Community Energy Association

A Tool Kit for Community Energy Planning In British Columbia

Case Studies

Volume 3

Revised 2006

Overview

The Community Energy Association (CEA) is a charitable non-profit organization taking action on energy sustainability and climate change by assisting communities to develop energy efficiency and green energy initiatives.

The BC Energy Aware Committee, CEA's predecessor, first produced a *Toolkit For Community Energy Planning in BC* in 1997. It has subsequently been updated and expanded to reflect the issues and experiences of community energy planning throughout BC. The Toolkit is available as an internet resource, downloadable pdf, or in a printed version, available from the Community Energy Association.

The Toolkit is written for local elected officials, municipal and regional planners and engineers, real estate developers, First Nations, provincial and federal governments, and anyone interested in community sustainability and energy opportunities. It will also be a valuable resource for residents and community associations, gas and electric utilities, independent power producers, planning and development consultants, architects and homebuilders. In addition, the Toolkit offers ideas for policy changes to move conservation to a higher priority, reduce consumption, save or protect greenspace and reduce greenhouse gases.

Case Studies & Features

This volume features detailed discussions of specific initiatives, programs, or issues related to community energy planning in British Columbia, with points of interest for planners, engineers, local elected officials, and developers throughout.

Table of Contents

Sustainable Developer, Realistic Realtor

Introduction

Michael Geller and Harold Kalke build communities and buildings with innovative, 'sustainable' features. Bob Rennie has sold more residential real estate, mostly condominiums, than anyone else in Canada. We brought the three together to discuss the future of energy efficient and 'sustainable' residential developments in British Columbia, and what could be done to encourage more environmentally-conscious residential infill in BC's communities.

A cornerstone of most attempts to improve both the energy performance and the environmental and social 'liveability' of urban centres is to increase residential density. But while it's one thing for a municipality to zone and to encourage increased residential density in Official Community Plans, it can be another to actually attract developers with the vision and sensitivity to infill areas in ways that add real value both to energy performance and urban liveability. Finding residents willing to trade-in some of the perceived luxuries of suburban living can more difficult again.

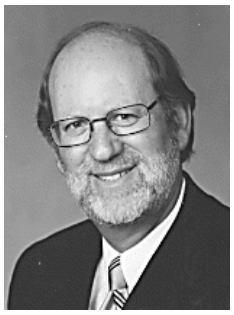
So how can a municipality attract the 'right kind of developer?' Is there money to be made from sustainable buildings? What are 'green' or 'sustainable' developers looking for, and how can their buildings be sold to people? In this feature, we ask three leading figures from BC's building industry to discuss the barriers and opportunities facing beneficial urban densification.

Michael Geller, Harold Kalke and Bob Rennie are three of BC's best known and most influential figures in the building industry. Each has successfully created and defined a unique role in BC's (particularly Vancouver's) development community, and has pioneered practices that others have and will continue to emulate. With differing backgrounds, goals and worldviews, their perspectives on what should be done to promote community and energy planning naturally vary. What unites them is a belief that the building industry can do better at creating environmentally-aware developments that benefit everyone.

In late September 2000, Geller, Kalke and Rennie came to the Yaletown offices of Compass Resource Management to discuss their needs, objectives and ideas for encouraging 'greener' residential infill in BC's communities. The following notes have been prepared from what turned into a remarkably animated and wide-ranging discussion.

Bob Rennie works with the developers of high-profile residential complexes (including Vancouver's Wall Centre, The Residences on Georgia, Coal Habour, the Palisades) to match the building's features to the requirements of a target market. Rennie pioneered the pre-sale offering and widely regarded as the market leader in its field.

Harold Kalke has been a developer since 1971, and has been a major proponent of environmentally and socially-aware buildings for much of that time. One project, 2211 West 4th Ave, Vancouver (also known as a the Caper's building), has received accolades from throughout the development community for its many environmentally-benign innovations, including a geothermal heat pump system that provides heating and cooling for all of the office and retail premises, and residents with endless cost- and guilt-free hot water. The David Suzuki Foundation is based there ("an endorsement for him -- there's symbiotic kind of relationship"), along with a host of residents attracted by the building's quality and the values it represents.



Michael Geller has thirty years of diverse experience in real estate planning and development in both the public and private sectors, including recent involvement with the redevelopment of the Westin Bay Shore property and the selection process for the proposed expansion of new trade and convention facilities in Vancouver. He is currently President of the Burnaby Mountain Project in Simon Fraser University, which will be an ecologically and socially-innovative new community with up to 4,536 residential units and 10,000 people. The site will incorporate new retail and commercial space, parks, schools, recreational and community facilities on approximately 200 acres of land.

How can a developer make money from 'sustainable' buildings?

Throughout the interview, Geller, Kalke and Rennie alluded to a number of strategies that a developer could adopt to both create value and promote sustainable objectives. Though not a comprehensive survey of the range of possibilities open to developers, this does serve to illustrate how developers with different strengths and experiences can approach the sustainable building market from various angles.

Create a premium product for individuals who are willing to pay

In the first strategy, the developer builds a very high quality building employing cutting-edge sustainable building principles. This need not necessarily involve complex technical or 'gimmicky' features, since the target market is a niche segment of informed, environmentally aware and affluent residents or occupants who seek out and can afford a premium product. Such a clientele understands that the long-term energy savings accrued in the building will ultimately offset the increased capital cost, and appreciates the wider social and environmental benefits such buildings can offer.

Harold Kalke has made a success of such an approach, and he broadcasts his uncompromising attitude of simply building the best building he can.

"I don't have any time for trying to get CMHC or Hydro or any municipality…to give me bonuses for something that I want to do as a developer," he says. "I focus on the occupant…It's a privilege, I should say, to be able to spend extra money to set apart this product from any other product in the marketplace."

In terms of community context, a premium sustainable developer may need to be prepared to allocate resources to promote other 'sustainable community' objectives to balance the affluent niche group who are providing the funding. In the case of Victoria's Shoal Point development, for example, the developer of a premium sustainable building spent a further $1million on promoting wider community development, including nurturing local sustainable businesses and providing on site low-income housing units.

The challenge for a developer adopting this strategy is to ensure that there is sufficient available 'target demographic' to make the undertaking financially viable.

Sell sustainable 'baby steps' to a mainstream market

A second strategy, proposed by Bob Rennie, is what we could call the 'baby steps' approach. In this strategy, the developer's target market is a mainstream one that could be 'sold' on certain readily understood sustainability features that can be offered at little or no premium but that are nevertheless perceived as being valuable by the client.

"The problem that municipalities have is how do you get a broader demographic, how do you do it downtown with a ten percent premium [instead of a much higher one]?" Bob asks. "To just target the demographic that's there now, I don't think there's enough in each community without an awareness program".

As a realtor, Bob sees 'sustainable' features as being only as worthwhile as they are perceived to be by the market. "[You need] to demonstrate to the consumer what

he's got, [if not] then don't bother putting it in because he won't know he's got it. I want everything you've got in the building demonstrated. …it's liveability, it has to be saving money long term, it has to be fresh air, it has to be something that's very tangible and real…it's like I'm buying a Volvo because it's safe."

Create a "public good" product, supported by institutional funds, for a niche market

A third approach is to work with organizations prepared to take risks and 'leave some money on the table' in order to find the 'right thing' to do to nurture the sustainable building market. Since the benefits associated with sustainable buildings are often public benefits, public institutions (such as federal/provincial/local governments, universities) may be in a position to support such an approach. Other potential partners could include companies with a vested interest in emerging sustainable technologies (eg equipment manufacturers or energy service companies) or organizations that may benefit from the association (eg corporations, NGOs etc).

As a 'public good' product, such projects may incorporate other features that would be outside the scope of the premium developer. For example, Michael Geller's Burnaby Mountain Project has backers who are interested in trying new things to help others discover which technologies and design approaches work and which don't. Rather than a single building, Geller is helping to develop a whole community, aimed at mixed income residents, in a way that incorporates features that may or may not be presently supported by a market. For example, all his residential units have composting toilets; some have a grassed layer of earth on the roof to help buffer stormwater flooding peaks. [features of sustainable buildings]

However, Geller is also keen to maximize the value of the property he's developing. Novel features will be introduced only if he believes that they will be recognized, over the longer term, as having value. Michael explains:

"I, like Harold, spend a lot of time listening to people telling me about all the quote, energy efficient, or sustainable features that I should be incorporating into our community, and I constantly try to apply what I'll call the 'Bob Rennie Test' to every one, which is, 'is this ultimately going to repay itself, or add value?' Because if it won't, if it's going to deter marketability, no matter how noble it is, we'll be very reluctant to go ahead with it".

As more organizations begin to adopt a "social responsibility" culture, or otherwise become more inclined to 'lead by example', more opportunities may arise for developers interested in promoting sustainable features to obtain support in this way.

'Play up' minimum requirements to a mainstream market

A fourth strategy requires the least commitment by a developer, but may nevertheless help to promote public interest in sustainability features that may ultimately lead to enhanced value in the market. It involves simply complying with legally mandated minimum requirements, but advertising them to clients as qualities of the building. Although this may be exploited for cynical purposes, this at least has the benefit of introducing clients to the vocabulary of sustainable building properties, and may ultimately lead to prospective buyers discriminating on this basis, thereby adding value to the market.

Bob Rennie sees this approach as a vital part of creating awareness in the general market for residential buildings.

"somehow, [we need to be] getting developers to talk about the little bit of sustainability in their development," he says. "there is value [in this], and the consumer does want to be told about these things, but softly."

Are there risks associated with sustainable developments? And if so, how can they be managed?

As with any emerging market, there are new risks associated with sustainable buildings that need to be managed in a way that reflects the priorities of the developer and any financial partners. Risk management options naturally depend on the developer's choice of sustainable strategy outlined above, but may include:

Cream skimming

In this strategy, the developer offsets some risk by being among the first to tap into a particular limited market segment. If, for example, only 1% of the market would be interested in paying a particular level of premium, then the first player to enter that market has a natural advantage.

Clearly, this approach inherently exposes the developer to the risk that the market isn't strong enough to justify the investment.

Learning from others' experience

Conversely, a strategy of copying cutting-edge projects may still enable a developer to capture market niches but can reduce risks by learning from mistakes of those doing entirely novel things.

Developers, Harold Kalke suggests, have, like other industries, become caught in a rut of doing a predefined series of tasks, and in doing so have lost the ability to look at the market in new ways. Where Geller and he innovate and find new and better ways of doing things, he hopes others will follow:

"What we really need in the development industry, and in places like Nelson and all over the place, is examples," he says. "Innovative examples of, like, little break-out things. Because developers are very good at copying things. What I want to do is drive around Michael's thing at SFU and copy. Really, that's all I want to do."

"You want me though, to experiment and be the first one to find out whether the market will pay for things like composting toilets in every bathroom," jokes Geller.

"Particularly that!" Kalke agrees.

Sharing risk with partners

Clearly, the more willing project partners are to assume risk, the less developers need to assume themselves. In the case of the Lillooet solar pool, for example, the developer was able to raise funds from local companies who could both see the

business case, and who had their own interests in promoting the use of local alternative energy.

Taking advantage of special 'sustainability' development benefits

Developers' risk can be somewhat offset by taking advantage of particular government or local authority programs that aim to support sustainable initiatives.

Bob Rennie puts it this way: "[A developer has to ask,] is there enough of that conscious demographic to warrant the extra expense? If not, if you get the municipality or City to offset with density, or something they give you to recognize that you're educating them what the requirements should be, and that you've met some of it, so you can now bring in a much broader demographic because it's not costing them any more…[otherwise] our profit margins are so narrow here, you just have to up the price -- you can't pass it on.

How can developers promote sustainable buildings?

The group proposed a number of ways in which sustainable buildings could be sold to clients.

Precedent

Supporting Harold Kalke's view on the importance of showcase examples, Michael Geller notes from experience the power of precedent in creating clients' awareness of novel building features:

"Interestingly, after Concord Pacific did its presentation centre and demonstrated all the wonderful technological features they were putting into their units, they changed the public perception, I believe, towards technology. And I think that Bob's client built on that in the residences on Georgia, whether deliberately or not, they benefited because Concord suddenly got people asking about technology cable, [and other novel features]. People came into Bay Shore and the first thing they wanted to know was about our Internet capability!"

Identifying sustainability 'hot buttons'

Bob Rennie has also seen how information technology features have become sought after as 'hot buttons':

"I'm doing three 'star wars' technology…projects in Seattle, and always the consumer wants to know 'who are my cable providers, my telephone providers, and high speed internet access [providers]-- that's it".

He suggests that sustainable building developers need to similarly identify and create awareness of parallel sustainability 'hot buttons'. He uses the example of an 'away button' -- a switch an occupant could press on the way out of the door to lower the temperature of the room and switch off all the lights.

"People are lazy -- it's absolute convenience -- they don't want to be educated about this… You just need one thing that you can bring it down to that is so simple that the

consumer can think, 'do you know what -- that's great, I don't want to run around and turn all the lights off and I don't want to pay the electric bill'".

"You almost have to find three or four absolute 'hot buttons' that people start asking for….because all this quantitative stuff, nobody cares, because they don't get it, because you're making them look stupid. But an away button I can understand. A low-flush toilet I can understand."

Emphasizing long term benefits to occupants

Harold Kalke, meanwhile, sees long term benefits as the 'hot buttons' he sells to his clients, who typically include that niche market willing to pay a premium for sustainability. "Every project I do … must materially and positively influence the occupants' lives. Materially means money. As the market goes down, their investment in one of these units should go down the least and in an upmarket it should go up the most. How do you do that? [By ensuring there's] a long range quality about it. It's not going to leak…it's well built, that's what it is. But the other thing… is the occupancy cost. Things like water and energy and sewer and all the things you get hit for by the city and other agencies such as Hydro [are lower], so that's how you sell this stuff."

Branding

An important technique Bob Rennie uses to sell condominiums is to specify well-known and sought after electrical appliances. Clients may not know much about, say, building envelopes, but they do recognize the quality of a 'Sub Zero' refrigerator and may associate the whole condominium with the quality cues they can recognize.

Harold Kalke uses a similar approach with whole buildings: "Because when I give you that building to sell, you can't sell concrete and rebar and copper pipes and all of the stairwells that meet zoning codes and the National Building Code, there's nothing to sell yet."

He turns to Bob. "What do you sell?"

Bob Rennie sells Sub-Zeros.

"OK, a Sub-zero. So what you're selling is brand. And the more brands you can hook into, let's say a residential unit, then the better for you. But what about the building itself as a brand? That's where it's at. So if I spend 10% more money, and I can get 300% [return] on that 10%, then that's where the margins are. Because otherwise I'm just competing with concrete and land costs or just trying to beat the trades down and down and down."

Who should take the lead in marketing and education?

Realtors

Not realtors, argues Bob Rennie: "Realtors don't carry knowledge," he says. "They only go find it when asked to do so. They're the toughest crowd…"

Developers

Harold Kalke, believes that innovative developers should assume responsibility for their own market: "I think that the primary role has to be brought to bear by developers. And the reason is that the industry itself is always looking at the focus groups and looking in the rear view mirror as to public opinion."

Municipalities / other organizations

Michael Geller, meanwhile, sees market development and education as something external organizations can usefully become involved in. "I don't think it's the architect or the developer's responsibility to educate the marketplace in terms of the benefits of energy efficient buildings," he says.

"I think it's a broader society responsibility, and the logical people to do it are 'energy companies', or government or other interest groups in society who are deemed to be knowledgeable and reasonably independent. Ironically, I often find that if the developer suggests something, more often than not that's a negative in itself. But what we don't have right now are enough entities out there creating a higher level of awareness of what Bob's talking about. Many years ago I used to be on something called the Canadian Housing Design Council, and one of its mandates was to educate the consumer as to what sorts of things they might expect and demand. And in the absence of things like that, at the end of the day it is the realtors and the developers who end up letting the public know because there isn't that broader knowledge being disseminated."

What can municipalities do to support developers interested in sustainable building projects?

Help foster a 'sustainability' culture

Geller, Kalke and Rennie agree on the importance of context in nurturing sustainable projects. For Rennie, this primarily means ensuring that the right kind of demographic is available and willing to buy your product.

Although critical of the role of elected officials in furthering this, Kalke sees a 'sustainability' context arising from good planning principles, starting with clear long term planning goals that encompass, amongst other things, urban densification principles. "You've got to go back and say 'what's our urban planning vision here for a couple of hundred years?'" he says, "And work on that."

"Sustainability has become engrossed in this obsession for quantitative analysis and [while] there's some aspect of that, we've gone way overboard with 'litres per person per year' and 'BTUs per square foot' …and [have ignored] the qualitative aspects of sustainability," he continues.

Michael Geller's Burnaby Mountain Project, Kalke believes, helps nurture "a complete community…and when you build a very vibrant community, of course, the desirability to be there increases. And the value increases. And the quality of life increases…you'll feel so good about making the decision to move there that you'll

truck on with life with an increased sense of passion and ability, then it comes round and hits me in the back and that's the sustainability aspect of it."

Kalke concludes: "You can build the most sustainable building but if you put it in the context of an urban setting, that is just like, you know, shutters down over the windows because there's bullets flying round at night, you don't give a s*** about whether it's costing $10 less a month to heat your place".

Geller, however, is more accepting of the role of municipal leadership: "Nelson… is an interesting situation, where I think it isn't inconceivable that a municipality, through it's planning policies, through an attitude to the preservation of heritage buildings, through certain kinds of enlightened attitudes, can begin to create a certain aura to a place that suddenly does enhance its attractiveness to people and that, in turn, works. It strikes me that there's a place that's doing a number of things that Kamloops isn't doing, or Smithers isn't doing -- if you could buy public stock in Nelson, I would do so, because they are starting to identify a certain niche of people willing to pay a premium for a certain type of environment, and so if developments there are, quote, sustainable, or represent best planning policy, they will create value."

Bonuses

Bob Rennie thinks most developers are looking for financial breaks. "If the municipalities want to see people do what Harold did, Harold has the brain and the passion, the foresight to do it, but in order to get the typical developer, who is just after making money … everything is bottom line, bottom line…municipalities have got to look at offering something. It might be density, offsetting taxes, something so that the developer can see a win... somebody has to start it so that the developer doesn't see that it's a huge cost. He just sees it coming out of profit. He doesn't even look at "do I have a better absorption" or "will I attract a better buyer".

Flexibility

One issue Geller and Kalke both agree on is the need for flexibility from those attempting to support cutting-edge sustainable projects.

They see various organizations' tendency towards prescriptiveness as a real problem for developers looking to innovate, whether it's through prescriptive activities required to obtain funding through a government or utility company program, or through municipal engineering design codes. A specific bugbear for both Kalke and Geller are typical municipal design codes for road widths in residential areas:

"I mean they create awful looking communities, they create far more pavement -- I can't believe I'm saying this, I've become indoctrinated up there," says Geller, referring to Burnaby Mountain. "Most developers would love to develop narrower roads that would have less impact in terms of storm water, that would look good and take up less green space, and you're not allowed to, because of municipal engineering standards".

Kalke and Geller both recount war stories in which they have attempted to gain permission to adapt what they considered to be inappropriate design standards. In West Vancouver, the Advisory Planning Commission of which Kalke was Chair developed its own road standards and took them to the municipal council, which

approved them. "It's this kind of thinking that's so ingrained in our society about what works and what doesn't work: that's the problem," he explains.

Municipal support for certain technologies over others, Kalke argues, distorts the market's ability to pick winners and losers. Another problem with prescriptive approaches, says Geller, is that they sometimes specify technologies that, in his opinion, are not fully tried and tested. "There's a danger when municipalities do start to put in requirements for things that are unproven," he says. "I don't want to be told to put in geothermal heating because I'm not convinced that it will work all the time".

On the other hand, Michael also thinks municipalities can also be too conservative about new technologies, particularly when needlessly requiring conventional back-up systems to insure against a failure of innovative ones.

Bob Rennie suggests that there might be a role here of an external agency to work with developers and municipalities to help develop alternative design codes. The Federation of Canadian Municipalities might be able to help in such a role.

When necessary, set minimum standards

With the above caveats in mind, Michael Geller and Bob Rennie agree that municipalities should work to establish a level playing field for certain environmental features. "I do feel there is a role for elected officials and governments to impose certain regulations, sometimes on the leading edge, in order to ensure certain things happen," says Geller. "Recycling is an example…There are communities that still don't have recycling. Now I would think that at a certain point it's up to the municipality to mandate that, 'yes we are going to have recycling', and then it will happen."

Geller also sees the benefits of mandated minimum standards:

"Right now, there's a much higher level of energy-efficient building going on in the City of Vancouver than there was ten years ago. Is it happening because the public demanded it? No. Is it happening because the developers and the architects wanted to do it? No. It's happening because the City of Vancouver instituted a new energy code that started talking about the percentage of glazed windows and the percentage of heat loss and heat gain, and the developers have to comply with it and the builders have to comply with it and it's happening."

Lead by example

Harold Kalke, however, would prefer to be left alone to do his own thing. In turn, he suggests public bodies should do more to promote energy innovations in public buildings, rather than dictating the terms under which he can innovate in private ones. He cites an example from Sweden, where a particular percentage of heat in public buildings is mandated to come from geothermal ground loop systems and district heating systems -- a mandate that has spurred energy innovation in the public sector and which in turn is providing models for the private sector to pick up on.

"It's the state's role to look after it's own Ballywick so that we can copy it", insists Harold.

Conclusions

Three industry leaders, three quite different visions of the path to sustainability. Kalke's need for independence from "bureaucratic organizations" has lead him to target private end-users with the willingness and means to pay a premium for an innovative, quality product. Geller, although clearly mindful of the need to maximize the value of his development, is more comfortable sharing the responsibilities and burdens of environmental innovation with public institutions, and therefore has a different range freedom within which to experiment. Meanwhile, Rennie's impulse to maximize the size of a viable "demographic", either by lobbying municipalities for financial breaks or by searching for ways of marketing sustainability "baby steps" to more mainstream consumers, contrasts with the developers' strategy of building essentially niche products to push the envelope and serve as templates for subsequent developers.

Ideas for developers

- Be aware that there is a whole spectrum of ways in which you can become involved in 'sustainable developments', from premium cutting edge, state of the art showcases to simply promoting mandated environmental features in such a way that you may stimulate market interest in more advanced options;
- Develop a risk management strategy to help reduce risks related to high capital costs or uncertain markets;
- Think about marketing partners -- who else has an interest in your idea? eg utilities, municipalities, equipment manufacturers, local or federal organizations, energy service companies?
- Be aware of the power of precedent in shaping a market -- market demand can be created as well as responded to. Be alert to increased consumer demand and awareness in the wake of local sustainable developments;
- Try to nurture a good working relationship with a sympathetic municipal planning department and/or local politicians; be prepared to explain the community benefits of your proposal when asking for flexibility on engineering design standards, and refer to other alternative design standards eg East Clayton [link] to back up your case.
- If possible, 'shop around' various municipalities for the best incentives to design according to sustainable principles; be proactive in selling your ideas to potential influential champions;

Ideas for municipalities

- Help create the context for sustainable developments -- ensure you have a long term planning vision for sustainable urban growth;
- Encourage public debate about the future of your city or district -- what kind of place do people want to live in?

- Provide incentives to attract the kinds of developments and the developers you prefer;
- Be open-minded about required engineering design standards with developers interested in "pushing the sustainability envelope";
- On the other side of the coin, be prepared to set minimum performance standards (or, where unavoidable, mandate specific practices) where this will level and/or raise the playing field;
- Mandate specific practices only when there is clear public support (e.g., recycling) or proven technology
- Avoid pushing developers into specific practices that may have uncertain associated risks -- carrots are usually better than sticks;
- Allow the market to determine winners and losers where possible -- for example, set performance goals that invite innovation and creativity in their implementation.
- Work with external partners such as the BC Energy Aware Committee or Federation of Canadian Municipalities to explore some of the wider issues surrounding sustainable buildings.
- Facilitate partnerships between developers and parties who could minimize the risk of innovative development.

Ideas for UCBM, provincial government or NGOs

- Facilitate multi-stakeholder forums to explore alternative development standards and other general issues raised here;
- Act as a neutral information resource for all parties, including developers, municipalities and the public;
- Facilitate partnerships between developers and parties who could minimize the risk of innovative development

Community Energy Planning in Kamloops

Introduction

Scale:	Comprehensive City Community Energy Plan
Community Size:	Mid Sized (296 square km, much of which is land reserve)
Population:	80,000
Climate:	Semi-arid
Annual Average Temperature Ranges:	Ave. High Temp. Range: -2ºC (Jan), 28ºC (July) Ave. Low Temp. Range -8ºC (Jan), 13ºC (July)
Location:	South-central interior of British Columbia
Focus Areas:	Land area/transportation, site & building design, infrastructure, energy supply, Canada
Benefits:	Cost savings, environmental, liveability
Implementation:	Action plan adopted by Council April 22, 1997. Reviewed March 2000.

In 1996, the City of Kamloops became one of BC's first larger communities to develop a systematic, energy-focused view of its operations.

The result of an extensive process with wide stakeholder input, the Kamloops CEP was an ambitious attempt to maximize energy savings by developing a comprehensive portfolio of policies and actions covering everything from alternative fuel use to energy management protocols, from energy modelling to subdivision planning.

Origins and development

With hot summers and cold winters requiring considerable energy for cooling and heating, water and wastewater pumping power needs aggravated by steep topography, and heavy reliance on the personal automobile resulting from dispersed development patterns, Kamloops has always had much to gain from proactive energy planning.

Throughout most of the 1990s, the City enjoyed significant economic and population growth, and liveability issues became a concern. As the time came to develop a new Official Community Plan (OCP), these factors were projected to continue well into the future.

In 1996, the City of Kamloops won a bid for considerable funding from the BC Energy Aware Committee to develop a community energy plan (CEP). The City's bid was successful for several reasons including:

- the City's energy consumption patterns pointed to a substantial potential for energy savings;

- the City's recent record for implementing innovative environmental programs;
- the City's OCP was due to be renewed and could be co-developed and integrated with the CEP.

The CEP development process included:

- developing energy-related objectives for the City that would help to meet the community objectives of the existing and developing OCPs;
- identifying strategies for achieving these energy objectives and supporting broader community goals;
- establishing the City's approximate baseline energy use;
- using a computer model, evaluating the energy implications of alternative development scenarios for the OCP process; and
- developing an action plan to meet the energy objectives, and establishing monitoring and management protocols to evaluate the actions and to ensure the continued relevance of the plan.

The OCP, "Kamplan 1997", was developed alongside the CEP and published shortly after. The energy policies identified by the CEP are reproduced as a separate chapter in the OCP. In addition, the OCP includes the following key planning goals, all of which are consistent with sound energy management:

- encouraging infill and intensification;
- discouraging urban sprawl;
- guiding new development to cost-effective and pre-serviced growth areas;
- bringing shopping, work and home closer together;
- encouraging a mix of housing types and density in old and new neighbourhoods; and
- encouraging alternate transportation systems, including walkways, transit, bike paths and ride sharing

From the start of the CEP project, a community energy planning stakeholder group helped to guide its development. Stakeholders included a broad cross-section of energy utilities, provincial ministries, City staff and school board, business and industrial representatives.

The starting point for the energy plan was a review of the community's objectives as stated in the existing and developing OCPs. The stakeholder group established energy-related objectives to support these broader community goals.

GIS (geographic information system) modeling established the baseline energy use of both the City as a whole and of a typical subdivision zoned for future development. The City modeled various development scenarios to judge the effects of major planning decisions on the area in terms of cost and environmental and

social impacts. It also compared various "neighbourhood" subdivision development scenarios.

After detailed modeling and evaluation by the project consultants and City staff, stakeholders participated in a workshop to select a preferred development scenario from an energy perspective, and to screen and prioritize CEP action items.

Integrating CEP with other City Programs

The City of Kamloops undertook a number of initiatives in parallel with its CEP.

For example, it now uses an ISO 14,000-style environmental management system approach to its solid waste management activities. This includes a commitment to pollution prevention approaches and material and energy quantification, monitoring and tracking.

Also, the City's activities under the Federation of Canadian Municipalities' Partners for Climate Protection program are approached from a similar perspective.

The Partners for Climate Protection (PCP) commitments include the need to profile and forecast energy use and emissions for municipal operations and for the wider community, establish reduction targets and to develop local action plans to meet those targets - activities that lie at the heart of community energy planning.

By integrating these mechanisms, this approach provides an elegant and practical way of overcoming the barriers to the implementation of the CEP, since it:

- levers the benefits of an existing, successful organizational structure (responsible for implementing the PCP program);
- ensures an umbrella view of energy activities;
- increases efficiency and productivity. Since greenhouse gas emissions correlate directly with energy consumption, modeling and monitoring requirements are readily combined;
- will have direct exposure to Council, increasing the potential to justify proactive measures to reduce energy use;
- will act as both an internal communications conduit and a feedback mechanism to the various City departments;
- is supported by all participants.

Major plan features

Twenty-four initiatives in six focus areas were adopted as "high priority, short term" action items. Ten others are listed as lower priority, longer term items. Some of the key initiatives include:

- a performance points system (to provide incentives to encourage energy-efficient development);
- density guidelines (to encourage sufficient residential densities to make commercial services and transit viable in designated areas);

- alternative fuel in fleet vehicles (applicable to City and other public/private vehicle fleets);
- joint water/energy retrofits (installing water and energy conserving devices in homes and businesses);
- street orientation design guides (considering solar angle as a criterion for design in new development);
- district energy zoning (establishing a special zone in the downtown area to support the development of a district energy system, and identifying other candidate neighbourhoods for similar systems); and
- energy audits (for existing and planned City facilities).

One of the most exciting features of the plan was a framework for establishing development standards for new subdivisions. The Upper Sahali neighbourhood redesign study resulted in the creation of the "Sub-hub" concept. The sub-hub concentrated activity in a moderate density, mixed-use nodal area. It was a compromise strategy intended to gain some of the energy-efficiency and liveability advantages of an "urban village," while preserving the integrity of the surrounding residential neighbourhoods (including auto access). From an energy standpoint, the sub-hub focused on three top energy issues for Kamloops:

- increasing travel mode choices;
- creating anchor loads for small district energy systems, and
- creating opportunities for on-site electricity generation.

Design criteria included increased density and diversity, street connectivity, parking supply, transit orientation, district heating, solar orientation, and others.

Comparison of the As-built and the CEP Re-design scenarios suggested that:

- total costs could be reduced by 5-10%;
- air emissions could be reduced by over 10%;
- total per capita energy use could be reduced by 5-10%;

These results were thought to be significant given that the sub-hub incorporated very conservative changes to the original design and targeted a suburban neighbourhood. Much more significant savings were estimated for more urban-oriented sub-hubs.

Conclusions

The Kamloops CEP is a good example of a comprehensive energy plan for a mid-sized community. It shows the extensive energy and cost savings that can be achieved through relatively small changes in planning and zoning decisions. In particular it highlights the energy impact that land use decisions have on transportation energy use. Although not all the CEP recommendations were

eventually implemented, the document provided a guide for the City to move forward on transportation, land use, and energy efficiency issues.

Quesnel: Small Steps towards better Transportation

Scale:	Official Community Plan; smaller, established community.
Population:	11,000 (City)
Area:	23.0 km^2 (City)
Annual Average Temperature Ranges:	Ave. High Temp. Range: -4.7ºC (Jan), 24ºC (July) Ave. Low Temp. Range -13.6ºC (Jan), 9.1ºC (July)
Location:	Central interior of British Columbia
Focus Areas:	General infrastructure planning, roads and streets, bicycle and pedestrian trails, transit opportunities.
Benefits:	Air quality, long term transit viability

Introduction

Most people agree that improving the range and quality of available transportation options can make a community more energy efficient and liveable. However, many smaller, established communities in British Columbia do not have the population density to support a public transport system, and many feel powerless against the dominance of the personal automobile.

So what, realistically, can be done by smaller communities in the province to improve their transportation systems? In this case study, we look at some transportation initiatives recently undertaken by the City of Quesnel, a City of 11,000 people in central BC, and explore the conclusions for similar communities.

Quesnel: Background

Like many in the region, Quesnel's economy is driven by the forestry industry, and its two pulp mills and six saw mills employ over 3,000 of its residents. It boasts "the most concentrated wood products manufacturing area in North America" a short distance north of the downtown core. Unfortunately this industrial base, as well as a busy highway that cuts through the area and a bowl-like topography that tends to inhibit air movement, has lead to urban air quality that according to one source is among the poorest 15% in the province.

The city's forestry companies have taken major steps in recent years towards cleaning up their local impact. Many local people believe that the onus of responsibility for further environmental improvements has shifted from these companies to the municipality itself.

In the years leading up to the drafting its new OCP, the City of Quesnel sought to address some of these concerns. It consulted the local population through the extensive use of neighbourhood workshops, focus groups and public meetings. City staff and external consultants were also asked to contribute their ideas towards policy development.

As a result of this consultation process, the City of Quesnel recognized that more proactive management of urban transportation might make a significant contribution towards improving air quality. In its new OCP, therefore, the City introduced initiatives to reduce the air quality impacts of urban transportation. It is clear from the policies and activities cited in the OCP that the City would also enhance the energy efficiency and the liveability of its urban core in doing so.

In contrast to Northeast Coquitlam's OCP, Quesnel's OCP does not try to take on everything at once. Instead, it illustrates how small, smart steps in the right direction can make a real difference to the energy performance and liveability of an established smaller community with a fair growth rate (3.2% between 1991 and 1996, according to Statistics Canada).

Over the past few years, the City has implemented a number of transport-impacting initiatives that can be broadly categorized the following groups:

- land use planning policies that create the conditions for a more energy-efficient urban transportation infrastructure in addition to fulfilling other objectives
- transportation-related initiatives relating to:
    - reduced embodied-energy roads and road systems (i.e. that use less energy in their construction);
    - bicycle trails and pathways;
    - initiation of a study into public transportation possibilities.

In this case study we examine each of these aspects of Quesnel's OCP and its recent experiences to see what lessons can be learned for other smaller, established communities in British Columbia.

General Infrastructure Planning

For smaller, slow growing communities, more energy aware infrastructure planning policies may take many years, sometimes decades, to deliver results. However, perhaps the single most important CEP principle is to develop a long term planning vision to ensure that things will, eventually, get better.

In this first section, therefore, we look at a number of policies adopted by Quesnel's OCP for ensuring long term success.

The OCP contains a number of policies aimed at gradually increasing density and reshaping the urban mix of commercial and residential users. This is done with the expectation that these changes will eventually result in more livable spaces, reduced emissions as a result of shifting away from automobile toward pedestrian, cycling,

and transit modes of travel, reduced cost of transit, and improved business viability of the downtown core.

The policies can be regarded as one of two types: direction policies and implementation policies. The former outline *what* Council wants to achieve; the latter spell out some of the *ways* it intends to bring these changes about.

Direction policies

Encouraging a mix of land uses downtown and in other commercial centres

First storey commercial mixed-use developments are a great way of providing more opportunities for people to be within walkable distances of the places they need to go, while at the same time creating a dynamic street environment, making the area safer and more attractive to potential residents and visitors.

The OCP also identifies a economic argument for this:

"Strong planning policies for Downtown Quesnel can promote business retention and new development. As the focal point of the community, a healthy and vibrant downtown can boost morale and stimulate investment".

Accordingly, Quesnel Council will:

"encourage mixed-use residential and commercial development, with residential above first storey commercial uses within the downtown and other specific commercial areas."

As a corollary to this, Council will will also:

"discourage office uses from locating anywhere other than the Downtown area [including government offices]"

Another option along these lines is to:

"in certain areas, allow live-work uses, where people can live in the same building in which they work."

Increase density downtown and in other commercial centres

Increasing the intensity and density of residential land use near commercial and employment centres has a direct impact on local transportation options. People who live near their places of work have more realistic opportunities to walk or take a bicycle to work, or to similarly access other services such as restaurants or dry cleaners. Not only does this reduce the number of vehicle trips, but it also helps to stimulate a vibrant urban centre that is more 'liveable' than conventionally-planned neighbourhoods.

Quesnel Council will:

"encourage the intensification of residential land use and density near commercial and employment centres, along major arterials and in areas where existing services can accommodate higher densities".

Densifying along major arterials helps cut down on traffic created by people moving through several suburban streets to access main streets.

Implementation policies

Some of the things Council will do to bring these things about include:

Favouring infill

Council will:

"encourage infill and redevelopment of existing areas designated as medium density residential before designating new areas as medium density residential."

Densifying existing areas increases the efficiency of many infrastructure services, such as water and wastewater provision, as well as reducing the "embodied energy" of the infrastructure -- since the amount of materials per individual is reduced, energy (and money) is saved on everything from the manufacture of asphalt to traffic signals. Also, of course, the greater the residential density of a location, the more viable public transportation provision becomes.

Offering developers density bonuses

The Quesnel OCP also spells out specific conditions under which it will offer so-called "density bonuses". Developers are attracted by increased density authorizations because the more units they can construct per unit area, the lower their costs per unit. Municipalities, however, often need to limit the density of certain areas to maintain the character of an area. Local Councils can therefore offer somewhat elevated density "bonuses" as an incentive for developers to incorporate other features the municipality wishes to promote and which may offset any negative effects of increased density.

In Quesnel's case, this is phrased as follows:

"Council may consider applications to rezone new areas to allow densities up to 120 dwelling units per hectare [the regular maximum being 90] if development [within designated areas] meets the following criteria:

- *Must be within a five minute walk (about 250 metres) of the Downtown core or West Quesnel commercial area;*
- *Must provide amenities that may include public gardens, public plazas, playground equipment, public art, pedestrian and bicycle facilities, and other amenities;*
- *Primary vehicular access to the development is from a major road that does not require travel through adjacent Low Density Residential Areas;*
- *Provision of at-grade parking, under-building parking or underground parking;*
- *Provides a maximum of three stories of residential use;"*

The public amenities described are all aimed at improving liveability and providing incentives for people to walk or bicycle around an area rather than exclusively travel

by car. In BC's colder climates, this practical design criterion is particularly critical for encouraging pedestrian travel.

Making residential developments conditional on the provision of commercial space

One way of ensuring that the downtown area develops a healthy mix of residential and commercial uses is to tie the construction of one to the other. The OCP, for example, says that Council will:

"allow multi-family residential development within the downtown designation only when the ground floor contains commercial uses."

Being flexible in zoning

Quesnel will be relatively flexible in the way it interprets the zoning of "medium density residential" areas to ensure a lively mix of appropriate commercial, public and institutional uses. The OCP says that Council will:

"consider other uses in the medium density residential designation, including:

- *home businesses;*
- *small parks;*
- *small places of worship;*
- *small local commercial uses, especially where located on the ground floor as an integral part of the medium density residential development;*
- *institutional uses directly related to residential needs, such as medical care, meal provision, exercise facilities, daycare facilities."*

Transport-Specific Policies

In its section on transportation, the City of Quesnel's OCP states that the City will:

"consider alternative design standards and neo-traditional planning principles (which include the use of a grid street network, lanes, boulevards and narrower streets)".

This statement refers to a more general change in urban planning priorities and so is explored with reference to the City's other policies below.

The term neo-traditional planning, otherwise called 'New Urbanism', is a reform movement that recently emerged in North America to respond to the problems created by urban and suburban sprawl. All the above-mentioned policies of the Quesnel OCP are consistent with this 'new' approach that, as its name suggests, looks backs to less vehicle-dominated times for inspiration.

According to the US Department of Energy's Center of Excellence for Sustainable Development, the primary design characteristics of New Urbanism include the following:

- Mixed land uses within neighborhoods;
- Pedestrian-centered neighborhoods with primary social and economic facilities within a five-minute walk;
- Community orientation around public transit systems;

On the previous page, we discussed how mixed land uses can help prevent sprawl and the problems associated with it. On this page, we discuss how roads and trails can be made more pedestrian and bicycle friendly. Transit options are covered on the following page.

Roads and streets

Other than considering the general application of neo-traditional design principles, the Quesnel OCP does not cover in detail specific implications of this approach and their potential effect on roads and streets.

However, many people have suggested a list of features associated with neo-traditional road and street design. For example, in his study of sustainable design and planning strategies in North America, Robert Hsin lists the following considerations:

- **"Human-scaled" streets**
  Reducing road widths and curb radii have many beneficial effects. Traffic speeds are reduced, and streets feel smaller and less daunting to pedestrians. Embodied energy is reduced since less material is required for construction.
- **Street patterns to dilute rather than concentrate traffic.**
  Conventional street patterns use various techniques to force traffic into a small number of primary arterials, leading to traffic congestion and a generally unpleasant environment for pedestrians around these areas. A grid-type design, by contrast, offers travellers more options and so spreads the load more evenly.
- **Street patterns that conform to a site's natural topography.**
  Where traffic is not a critical issue, however, designing a street to conform to a site's topography is desirable, to reduce environmental impact of the development, to reduce the need to alter the site's natural drainage patterns, and to save costs by eliminating unnecessary over-engineering of road systems.
- **Provide greenery within the streetscape.**
  Urban greenery helps improve local air quality and enhances liveability.
- **Specify alternative paving surfaces.**
  Where appropriate, alternatives to asphalt and concrete may be used to reduce the environmental impact of using these materials. For sidewalks and areas where traffic load is not high, unpaved or permeable paving surfaces could be used. Alternatively, recycled materials, such as crushed glass, recycled tired or aggregate could be specified.
- **Reduce the area of impervious surfaces.**
  Other effective ways of reducing the amount of paved surface required

include multi-storey developments, shared driveways, and decreasing side and rear yard setbacks.

- **Provide alternatives to parking lots.**
  Street parking can often help create a more pedestrian-focused street environment and prevents the loss of 'dead space' that parking lots represent.

Bicycle routes

More common in OCPs throughout the province are policies on improving the availability and quality of pedestrian and bicycle trails. For Quesnel, however, the development of certain bicycle routes is specifically part of an overall transport system.

Quesnel Council's policies on pedestrian and bicycle routes include the following:

- *"Provide for and encourage bicycle and pedestrian movement by developing an integrated system of safe and convenient sidewalks, pathways and trails;*
- *Continue to implement a program of priority sidewalk construction within Quesnel;*
- *Work towards improving the width and approaches on sidewalks in order to allow more efficient wheelchair access within Quesnel;*
- *Consider extending sidewalks to service areas with particularly high volumes of pedestrian traffic including schools, recreational facilities and commercial areas;*
- *Continue the policy of requiring sidewalk in new development, except for along cul-de-sacs;*
- *Work towards establishing a bicycle and pedestrian trail network;*
- *Consider widening sidewalks downtown and in other areas where there are high volumes of foot traffic;*
- *Investigate a pathway connection between residential areas and industrial employment centres toward the north end of the City;*
- *Investigate options for pedestrian access across [the local] Highway;*
- *Encourage stronger connections between the Downtown, and the Riverfront park and Trail;*
- *Continue to improve the pedestrian environment of downtown".*

Because of Quesnel's severe winters and steep terrain, it is unlikely that bicycle trails will offer an entirely realistic commuting alternative for most people in the City. However, in addition the benefit offered to those are willing to brave this geography, bicycle trails also enhance the liveability of the City for wider numbers of people who enjoy them for recreational use.

Pedestrian routes

'Walkability', says Richard McLaughlin in one of a series of articles on New Urbanism for Planning Minnesota, is a central feature of the neo-traditional urban design approach. McLaughlin introduces two features crucial to creating walkability: walking distance and pedestrian continuity.

Walking distance, he proposes, is

"*a distance comfortable for most people to walk, as an attractive alternative to driving. This distance is best represented as one quarter mile (400 metres), or a five-minute walk. Walking distance is a historic axiom of urban pattern, delimiting the French Quartier and the Neighborhood Unit described in the 1929 New York City Regional Plan. Current adaptations such as Traditional Neighborhood Development (TND) and Transit Oriented Development (TOD) also use a five-minute walking distance as a primary design determinant."*

Neo-traditional planners also try to achieve "pedestrian continuity" which McLaughlin describes as,

"an experiential quality created by a safe, comfortable and attractive network of pathways connecting frequently-visited destinations. The essential characteristics of pedestrian continuity are: ·

- *Each pathway's trajectory has a desirable or useful destination;*
- *Frequent destinations are located in places that create a succession of five-minute walks;*
- *The pathway network offers choices of route, and is logical, uninterrupted, and inclusive of shortcuts wherever possible;*
- *The pathway's trajectory is spatially defined by interesting building architecture and landscape, and tempered by the local climate, providing shade when the air is hot and sun when the air is cool;*
- *Pathways are protected from automobile traffic wherever possible;*
- *Pathways are visually monitored by people in surrounding buildings, and therefore offer pedestrians a sense of safety;"*

Political leadership

Mike Doyle's 1999 election campaign coincided with the development of the OCP, and focused on a promise to investigate the introduction of a public transport system and to further develop bicycle trails.

Working as a Job Facilitator, Doyle dealt every day with people who couldn't take advantage of new opportunities because they did not have access to private transport. The community has recently attracted a number of commercial enterprises that are beginning to concentrate some distance away from the lower income residents who would be likely to benefit from entry-level positions created.

Recognizing the potential role a public transport system might have in helping connecting people with work opportunities, councilor Mike Doyle chose to draw attention to what he perceived to be growing latent demand. Without further consultation, he admits, he "just stood up and said it, and then pursued it."

Doyle made his case by arguing that both expanded bicycle trails and a new public transit system would have significant payoffs for the local economy.

Tackling transport

As the sidebar on the benefits of public transportation describes, improving public transportation opportunities in a community can significantly increase energy efficiency and liveability. However, this can also be one of the most difficult things for a community to tackle in a proactive way, since most municipalities in BC share responsibility for it with BC Transit.

The BC Transit Municipal Systems Program administers transit planning and funding for all systems outside Victoria and the Lower Mainland. Through this program, BC Transit partners with local communities to provide a level of service that balances the needs of various stakeholders.

Quesnel's experience shows that a community can be very much an active partner in this relationship.

The City of Quesnel is currently served only by a 'para-transport' system that is primarily aimed at people with specific (mostly ambulatory) needs.

However, largely through the enthusiasm and commitment of one member (see sidebar on Political Leadership), Quesnel Council recognized the key role improved transit could play in enhancing air quality and meeting other objectives. The City advised BC Transit of recent changes to its transportation needs, and invited it to assess potential public transportation options. Following a feasibility study by BC Transit, Council and BC Transit agreed to initiate a new, expanded transportation system.

Communities elsewhere in BC can similarly assume responsibility for alerting BC Transit to their changing needs. In this section, we summarize the kind of information BC Transit looks for in assessing the viability of a public transport system in a smaller community, with the intention of empowering local people to monitor these local indicators themselves.

Helping BC Transit monitor local needs

BC Transit works with communities to develop an appropriate level of service. In performing a transit feasibility study, BC transit follows a relatively predetermined procedure of the following logical steps:

- Identifying perceived local transport objectives;
- Examining the past experience of public transport in the City;
- Researching and analyzing the effectiveness of current transport arrangements;

- Examining potential transit markets;
- Evaluating various potential transit options;
- Proposing a specific portfolio of transit services;
- Outlining a proposed implementation strategy;

Local communities can assume a proactive role in their relationship with BC Transit by using their local knowledge to keep abreast of developments in the first activity (identifying perceived local transport objectives) and the fourth (examining potential transit markets).

BC Transit uses a variety of sources to assess the public transportation needs of the communities in its jurisdiction on an ongoing basis. For example, it uses statistical data generated by BC Stats to estimate the potential demand for each demographic group in each community.

However, as Mike Doyle's experience has shown, local people are best placed to understand the specific situations behind the statistics and so pick up on local needs before an external agency. In this section we draw from the BC Transit study prepared for the City of Quesnel to highlight the issues communities may wish to be alert to.

In performing a market analysis, BC Transit typically looks at the transport requirements of the community from the perspective of the following groups (Persons with a disability are also considered a specific target group by BC Transit because of their need for special services. However, these needs cannot be generalized in the same way as the others because they incorporates people of all ages):

- School students / youths;
- Younger adults / collage students;
- Adults;
- Seniors;

Unsurprisingly, each group has distinctive needs and patterns of transit use that are fairly consistent across communities. Significant changes in the local transportation situation of any of the following groups should be raised with BC Transit. By taking note of these local indicators, communities can begin to assume a proactive relationship with their public transport provider.

School students / youths

This group typically has limited transportation options, other than walking or cycling, and so is potentially a captive market for transit. Essentially a commuter market to and from school, other main uses include weekday afternoons and weekends to central areas. Transit's main strategies to maximize ridership in this group are to offer fixed schedule/route services to and from school, and central areas on weekday afternoons and weekends.

Possible indicators of changing transit needs in this group may therefore include the following:

- New schools, relocating schools;
- School District re-evaluations of busing needs due to changing ridership boundaries etc;
- New or emerging residential areas, increasing urban densification;
- Significantly increased school intakes;
- Emerging new central areas, regular attractions;
- Increased concern about security.

Establishing ridership at this stage will increase likelihood of transit use in later life.

Younger adults / college students

This group is again a potentially relatively captive market for transit, though many typically rely on family and friends for most transportation. This group tends to make multiple trips for a variety of personal errands; evening ridership higher than for youths. College students have commuting needs that may not conform to typical peak periods. Transit's strategies to capture this group therefore include include offering fixed schedule/route services to and from college, possible evening services, and consistent, moderately frequent fixed-route service during weekday business hours.

Possible indicators of changing transit needs in this group may therefore include the following:

- New colleges, relocating colleges;
- Significantly increased college intakes;
- New or emerging residential areas, increasing urban densification;
- Relocation of basic services, eg post offices, day care facilities etc;
- Emerging new central areas, regular attractions.

Adults

Adults are most likely to own a private car. Some do not, however, and typically have same needs as young adults. Some also choose not to use private car, for a variety of reasons. Adults will typically need transport for commuting, as well as during evenings and on weekends to core areas.

Adults might best be attracted to transit by offering fixed-route, fixed-schedule commuter service, consistent, moderately frequent fixed-route service during weekday business hours and possibly an evening service. Transit can also work with employers to create a 'Travel Options' strategy to reduce single occupancy vehicle use and peak time congestion.

Possible indicators of changing transit needs in this group may therefore include the following:

- New industrial or commercial areas, relocating industrial or commercial areas;
- Major new employers, change of major employer management;
- Significantly increased working population;
- New or emerging residential areas, increasing urban densification;
- Relocation of basic services, eg post offices, day care facilities etc;
- Emerging new central areas, regular attractions.

Seniors

Non-driving seniors are again a relatively captive market for transit, who tend to be midday riders. BC Transit tries to encourage multiple trips in a day, thereby giving passengers more ability to independently arrange their days and trip plans. A fixed-route, fixed-schedule service that offers consistent midday service and 'personal' service will appeal to a broad base of seniors.

Possible indicators of changing transit needs in this group may therefore include the following:

- Significantly increased senior population;
- New or emerging residential areas, increasing urban densification;
- Relocation of basic services, e.g. hospitals, medical centres, activity centres post offices, etc;
- Emerging new central areas, regular attractions.

Benefits of public transport systems

(Source: BC Transit)

Reduced Infrastructure and Congestion Costs

Increasing automobile numbers bring with them a number of direct costs to the community. These include:

- *Land costs;*
- *Construction and maintenance costs for expanded roadways and parking facilities;*
- *Traffic control and enforcement costs;*
- *Congestion costs, related to lost time and reduced productivity;*

If some of the growth in automobile traffic, particularly at peak travel times, can be diverted to transit, significant savings can be realized.

Reduced Environmental Costs

An average transit trip results in significantly less energy use and pollution production per person than the same trip made by private automobile. Transit trips also require less land consumption since the same number of people can be carried on less road space and there are reduced parking requirements.

Community Development

Community transportation systems support and promote numerous aspects of economic and social development, including:

- creating jobs by attracting employers to areas that are accessible to more people;
- empowering workers by enabling transportation disadvantaged people to reach jobs;
- strengthening local businesses by giving them access to workers and to a wider market;
- enabling elderly people to remain independent by providing access to health care, shopping, day care programs, and other basic life needs.

Improved Mobility and Accessibility

Transit provides mobility to many people who do not have access to other modes of travel due to age, disability, or income.

Independent Living Transit provides the elderly and disabled, as well as those unable to drive for other reasons, freedom to travel without relying on others.

Conclusions

In this feature, we have highlighted some of the steps the City of Quesnel has undertaken to improve its citizens' transportation options, primarily to help increase the quality of its urban air.

The main points of its approach have been to:

- Develop a long term urban planning vision that will ensure that its transportation situation will slowly improve;
- Consider the use of 'neo-traditional planning principles' to help make walking and cycling more pleasant and therefore more realistic;
- Instigate a program of road and trail building to offer people some alternative transportation options as well as improving urban liveability;
- Take a proactive role in its relationship with BC Transit by alerting it to changes in local transit needs.

Quesnel's portfolio of transportation strategies is by no means comprehensive -- further ideas for improving the prospects of public transportation can be found throughout this website. However, this is a good example of an effective portfolio of initiatives for a community of this size and situation. The strategies outlined here include straightforward, common sense ideas that can be undertaken without placing an overly onerous burden on Council, planners, developers or local residents and businesses. They include simple incremental steps toward long-term solutions for transportation and air quality problems.

Clearly, there is no 'magic bullet' for solving transportation problems, nor a template that can be applied in all communities. For Quesnel, long term solutions will come from integrating a diversity of approaches in mini-steps, and responding over time to the emerging benefits of increasing urban density and mixes of use. As Councillor Mike Doyle puts it, "When I was first assigned my responsibilities [environment, transport, trails and employment], they appeared diverse and unrelated. But the more I looked into the environmental, economic and social issues, I could see they were all interlinked".

The ideas presented in this feature are summarized below:

- Develop a "very long term" urban planning vision;
- Inoculate the vision against short term political change by developing it with broad stakeholder participation and OCP revisions;
- Offer developers incentives to help realize the vision;
- Work persistently towards a more compact and mixed use urban infrastructure;
- Adopt the "five minute rule" to attract pedestrian use;
- Ensure that bicycle and pedestrian commuting routes are as practical, safe and pleasant as possible;
- Work with local employers and BC Transit to consider "green' commuting options;
- Develop a proactive relationship with BC Transit and help it keep abreast of relevant changes in local target markets;

Above all, take responsibility for your own air quality. Even if the major factors affecting local air quality are effectively beyond your influence, taking what steps you can is an important act of leadership, and may have many long term livability benefits.

Shoal Point: Towards Sustainability in Victoria

"People say you can't afford to build like this, you can't get workmen, but that's all nonsense. People haven't been doing it because they haven't been doing it. It's cheaper not to do what we've done, but people will pay to live with beauty. It doesn't really cut into our bottom dollar because we're getting high prices on a per square foot basis".

-Developer David Butterfield

Introduction

Description:	High efficiency, mixed-use residential-commercial building complex
Location:	Victoria city centre, South-West British Columbia
Climate:	Temperate
Annual Average Temperature Ranges:	Ave. High Temp. Range: 6.2ºC (Jan), 21.8ºC (July) Ave. Low Temp. Range 0.2ºC (Jan), 10.7ºC (July)
Building Features:	Ground source heat pump system, passive solar orientation, energy-efficient envelope, low E glass, energy efficient building materials and technology, heat exchange greenhouse
Environmental performance:	Designed to consume around 45% less energy than an equivalent building designed to MNECB (Model National Energy Code for Buildings) standards
Building Area:	31,900m^2, incorporating 150 residential units and 5,850 m^2 of marine-based commercial space
Cost:	Approx $90 million. A further approx $1 million in civic contributions.
Areas of Discussion:	Green building design, municipalities and green developers, community sustainability, land-use decision-making processes.

The Shoal Point development on Victoria's Fisherman's Wharf has attracted much attention since plans were announced in 1998. Among those following its progress are community energy planners, for whom Shoal Point represents an interesting case study of both energy technology and community sustainability issues. In this case study, we highlight these features from the various perspectives of Shoal Point's stakeholders.

Arguably one of the most environmentally advanced buildings in North America, the building incorporates a portfolio of relatively low-tech features to great effect. Promoted as a showcase by Natural Resources Canada's C-2000 program, Shoal Point is designed to consume around 45% of the purchased energy used in an

equivalent building designed to MNECB (Model National Energy Code for Buildings) standards. Although most of the energy efficiency gains are due to low-cost design and material features, the centrepiece of the building's environmental technology is a ground source (or geothermal) heat pump that will provide much of the heat for a majority of the residential suites.

Shoal Point is a high-density mixed-use commercial/residential building within walking distance of Victoria city centre, all features that point towards further systemic energy efficiencies. By creating local jobs, sourcing local materials, upgrading facilities and bringing wealthy residents to an economically depressed local area, its developer hopes to help spur the revitalization of the Wharf and to bring new opportunities to the local community.

For all this, however, Shoal Point begins life a controversial development. Although requiring significant decontamination and upgrading, the site chosen for the building is a prized waterfront location originally zoned for marine commercial activity by the City of Victoria. Arguing that premium residential occupants were needed to act as the 'economic engine' of the area's regeneration, the developer found itself at odds with some sections of the local population who would have preferred to find an alternative way. The dispute raises key questions surrounding the nature of local economic sustainability, and how a municipality should balance these differing perspectives.

In the first half of this discussion, we examine some of the energy technology features employed the Shoal Point development in reducing its energy and environmental burden. In the second, we examine the community context of the building, and how the developer and local municipality worked - with varying degrees of success - to address stakeholder concerns over its potential social and economic impact. Below, we draw some general conclusions for developers, municipalities and elected officials facing similar opportunities and problems elsewhere in the province:

Ideas For Developers

- There is a profit to be made by bundling sustainable and energy-efficient building properties into a 'premium package' in the right location;
- Set performance standards and then find the best way to achieve them
- Buildings can be designed to use 50% less purchased energy than described in the Model National Energy Code for Buildings (around 170 kWh/m^2/yr under typical weather conditions in the Lower Mainland). Although Shoal Point was designed to be a premium cost building, similar energy savings have been achieved elsewhere in BC at *no extra capital cost*;
- Highly effective energy efficiency building techniques to consider in BC include:
    - Maximizing the potential of passive solar heating and natural lighting;
    - Using advanced building envelope, glazing, insulation and lighting systems, as well as simple controls and sensors;

  - Employing computer energy simulations to optimize the systemic energy performance, thereby minimizing the quantities of building materials required;

- Getting the analysis of energy savings done
  - See BC Hydro's Design Assistance Program
  - Try it yourself, with free downloadable software. Perform an initial screening or a more detailed analysis.
  - Ask municipalities to cost-share with you!

Financing options to consider:

- It may be possible to partner with an energy service company (ESCO) to help spread the costs of incorporating energy efficient features

Alternative energy sources

- Can't afford to do the whole thing? Do half! At Shoal Point, putting all units on a heat pump system proved just too much for the up-front capital budget. The solution - half of the units use conventional energy, the other half will use geothermal or ocean-source heat pumps.

Addressing public concerns

- Consider investing in a substantial upfront stakeholder consultation process to avoid later delays

Ideas for Municipalities / elected officials

- It is often possible to build a commercial or institutional building that consumes 50% less purchased energy than an equivalent building built to MNECB standards at little or no extra capital cost.
- Set targets for, say 25%, reductions in purchased energy relative to MNECB standards when commissioning new public buildings
- Challenge other municipalities, developers or private enterprises to do the same
- Require or offer incentives for developers to do the same
- New energy technologies, such as heat pumps, can be cost effective, but may have site-specific costs and feasibility issues.
- Municipalities or Citizens Advisory Committees should consider requiring developers to undertake a feasibility study on one or more alternative energy sources for new large commercial or multi-family residential buildings, but should not normally make prescriptive requirements that could later prove unworkable
- Innovative new developments that challenge existing social and cultural values require meaningful consultation.

- Require that developers conduct real consultation at the earliest possible stage in proceedings

Energy Technology

Summary Table

Overall Improvement over MNECB standard building: 45% less purchased energy consumed.

Feature	Technical details	Approximate incremental capital cost (saving) over MNECB standard building	Approx % relative contribution to total predicted improvement	Comments
Ground source heat pumps	ARI 320: COP 5.3; ARI 325: 3.7 COP	$464,000	45%	Installed in 58% of suites in Phase One, and 77% of suites in Phases 2 and 3.
Passive solar design and lighting		($50,000) saved on lighting fixtures due to passive solar design. Although the main U-shape design was cost neutral, complex use of passive solar design at the suite level incurred increased costs.	25%	Reduced need for heating, cooling and lighting created by design features such as U-shape floorplan, balcony shading etc
Walls	R-12.	Premium price paid for walling material for non-energy related reasons ($1m incremental for high quality rainscreen technology)	5%	The primary construction is a Norman brick veneer on the outside, then a 1 ½" air space, a 1 ½" rigid insulation, self-adhesive membrane (for material changes), ½" exterior gypsum, 4" steel studs, ½" gypsum.
Roof	R-20 for 80% and R-28 for 20%.	Premium price paid for roof for non-energy related reasons (balcony space and aesthetics)	5%	The majority of the roof (approx. 80%) will be a deck membrane on the outside, on top of a concrete slab sloped to a 2% gutter or scupper, insulation of R-20, with z-grits and finally ½" gypsum.
Windows	High 'e' windows (reflect 56% of UV rays).	$300,000	5%	Low-e glazing will cover approximately 55% of the building exterior. All are double pane aluminum thermally broken windows.
Other features	Other features include sensors, high efficiency appliances, high efficiency pumps etc.	Difficult to assess incremental costs attributable to energy efficiency, as building uses high end appliances with a range of premium features.	15%	

Geothermal (or ground source) heat pump

Perhaps the most high-profile energy efficiency feature of the building is a geothermal heat pump that exchanges heat energy between the building and the water in the ground beneath it. In the winter, heat is delivered to the building, and in the summer it is removed.

"It's basically a form of solar energy", Ludo Bertsch, the project's environmental technology consultant explains. "The sun heats the ground or ocean water and in the winter the heat pump is able to extract that energy".

"It works on the same principal as a refrigerator and it's planned to reduce heating and hot water bills by about one half," states Shoal Point developer, David Butterfield.

A large geothermal heat pump in the building will circulate a heat transfer liquid through a closed-loop piping system that dips deep into the ground and loops round the whole building. Suites then have an individual compressor (occupying a 'closet-sized' area) that will extract and circulate the heat from the loop into the room.

"The energy efficiencies you can achieve with ground source heat pumps are really quite something," Ludo says. "With an electric baseboard you have a COP [Coefficient of Performance] of 1.0 - the electrical energy in is the same as the heat energy out. Gas furnaces have a COP of about 0.6 or 0.7. But geothermal heat pumps are in the three to four region -- for every one unit of energy you put into the system to run the pumps, you get three or four out in the form of heat".

Given the premium cost of the heat pump system, however, the developer chose not to install them in every suite in Phase One. The table below shows the trade-off the developer made.

Cost trade-offs (for Phase One: 61 suites, 35% of final area)

Suite heating Option	**Capital Cost**	**Comments**
61 suites with electrical baseboard heaters	$200,000	Low maintenance, least 'environmentally friendly'
61 suites with heat pumps	$1,000,000	Operating costs 25% of gas boiler system. However, gas boiler system still required for back-up (~$8,000capital cost).
25 suites with baseboards / 36 with heat pumps	$664,000	Compromise solution, at a premium of $464,000 (Plus back-up boiler)

In opting to use heat pumps, the developer also had to install a back-up gas-fired boiler for times when the heat pumps could not deliver the required load.

While, clearly proud of the system, Ludo cautions would-be developers about the technical and administrative hurdles that may face the users of geothermal heat pumps.

"A number of issues arose that we didn't foresee," he says. "For example, if we can't get suitable groundwater then we'll have to divert the pipework to use ocean water. For us, this means going across federally owned land, and dealing in this case with the Department of Transport. So it might take us a little while to get the system going." In the meantime, the building will be heated by the back-up gas boiler.

Passive solar design

Shoal Point makes imaginative use of passive solar energy, which will make another large contribution towards the complex's energy savings. As the image below illustrates, it is designed in a south-facing U-shape to capture as much sunlight as possible in winter, reducing the energy requiring for lighting and heating. In the summer, the deep balconies (minimum 3 m depth), shading and extensive vegetation covering the building prevents overheating of the suites. Over 55% of the building's surface is made up of low emmissivity glass, which reflects 56% of the suns UV rays.

Artist's rendering, south view showing u-shape passive solar configuration

Shoal Point is not an unusual example of success with passive solar design. In another of Natural Resources Canada's showcase buildings, Building 2 of the Crestwood Corporate Centre in Richmond, BC, a combination of passive solar design and reduced lighting density reduced the lighting energy requirement for the building by over 50%, as well as contributing significantly to the building's hugely reduced heating requirement.

Other energy features

Other energy efficient features of the building at Shoal Point include:

- An energy efficient building envelope;
- High efficiency pumps and fans that circulate heat around the building
- Large quantities of plant material that act as a temperature buffer in addition to improving the building's air quality;
- Large decks and balconies that provide shade during the summer, reducing the cooling load of the heat pump;

- High efficiency gas appliances and fireplaces;
- Heat modelling

Understanding and balancing the heat requirements of such a building requires a balance of expertise, experience and computer power.

The developer hired BC Hydro experts to model the use of energy in the building under a variety of design scenarios.

"A great thing for us was to have Hydro come along with their computer and answer our designers' 'what if?' questions. We were able to see that, say, doubling insulation on the ceilings wouldn't have much effect, but doing the same thing with the windows would really make a difference," says Bertsch. "That was the fascinating aspect of it -- our team works with these things all the time but we don't get feedback without this [analysis]".

Although it does not currently promote its services directly, BC Hydro's Design Assistance program has supplied us with a brief introduction to its services for municipalities and developers.

Together, these and other design innovations led to Shoal Point winning a number of prestigious design awards, recently including the Urban Development Institute's Award of Excellence 2000 for best multi-family, high rise building.

The challenges of sustainable communities

Introduction

As the quotes in the sidebars (below left) suggest, Shoal Point's advanced energy and environmental features have won many admirers among those with an interest in promoting examples of such excellence. However, since its inception it has also been the focus of considerable local controversy, despite the many positive local impacts the building looks poised to deliver.

Given the close links between community energy planning and local sustainability objectives, this project raises some interesting issues surrounding energy management excellence and the impacts of major developments on local communities. After all, what good is energy efficiency if it attained at the expense of people's quality of life?

Shoal Point - the community context

Although it had spent many years as a neglected, post-industrial brownfield area, the Fisherman's Wharf site chosen by developer David Butterfield was clearly of prime significance for the City of Victoria. Situated on the waterfront just ten minutes' walk from the city centre, the plot was one of the few of its kind remaining in the area.

The 'upland' area of the site, a section of land owned by the federal government directly adjacent to the water, has some of the last remaining facilities for the fishing industry on the Wharf. Furthermore, as a focal point of local fishing activity, there is

considerable interest in the economic sustainability of the site, given the several conventional residential units built nearby in recent years.

The local community is anxious to retain its links with the marine economy and not to be 'cut-off' by the imposition of another self-contained, premium priced residential development. Since the land was zoned for 'commercial marine' development, any new use would have to either conform to this or make a compelling case as to why this classification should be revised.

"Development of any kind on the site was likely to be controversial", notes Dennis Carlson, a City of Victoria planner closely involved with the project's planning application.

In December 1995, at the initiation of local developer David Butterfield, a committee was formed to discuss the redevelopment of Victoria's Fisherman's Wharf area, comprising representatives of the developer, the City, community association groups and harbour workers.

Dennis Carlson was one of the municipality's representatives with this group, and had strongly encouraged the developer to consult widely and without preconception about possible futures for the site. "In the past we've found that this has been a successful model for working out the potential bugs in a project before things go too far", Carlson says.

Over the course of six months, the committee actively explored various options and priorities for developing the area.

Relatively early on in the process, the committee reached consensus on an overall strategy for the Wharf's future, outlining areas, for example, that were to be commercially focused and areas that should be rezoned for mixed use. The group also agreed that the City should ensure that mixed-use residential projects should provide a revenue stream to help boost the fortunes of the harbour workers, as well as to ensure the site was developed to the highest environmental standards.

A form of development agreement began to take shape, in which the developers' revenues from residential units would be used to meet the other needs of the site. These included funds to the harbour workers to develop much-needed facilities and to provide low cost commercial space, obligations to make public areas attractive places to work and live, as well as a number of other commitments. The building was sized based on calculations of the revenue stream required to meet these various civic contributions, which amounted to around $500,000.

However, as the group turned to consider in detail the type of building that might be appropriate to launch the redevelopment of the site, disagreements within the committee began to surface. One group in particular wanted to make the building a low rise, wood-framed building to emphasize a conservationist approach to the area. When the developer insisted that such a building would not be commercially viable, the committee dissolved and the issue became public. An increasingly bitter conflict ensued, in which Council and the City had to try to accommodate the growing objections of local people to the proposed brick and glass development.

The City required the developer to undergo its formal community consultation exercise, which showed that local residents were divided over the proposal. Those

that opposed the plan did so for several reasons: some agreed with the conservationist group that the building should be of a low-rise, wood frame design; some were concerned that rezoning a 'marine commercial' area for mixed use was a threat to harbour workers, regardless of the benefits to them. Yet others were concerned about the nature of the change in community that could result from the sudden influx of so many wealthy new residents.

However, after a controversial series of public meetings, Council passed the developer's rezoning application by a narrow margin. "The early consultation work of the developer certainly helped," says Dennis Carlson, "as did the amenity package that included a further $425,000 commitment to local affordable housing." Then, of course, the project was a tax benefit for the City, and many considered that the attractive building would be an asset to the harbour.

He concludes: "the ultimate outcome of this will depend on whether or not the project delivers all it promises. The City is under major scrutiny from Council and the public, and we're still under pressure about it".

"… the developer went way beyond the City's regular requirements on this project", Carlson says. "I don't know, maybe the controversy was unavoidable?"

Conclusion

Municipalities are often obliged to balance the competing priorities of various stakeholders in planning applications in which energy efficiency and community sustainability are only parts of a complex equation.

What's increasingly crucial is to ensure that all stakeholders views, priorities and concerns are expressed fairly, openly and, ideally, in advance of detailed design work.

This appears to have been the case with Shoal Point. The City of Victoria, the developer and other stakeholders worked together for a considerable time and from an early stage. Many of the plans for both site and building development were created by a multi-stakeholder committee.

Ultimately, however, the process broke down when various parties felt they had irreconcilable differences. Whether or not a dispute in this was unavoidable in this case, as Dennis Carlson wonders, we can only speculate. But people will always disagree on how community energy planning-related efforts could or should impact the sustainability of local communities, and sometimes these differences are irreconcilable. Nevertheless, municipalities should undertake every effort to ensure that the *process* of consultation is as fair and transparent as possible, and that the issues at stake are clear to everyone, when a decision is ultimately made. With this in mind, the Canadian Mortgage and Housing Corporation is currently preparing a Sustainable Community Public Participation Manual for just such situations.

Ultimately, public debate is to be welcomed, as it indicates that multiple perspectives *are* being considered, unlike in many situations in the past. But as Shoal Point shows us, even going the extra mile beyond current best practice isn't necessarily enough to head off controversy.

"Shoal Point is an intriguing project when looked at from a series of green issues. It is re-using a site (an old industrial site which required extensive bio-remediation, vacant since 1991) within the fabric of the city and it pays attention to energy efficiency and the quality of the building for the people who will live there."

- Bill Browning, Rocky Mountain Institute (one of the US's leading energy policy think tanks)

"Shoal Point will be part of a new generation of energy-efficient, environmentally responsible buildings that reduce greenhouse gas emissions and contribute to a cleaner environment."

- Honorable Ralph Goodale, Minister of Natural Resources Canada