. Growth plan for the Greater Golden Horseshoe. Retrieved October 10th, 2007, from http://www.pir.gov.on.ca/English/growth/ggh_plan.htm
18. Participant B. Owner and Managing Partner, Guelph, Ontario, Interview - June 2008, Guelph, Ontario.
19. Participant E. Vice President, Region of York, Ontario, Interview – April 2008, Region of York, Ontario.
20. Participant R. President of Building Company, Vancouver Island, British Columbia, Interview July 2008, Nanaimo, British Columbia
21. Pleasance, Glen. Water Efficiency Coordinator, Region of Durham, Interview – March 2008, Region of Durham, Ontario
22. Royal Bank of Canada. (2008). Housing affordability – March. Retrieved May 12, 2009, from http://www.rbc.com/newsroom/pdf/20080314affordability.pdf
23. Schendler, A, & R. Udall. (2005, October 25). LEED Is Broken; Let's Fix It. Grist. Retrieved on January 25, 2007 from http://www.grist.org/comments/soapbox/2005/10/26/leed/index1.html

24. Statistics Canada (2003). A profile of the Canadian population: Where we live Retrieved December 1st, 2008, from http://geodepot.statcan.ca/Diss/Highlights/Page4/Page4_e.cfm
25. Statistics Canada. (2003a). 2001 Census, A profile of the Canadian population: Where we live, Provinces and Territories with above-average growth rates Retrieved October 2nd, 2007, from http://geodepot.statcan.ca/Diss/Highlights/Page4/Page4_e.cfm
26. Statistics Canada. (2003b). 2001 Census, A profile of the Canadian population: Where we live, Growth Concentrated in Large Regions. Retrieved October 2nd, 2007, from http://geodepot.statcan.ca/Diss/Highlights/Page9/Page9_e.cfm
27. Statistics Canada. (2005). Population Projections for Canada, Provinces and Territories, 2005- 2031. Retrieved October 2nd, 2007. http://www.statcan.ca/english/freepub/91-520-XIE/00105/part3.htm
28. Tomasulo, Katy (2008) Green Recovery? in EcoHome Magazine Retrieved December 1st, 2008, from http://www.ecohomemagazine.com/green-building/green-recovery.aspx
29. Veiga, A. (2009). Green trend behind many products at builders' show. The Press Enterprise Retrieved January 22, 2009, from http://www.pe.com/business/local/stories/PE_Biz_S_webonly_builders23.3dfadd8.html
30. Veritec Consulting. (2008). Region of Durham Efficient Community: Final Report. Durham, Ontario: Veritec Consulting.