green from the ground up

A 19-part series on green building from The Tyee Solutions Society

Contributors:
Katie Hyslop
Colleen Kimmett
Justin Langille
Monte Paulsen
Christopher Pollon

Tyee Solutions Society

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Welcome to Green From the Ground Up, a 19-part series from Tyee Solutions Society on sustainable building solutions in B.C. and beyond.

Green from the Ground Up is the result of months of research, interviews and investigation by our team of reporters on the Carbon Shift hub. Their journey took them to all corners of the province, where they spoke to builders, home owners, renters, policy makers and academics alike to get every angle on the past, present and future of green building in Canada. The result? Nineteen stories exploring everything from pre-fab to passive house, affordability verses sustainability and what makes a green house a home.

Tyee Solutions Society is a non-profit based out of Vancouver that produces catalytic journalism in the public interest. Currently, any organization that would like to republish all or part of a Tyee Solutions Series can do so free of charge (with permission). For more information, contact Chris Wood.

All articles in this series first appeared on The Tyee, Tyee Solutions Society's primary media partner. Elements of the series were later re-published in various forms by Regarding Place, Alternatives Journal, Green Real Estate Investing News and others.

This series was made possible through the support of the Vancity/Real Estate Foundation Green Building Grant Program. Support for this project does not necessarily imply endorsement of the findings or contents of these reports.

real estate foundation BRITISH COLUMBIA

Vancity

Contributors

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Colleen Kimmett is an environmental journalist focused on agriculture, energy and green building. She reports on sustainable food systems for the non-profit Tyee Solutions Society and is a contributing editor at The Tyee. Colleen has written about everything from demolition to eating pigeon in various other online and print publications.

Justin Langille is a Vancouver-based photojournalist whose work has been featured in The Tyee, Xtra and Briarpatch. He's always interested in collaborating with writers and contributing to innovative media projects.

Monte Paulsen is a veteran investigative reporter and green building enthusiast based out of Vancouver, B.C. He has written for numerous Canadian publications, including The Tyee, The Globe and Mail, Tyee Solutions Society and The Walrus, where his feature, Far from Home, won a National Magazine Award. Sustainable building is among Monte's current passions. He is a LEED Green Associate who is studying construction technology at BCIT.

Christopher Pollon is a freelance journalist and Tyee Contributing Editor based in Vancouver. He is a regular contributor to the Globe and Mail, BC Business Magazine and Canadian Geographic.

green from the ground up

Reporter's Notes

Building Green From the Ground Up -- One Story at a Time

"We're seeing projects now that will never have an energy bill and water bill, they will never release carbon into the atmosphere."

-- Jason McLennan, founder of the Living Building Challenge

The houses, hospitals, apartment buildings, schools and office towers we build today will all have an impact on our planet for decades to come.

The fact is, we have to start building sustainably now. Green building must become the norm if we are to stop the worst impacts of climate change. With buildings responsible for approximately one-third of greenhouse gas emissions in North America, this is imperative.

In Green From the Ground Up, my reporter colleagues Monte Paulsen, Katie Hyslop and Christopher Pollon, along with photographer Justin Langille and myself, Colleen Kimmett, highlight some of the most innovative and successful examples of green buildings. We explore trends in the next generation of green building and examine the policy measures and market forces that have the potential to turn today's best practices into tomorrow's business as usual.

When reading through the series, be sure to look for two important primers put together by Monte, which will help prep you on industry terminology and standards referenced in the other pieces. How Do They Decide a Building is 'Green'? offers a complete guide to green building certification systems, from LEED (that's Leadership in Energy and Environmental Design) to the Living Building Challenge.

Five Myths About Green Building is a thorough dismantling of some of the most common misconceptions about green buildings; that they cost more, are built from exotic, imported materials, claim exaggerated energy savings or are merely a fad that won't stick around.

After myth-busting, we arrive at the facts: Green building is one of the fastest growing sectors in North America's construction industry, and it doesn't have to come with a million-dollar price tag or lots of complicated technologies. In fact, our research throughout this series shows that some of the greenest buildings are small, simple and affordable.

After all, sustainability is more than just a small carbon footprint. A truly sustainable building takes into account every aspect of its construction and operation, from water use to indoor air quality, improving not just environmental conditions but also social and health conditions for the people inside.

Reporter's Notes

Finding ways to make green affordable was one of our priorities.

In the series, you'll be introduced to the Common Ground co-operative housing project on Lopez Island, in the San Juans, south of Vancouver. Each of the 11 family homes in this co-op cost about $236,000 to build -- total. Each uses 60 per cent less energy and 30 per cent less water than similar buildings.

You'll also be reminded of the Saskatchewan Conservation House, a home built in the 1970s to a standard approaching the modern and internationally-recognized 'PassivHaus.' It was so well constructed that even in the harsh prairie climate it requires just a small hot water heater -- no furnace -- to keep inhabitants warm year round.

And we'll give you a tour (of sorts) of the 'Zigloo Domestique,' a 1,920-square-foot open concept home in Victoria that was framed with eight recycled shipping containers.

"In my mind, a sustainable concept is one that makes use of materials that have already served their purpose," said the Zigloo's designer and owner, Keith Dewey. "Initially, everyone's perception is that steel containers must be cold, cramped and uninviting... that perception dissipates as soon as they step inside."

What all of these green homes have in common is a high-performance envelope: thick-walls insulation, air-tight doors and outlets, and double- or triple-glazed windows. All these features far exceed what's required by the B.C. Building Code, however.

Because building codes apply to all new construction, they have the potential to transform our built environment. In the European Union, which has some of the world's most stringent building codes, pushing the envelope has stimulated a new industry in energy efficiency, fuelling job creation.

"By 2008, there were more jobs in energy-saving technologies and the renewable energy sector than in the whole German automobile industry," said Guido Wimmers, a Dutch architect who now works in Vancouver. "First of all, push the code. Make it more challenging. So that legally allowed 'worst-case' [least efficient but allowable construction] scenario? Just push it a little big higher, raise the bar."

Raising the bar in building can help the economy as well as the planet. In the U.S., grant programs to help citizens undertake efficient upgrades on their existing homes are simulating job creation. And similar efforts are underway in Vancouver.

Our reporting team found some impressive examples of green building projects that harmonize environmental and economic sustainability. Along the way, Monte met Linus Lam, the executive director of Architecture for Humanity Vancouver. The two decided to work together to plan a two-day event called Quick-Homes Superchallenge, a community forum which attracted nearly 100 participants, including City councillors, funders, architects, planners, non-profit housing managers, designers and students. You can find a video of the event here.

Canada has the knowledge and technology to build green now, immediately reaping the

Reporter's Notes

tremendous environmental, economic and social benefits. But while our policies, rules and regulations may need to catch up, so do societal attitudes toward buildings and their legacy for the future.

Luckily some of the most innovative and ambitious green building projects are happening in educational settings. The University of British Columbia's Centre for Interactive Research in Sustainability (CIRS) is a building that actually gives back to the earth by treating its own water and producing more energy than it will consume. It will serve as a kind of living laboratory for research on green building.

When the building opens in the fall of 2011, John Robinson, director of the university's sustainability initiative, says he aims to have its inhabitants sign a sustainability charter, committing themselves to achieving the CIRS goal of benefiting the environment.

"Can we... create a building where people have a sense of place and engagement in their building? With their actual building, and with the spaces where they work?" asked Robinson. "We think the new sustainability agenda is about making peoples lives better, not just the environment's lives better."

Here at Tyee Solutions Society, we couldn't agree more.

Collen Kimmett

green from the ground up

Table of Contents

All stories appear in chronological order as they were published on Tyee Solutions Society's media partner, The Tyee.

green from the ground up

Table of Contents

Tyee Solutions Society

The Green From The Ground Up series is a project of The Tyee Solutions Society, made possible through the support of the Vancity/Real Estate Foundation Green Building Grant Program.

The entire series is available online at:
http://thetyee.ca/Topic/GreenBuilding/

Green and Affordable Homes, Out of the Box

Shipping containers hold the potential to revolutionize urban housing.

By Monte Paulsen

Article first published on April 12, 2010, by TheTyee.ca.

Vancouver boasts both the "Greenest Neighbourhood in the World" -- the LEED certified Olympic Athlete's Village -- as well as the world's first LEED Platinum convention centre.

But the city that calls itself the "Green Capital" has shown surprisingly little interest in a rapidly emerging building technology that promises to become not only far more environmentally friendly but also significantly less expensive than the heavy concrete construction that has reshaped the city's skyline. Indeed, Canada's first modern home built this way stands not in the Terminal City, but across the straight in Victoria.

Over the next few days, The Tyee will report on how intermodal shipping containers -- those 40-foot steel boxes that flow through the region's ports at the rate of more than two million a year -- are being refashioned into affordable green buildings across Europe and Asia.

And on Thursday evening, the Tyee Solutions Society will join with Architecture For Humanity Vancouver and the Design Foundation of British Columbia to kick-off the Quick Homes Superchallenge, a two-part charrette aimed at generating affordable housing concepts for public discussion.

The box that changed the world

The humble steel boxes in which goods are shipped, trained and trucked around the world touched off an economic "revolution," according to Mark Levinson, author of The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger.

ABOVE: City Centre Lofts is slated to become the first mid-rise to be built out of shipping containers in North America. It will be constructed using 50 per cent recycled material. The Salt Lake City building was designed by architect Adam Kalkin. The building's footprint is about the same size as a common 25- by 120-foot Vancouver Lot.

Levinson chronicles the 18 million big steel boxes that make globalization possible, flooding markets with low-cost consumer goods from China, filling cities with cut-rate department stores such as Wal-Mart, and felling wide swaths of the North American manufacturing sector and the high-paying jobs it provided.

"In 1956, the world was full of small manufacturers selling locally," Levinson writes, "by the end of the

twentieth century, purely local markets for goods of any sort were few and far between."

One of the world's first purpose-built intermodal container ships set sail from North Vancouver in November of 1955. The Clifford J. Rodgers carried 600 containers to Skagway, Alaska, where they were loaded on to rail to be carried over the White Pass to the Yukon.

Today, Port Metro Vancouver is Canada's busiest port. More than two million "twenty-foot equivalent units," or TEUs, flow through every year, according to port records. (Containers come in five basic sizes. A standard 20-foot-long by 8-foot-wide container equals one TEU. A 40-foot container is two TEUs.)

The vast majority of containers arriving in Metro ports hail from China, followed by Japan and Korea. And most return to the nations that sent them. But almost 100,000 get left behind each year.

In 2009, for example, records show that a total of 1,122,849 TEUs entered Port Metro Vancouver, while only while 1,029,613 TEUs were shipped outbound. That's a difference of 93,236 containers.

Likewise, in 2008, Metro ports took in 96,509 more TEUs than they sent away.

Those containers don't all pile up in the Lower Mainland. Most leave the region via truck or rail car, and many of those ultimately leave Canada via a border crossing or another seaport. But North America's longstanding imbalance of trade with China and other Asian exporters tends to create a backwash of surplus containers in places Vancouver and other port cities.

Greener than concrete, stronger than wood

Containers are built to stack nine high while carrying 60,000 pounds on a deck that's pitching on the open ocean. They are built to survive decades of service in a marine environment, and, if kept painted, will last indefinitely as part of a building.

"These are just big steel boxes," said Barry Naef, who directs the GreenCube Network and the Intermodal Steel Building Unit (ISBU) Association. Naef noted that these boxes present the opportunity to not merely recycle but creatively reuse what is arguably the most durable waste product of the globalization era. Stranded containers that are not repurposed tend to be melted down. As fuel costs rise, containers on the wrong side of the ocean can become worth more as scrap metal than the cost of shipping them back to China empty.

A typical 40-foot container represents about 8,000 pounds of steel, which can require about 8,000 kilowatt-hours of energy to melt and remanufacture. That's about half of what a typical home uses in a year. As a result, buildings created from used shipping containers function like carbon reduction and long-term storage devices.

At the same time, containers tend to replace concrete in more urban settings, due to the metal boxes' strength and easy stackability. And cement is far from green.

The manufacturing of cement is the largest source of carbon dioxide emissions after fossil fuel consumption, according to U.S. government statistics. A report by the World Business Council found that every ten pounds of cement releases nine pounds of carbon dioxide emission.

But according to Barry Naef, the biggest green advantage of shipping containers may be their strength.

"Their strength allows the structure to provide green roofs, green walls, solar hot water roofs, all without additional supports," Naef said. "It's hard to do these things on a wood-frame structure. "Concrete is great. But when you have to go spend so much to do a green roof, I don't think it winds up getting built."

Construction costs 25 per cent less

In port regions such as Vancouver, end-of-life shipping containers are often sold for as little as $1,500 in the Lower Mainland, while pristine 40-foot "high cubes" -- which feature nine-and-a-half-foot ceilings -- can fetch $4,000. Either way, it's substantially less than the cost of building a similar box out of wood or concrete.

The cost to convert that box to a home varies widely.

Charities providing housing to Maquiladora workers in Mexico are able to convert used shipping containers into simple homes for about $15,000 (excluding land costs). Those homes are small, but they come complete with doors, windows, a full bathroom and kitchen appliances for less money than most Canadians spend on a car.

Companies that provide container-based worker housing to the oil and mining industries sell heavily built pre-fab units for prices that start in the range of $35,000 per container unit. Some of these are heavily insulated for arctic conditions. Others include generators and water-processing plants. (More on these units on Wednesday.)

Custom home builders report saving an average of about 25 per cent against what a comparable home would have cost to build, according to Naef. He said cost savings vary widely according to how many hurdles are thrown up by local zoning and building code officials.

“Local building codes are a real hurdle for some builders,” Naef said.

“We need to do a much better job of educating zoning boards and building inspectors,” he said. “Each building inspector seems to have a different reason why they wouldn’t let someone build with shipping containers. Many objections are based on false assumptions.”

For example, he noted that many local building codes still require studding out all the walls in order to comply with outdated zoning ordinances. “This unnecessary duplication reduces --- but still does not eliminate --- the cost effectiveness of container-based construction,” Naef said.

New built form emerging in Europe and Asia

In dense cities such as Vancouver, however, the greatest cost savings and the most significant green advantages generally come down to the same thing: The less land a home requires, the better.

Containers are built to stack. And it has been through the creative assembly of stacks of containers -- coupled with the innovative ways of opening up the interiors -- that a new built form has begun to emerge in Europe and Asia. Here are a few examples:

Container City is a collection of London-area developments drawing on container techniques perfected by a company called Urban Space Management. The first project was built in East London, in 2001. The Container City projects include offices, retail shops, artists studios, a nursery, a youth centre, and a school as well as housing.

“This modular technology enables construction times and cost to be reduced by up to half that of traditional building techniques while remaining significantly more environmentally friendly,” states Urban Space Management.

Keetwonen is the world’s largest container housing project, as well as one of the simplest. The project is a student village built from 1,050 containers near Amsterdam city center.

Though only 320 square feet, each suite has separate sleeping and living rooms, a full kitchen and bath, large windows and a private balcony. The units are well insulated and served by a central heating system. The complex hosts cafes, shops, art studios and even mini-gyms.

And while some container projects strive to conceal the container’s industrial essence, a Korean project, Platoon Kunsthalle, takes the opposite approach. The Seoul artists centre was created from 28 containers.

Excerpts from the ensuing discussion in The Tyee's comment section:

Contaminants in shipping containers
posted by "gwebster" on April 12, 2010

I have considered using a recycled shipping container to build a laneway house in my backyard, but I wonder about potential contamination issues. Have these containers been sprayed with insecticides or fungicides? What other chemicals might have been used in the goods originally shipped in these containers? I haven't seen any discussion about this yet.

Contaminants
posted by Monte Paulsen on April 12, 2010

Thanks for asking, gwebster. This was one of the interesting minor points that didn't make it into the final draft of this week's series.

Some nations (Australia, for example) require the plywood floors in shipping containers to be treated with pesticides. The idea is to keep pests from migrating in these boxes. As a result, many container floors contain pesticides.

Builders using existing containers resolve this issue in one of three ways: Some remove the old floors entirely; some put a barrier between the old plywood and the new floor; some use newer containers that have only made one or two trips and have never been treated.

invented in Vancouver
posted by "Lloyd Alter" on April 12, 2010

I am so happy that you got it right about the shipping container being invented in Vancouver and NOT by Malcolm Mclean as it says in the Box. Peter Hunter's book "The Magic Box" written in 1993 clearly shows that it was predated.

Haiti
posted by "Don_EC" on April 12, 2010

With so many 'surplus' containers in North America, since the Haiti earth quake, I have been wondering why donated containers -- even without improvements -- might not represent a potentially-more-useful temporary shelter than thousands of tents?

This article suggests more elaborate usage, and this could certainly be considered in the long run. But if you gave me an option of occupying a tent or having a container in which to set up a temporary home, I think I would go for the container. And considering the ingenuity of the Haitians, I expect that in short order, they would have done conversions to make them very habitable.

As well, I expect that they would be fairly earthquake proof, if located on level ground and not stacked.

As always
posted by "zalm" on April 12, 2010

The question is not "what to live in" but "where".

CASE STUDY #1: The Silva

Photo by Justin Langille

The Silva
Central Lonsdale, North Vancouver

Completed: 2005
Use: Condo and Retail
Distinction: Canada's first LEED certified building.

Slashing water use by 43 per cent and energy bills by $16,000 a year, the Silva became the first building in Canada to achieve LEED (Leadership in Environmental and Energy Design) certification when it opened in 2005. Its 67 condominium units and 4,800 square feet of retail space set a precedent for future LEED construction in the region, and served as a case study for Metro Vancouver in how municipal government can encourage green buildings. Developers West Coast Projects Ltd. initially met opposition to the height of their planned tower, but as North Vancouver mayor Darryl Musatto put it: "The thing that got it through was the LEED certification." Along with water and energy savings, the Silva releases 27 per cent less storm water runoff into city drains. More than half the material used in its construction (by value) was sourced in the region. To top it off, VanCity Credit Union offered "green mortgages" that reduced equity requirements for buyers of Silva units. For all that, West Coast estimated the pioneering Silva cost barely 1.7 per cent more than a conventional building.

Is this Canada's Most Affordable Green Home?

How Victoria designer Keith Dewey transformed eight used shipping containers into an airy residence.

By Monte Paulsen

Article first published on April 13, 2010 by TheTyee.ca.

One of Canada's most affordable green homes stands not in the swaggering "Green Capital" of Vancouver, but in B.C.'s actual capital, Victoria.

Designer Keith Dewey built his own home out of eight end-of-life shipping containers. In so doing, he saved five years worth of electricity and spared about 70 trees -- all while cutting the cost of his new home by roughly 28 per cent.

"Initially, everyone's perception is that steel containers must be cold, cramped and uninviting," Dewey said of the reaction to his custom home, pictured in the slide show above. "That perception dissipates as soon as they step inside."

Dewey, who will talk about his home this Thursday night at the Quick Homes Superchallenge, added, "I was trying to create a green house that was well within the realm of feasibility for an average builder. So I didn't get too extreme with anything."

Victoria inspector supported the plan

"The idea of using shipping containers came to my attention back in 2000, when I saw a magazine cover about a project called Future Shack, which was developed in Australia," Dewey told The Tyee. "That really captivated my imagination."

The designer toyed with the concept over the next few years, and, "when the opportunity arose for us to design our own house, it was a natural development of the ideas that I'd conceptualized."

ABOVE: Zigloo Domestique is a custom home in Victoria, B.C. Architect Keith Dewey reused eight 20-foot-long shipping containers to create its frame. Open floor plans such as this can cost less to build using shipping containers than wood or concrete, because long steel beams are included in the price of the used container. Photo courtesy of Keith Dewey

Dewey built the home he calls Zigloo Domestique in 2006. The 1,920-square-foot home is nestled into a small L-shaped lot in the Fernwood neighbourhood. The open-plan home rests on a typical residential foundation.

The City of Victoria's building inspector required Dewey to employ a structural engineer and a building envelope specialist, but otherwise treated the project like any other single-family residential home.

"We found ways to harmonize what is already known about the residential building industry with things that are already known about the shipping container industry," Dewey said of his approach.

For example, he framed two-inch interior walls at

two-foot centres, and sprayed foam insulation into the void.

"It ended up being closer to four inches of foam, because there's a little bit of an air gap between the two-by-two wall and the steel, and then there's the corrugated nature of the steel wall itself," Dewey said. "We got R-28, which is well above the minimum requirement."

He topped the house with a conventional wood-framed roof, and dry walled much of the interior -- leaving strategically placed sections of corrugated steel as accents.

The house carries a traditional mortgage.

"I was able to convince the mortgage and insurance companies of the fact that this is a steel frame building, which just happens to have steel cladding. Once they were able to categorize it that way, then it was not problem," he said.

'A natural resource of consumer society'

"The sustainability issue was important for me. In my mind, a sustainable concept is one that makes use of materials that have already served their purpose. So I went out looking for end-of-life containers... things that were between 12 and 26 years old," Dewey said.

"These shipping containers, of course, we've got them all over the place. In a way they've become a natural resource of consumer society: everything comes to us in this box, but we have no use for the box now," he said.

Dewey bought eight used shipping containers, each measuring 20 feet long by eight feet wide by 8.5 feet high. He paid between $2,000 and $2,400 per container.

"A lot of them had dents and dings. One even had a breach on the side," he said. "By itemizing our inventory, I was able to use those in areas where I would be cutting out portions of the wall."

Thousands of old shipping containers like the ones Dewey bought are melted and recycled into new steel every year due to a variety of economic factors, including ocean-going insurance requirements, the high price paid for scrap metal, and North America's ongoing trade imbalance with Asia.

By reusing -- rather than recycling -- most of the steel in those eight containers, Dewey saved something in the range of 50,000 kilowatt-hours of energy. That's enough hydro to light his home from the day he moved in through sometime next year.

Dewey also saved a small forest. Though Zigloo Domestique makes extensive use of manufactured wood products such as paneling and cabinetry, it employs less raw framing timber than a wood-frame house.

"I figured that I saved 70 trees worth of wood by reusing the containers," Dewey said.

The house has a concrete floor on the main level, which was poured atop a grid of hot water lines that provide radiant heat. The hot water is supplied by an on-demand (tankless) hot water heater.

"It's a very efficiently heated house... by heating the basement and the main floor, the residual heat rises up the stairwell and flows through the remainder of the house," Dewey said.

"It's easy to cool, too. By strategically placing operable windows, we are able to get really nice summer breezes," he added.

A custom home for a spec-house price

"My idea was to design a custom home, using sustainable materials, and do it for the same price they were building spec quality houses out in the low-cost subdivisions," Dewey said.

In Victoria, spec homes run about $150 per square foot, while custom homes average about double that.

In addition to the engineer and envelope specialist, Dewey contracted professionals for all the trade work such as electrical, plumbing, drywall, painting, etc. The only cost he avoided was his own design fee.

"I didn't cash in any favours on this one. I wanted to see what the costs really were," he said.

"As it all turns out, we were able to do it for $180 per square foot," he said.

"I would easily stack this house up against any house out there for $250 per square foot or more. So I'm assuming we saved in the realm of $70 per square foot, mostly as a result of the reuse of these containers."

That works out to a 28 per cent savings, which is consistent with the 25 per cent estimate provided by Barry Naef of the Intermodal Steel Building Unit (ISBU) Association.

Dewey acknowledged that he spent an inordinate amount of time and money working out solutions to specific design problems. The building envelope, for example, required considerable attention.

"When you put two containers together, there is this inevitable quarter-inch gap. So we had to develop a library of little details that could prevent water and drainage," he said.

"I'm sure I will be able to do these things much more efficiently next time."

Public perception remains a challenge

Dewey has several new container-based construction projects in the works. He said they all face the same challenges.

Perception is the first. The most common container buildings are the thousands of workers' camps scattered across the booming Arab states, along with a small number of mining camps in remote locations.

"They look a bit like concentration camps... That does not help overcome the perception problem," he said.

"That's why I think the designer is a really important element. There are lots of engineers and fabricators who can fabricate something low cost, easy to maintain, and durable. But if it's not appealing, if it's not an attractive thing for people to walk by, then it's not going to work in an urban environment."

Unrealistic expectations about cost are the second challenge.

"Nine times out of ten people are wanting something cheaper... People call me and they say, 'Oh, it's a box, and it's cheap,'" he complained.

"There is money to be saved using shipping containers," he said, "but the cost of the house is much more than the cost of the used container."

Dewey does anticipate that once the form becomes more widely accepted, complete homes will be manufactured in low-wage regions and sold worldwide.

"We're not quite there yet, but there is the potential for these homes to become extremely affordable in pre-fab manufacturing," he said.

He designed a pre-fab workers housing complex called Modulute, which would have created 220 small, self-contained suites. Whistler approved the $3 million project a couple years before the recent Winter Games, but the American vendor contracted to prefabricate the containers was unable to secure financing during the 2008 recession.

"It was an easily stackable configure that could have been removed and reinstalled somewhere else," Dewey said. "It's a bit of a shame. It would have been a real nice spotlight project during the Games."

For the time being, he said, the container concept is catching on much more quickly in Europe. He cited Amsterdam's Keetwonen project and London's Container City developments as examples. (See yesterday's slide show for pictures of those projects.)

"I guess there's sort of a conservative mindset in North American culture," Dewey chuckled. "We say, 'I've got to see it to believe it. And I'm not going to look too hard to try to find it.'"

Excerpts from the ensuing discussion in The Tyee's comment section:

just wondering,
posted by "Takuan" on April 13, 2010

how do you fight fires in these?

It's the LAND people
posted by "cocean" on April 13, 2010

There's no shortage of novel ideas for extremely cheap and environmentally-friendly housing. That has never been the problem. The problem is largely municipal laws that restrict the size and type of a shelter, the amount of land to be associated with it and the materials used.

And there isn't so much a shortage of land as a shortage of political will that would free up land for the use of truly affordable housing, shelter that people even in the lowest decile of income could afford.

I have to admit, I like it
posted by "zalm" on April 13, 2010

This is the first article I've seen on this mode of adaptive reuse in building technologies that doesn't pretend to solve the affordability crisis. Land is still $500,000 for a crappy lot in the Big Smoke, and will never be affordable even if you use cardboard boxes for houses. This is the signal failure of the market, and will require other interventions to conquer.

But for adaptive re-use, this is well thought out. For the insurance industry to cover it, it must have passed a number of inspections from proper engineers. And like most steel buildings, you can't cut too big a window into it without compromising the structural strength of the building, so that minimizes the heat loss - I'm surprised with R-28 average in the walls that it would need heating at all. Activities of daily living should keep that place comfortable on all but the below-0 days.

Of course, I'm a bit of a polar bear, as my wife points out....

How about the Eco-Sense project in Victoria?
posted by "dave49" on April 13, 2010

Look up Eco-sense.ca. It is a project of two Victoria residents, Ann and Gord Baird, to demonstrate a sustainable and affordable lifestyle. Their off-grid, seismically reinforced cob home, fully equipped, cost $148.25 per square foot.

They pushed at a lot of policy issues and the latest challenge is the valuation by BCAA and their resulting tax bill. Under present law, they are paying more tax because they are equipped to be energy-independent (off-grid).

Info sheet at -- http://www.islandnet.com/~anngord/downloads/eco-sense-general_info_sheet_feb2010.pdf

To quote Ann and Gord, "If it isn't affordable... it isn't sustainable.

Designers Challenged to Get Creative About Housing Homeless

In April of 2010, readers were encouraged to take part in Architecture For Humanity's 'superchallenge' to find quick, affordable and green housing solutions for the city's growing homeless population.

By Monte Paulsen

Article first published on April 14, 2010 by TheTyee.ca.

"I think we should start from the assumption that what homeless people need is a home, and a meal, and to be treated with dignity and respect."

That's part of the advice that housing manager Janice Abbott will share with architects, designers and planners at tonight's kickoff of the Quick Homes Superchallenge, organized by Architecture For Humanity/ Vancouver.

Abbott, whose firm manages about 20 residential hotels in the Downtown Eastside, will be among more than a dozen experts offering advice to volunteer teams exploring how modular housing might be adapted to provide affordable green housing for Vancouver's growing homeless population. The design charette will consider the potential for housing crafted from reused shipping containers, such the projects described in The Tyee series, Green Homes, Out of The Box.

"Architecture For Humanity believes that adequate shelter is a basic human right, and that housing the least privileged provides an opportunity to demonstrate both creativity and social responsibility," said Linus Lam, who directs the international non-profit organization's Vancouver chapter.

The event begins tonight with a series of 10-minute presentations, and continues on Saturday with the design challenge.

Homeless need respect and security

ABOVE: Shipping containers, used in this MC Quarters project proposal, are one form of modular housing that could provide quick and affordable shelter for people living on the streets.

"I think one of the big flaws in the system right now is that a lot of folks start from the assumption that people who are homeless are profoundly mentally ill, and profoundly addicted," explained Abbott, the CEO of Atira Property Management.

"I'm not saying that those two things aren't true, but I don't think that's where you start from. You start from assuming that people's situations and their mental health is directly related to the fact that they are homeless," she continued.

"You get them into a home. You get them a safe home that's their own, where they are treated with respect by the staff -- and hopefully by their neighbours -- where they feel like they are part of a community,"

Abbott said.

“Once those things are in place, then you’ll know what the extent of their mental illness is, or their addition.”

Abbott, who also directs the Atira Women’s Resource Society also said that appropriate security is required in order for a respectful community to thrive.

THE QUICK HOMES SUPERCHALLENGE
Both events will take place at the InterUrban Gallery at 1 East Hastings St., in the heart of the Downtown Eastside. The Thursday night lectures start at 7 p.m. Admission is free, but due to space concerns the public is asked to RSVP.

“When you move someone in off the street in the Downtown Eastside, you definitely need staff in place to keep the predators out,” Abbott said.

“There are a lot of predators down here. There are drug dealers. There are pimps. There are people who are not vulnerable making profit off people who are vulnerable,” she said.

“These people will come in and take over peoples’ rooms in order to conduct their business. You need staff to make sure those folks don’t come in and take over the facility.”

Inspiration sought

Other speakers on tonight’s roster include Vancouver City Councillor Kerry Jang, Street to Home president Barbara Grantham, container home pioneer Keith Dewey, as well as architects including Michael Geller, Gregory Henriquez and Oliver Lang.

The Quick Homes Superchallenge has been organized by the Architecture For Humanity/Vancouver in association with the Design Foundation of British Columbia, and has been co-sponsored by the Tyee Solutions Society.

“I think the homelessness issue is not something we can simply throw money at even if we have it. It is a complex issue and requires constant effort from professionals, as well as periodic bursts of inspiration from the community,” said organizer Linus Lam.

Excerpts from the ensuing discussion in The Tyee's comment section:

Thank you for excellent series
posted by "cocean" on April 14, 2010

Monte, thank you very much for your great series on truly affordable housing alternatives. Now if only we get could the politicians to support these projects!

And once that's done...
posted by "zalm" on April 14, 2010

how about we find some land that these projects can go on.

Good luck. This is the age-old question that nobody wants to take a stab at answering

housing and automobiles
posted by "carfreecity" on April 15, 2010

Any look at housing, plans etc. must include automobiles.
For decades we have designed our society and housing to accommodate the use of automobiles.
Lots of pavement and land used for roads and parking.
Carfree cities create more caring people and clean healthy environments.
Crime is seriously reduced.
Parking lots are no longer necessary.
Green spaces and housing can easily be planned and built.
Everyone is less stressed.

Dreamers
posted by "alive" on April 15, 2010

OK, it is a nice to dream about how we could live without cars, and there are many benefits for sure.

Unfortunately our country has developed around the personal car, and every neighbourhood is like the next, completely dependant on travel to get to anything.

Now, the cities in Europe was built for pedestrians, the streets are narrow and there are stores on every corner.

But even there, the public fail to use the public transit, the buses go empty so often that schedules are cut.

Yes, maybe we all suffer from a car addiction, but it is real, because in many cases there are no real alternatives, and dreaming is not going to change it.

Thinking that the average Joe is going to walk or bike to Tim Hortons is not realistic.

Personally I dream of the day when the public will use their brains when they vote, and my dream unfortunately is not realistic either.

I'll take the dream over the despair thx
posted by "Chris Keam" on April 15, 2010

"dreaming is not going to change it"

Dreaming is just the beginning. Most everything we've ever achieved began as a dream. I'll bet the Tyee founders had a dream and nothing else, and here we are.

Realisticman:

With regard to Montreal's Bixi program, please refer to my earlier comment about people taking the extreme and using it to apply to all situations. By your reasoning, we'd throw away the road network because it's totally congested twice a day during rush hour and not operating properly.

Homeless Housing for Less

Proposals to build free or low-cost homeless housing said to be 'stalled' by the province.

By Monte Paulsen

Article first published on April 14, 2010 by TheTyee.ca.

Last summer, Vancouver City Council invited several B.C.-based companies to submit ideas about how modular housing might be employed to house the homeless.

Three container-based proposals were among the five submitted. One firm offered to build a 43-suite supportive housing complex at no cost to taxpayers. Another offered to lease dormitory-style rooms for only $350 a month. Yet another offered to build a similar project from scratch using local labour at its Coquitlam factory.

But the Vancouver council's enthusiasm for the project was dampened by a distinct lack of interest from the province. Vancouver councilor Kerry Jang said, "This initiative just sort of stalled at the province."

This installment of The Tyee's overview of container-based housing takes a look at the three proposals.

MC Quarters offered free housing

"Basically, we are asking the city to identify a site where we could do a pilot project. And we will provide the funding to develop that pilot project."

That's the extraordinary offer MC Quarters president Frank Lo told The Tyee that he made to the city.

MC Quarters is a new company that is building prefabricated worker housing in China for export worldwide. It was founded by Lo, a longtime Vancouver resident and former shipping container broker. Lo figures he sold more than a quarter of a million shipping containers before launching MC Quarters.

ABOVE: MC Quarters partnered with Coast Mental Health and architect Gordon MacKenzie to plan the project, which would include 43 small suites, as well as offices, a kitchen, common area, and laundry room. The proposal pegged construction cost at $3.1 million. That's $72,000 per suite. BC Housing is spending in the range of $350,000 per suite on the new homeless housing is its building in Vancouver.

Lo's concept involves adapting technology developed for refrigerated containers -- which are basically one steel box inside another, with foam insulation sandwiched between the walls -- for use as a structure in which super-insulated housing can be built.

MC Quarters sells construction camps to mining and oil companies. His company claims its container-based work camps are both more durable and more easily transported than the wood-frame modular structures sold by competitors such as Atco, Britco or Williams Scotsman. The B.C. company's first order is for a mining camp in the Yukon.

Lo's fledgling company also prepared by far the most detailed of all the container-based homeless housing plans submitted to the city.

MC Quarters hired architect Gordon MacKenzie to plan 43 units of supportive housing in a three-storey structure to be erected on a city-owned parking lot at the southwest corner of Princess Avenue and Powell Street. (See slide show at top of this page.)

In addition to 43 very small but fully self-contained suites, the proposed 13,755-square-foot building would include offices as well as a kitchen, common area and laundry room.

MC Quarters' proposal pegged the construction cost at $3.1 million. That's $72,000 per suite. Lo said he can deliver those units six months from the date he receives an order.

BC Housing recently started construction on six of 14 promised new homeless housing buildings in Vancouver. The suites planned for those mid-rise buildings are almost twice as large as the room-sized units in the MC Quarters proposal. But the BC Housing suites are expected to cost taxpayers more than $350,000 per unit.

About $1.6 million of the projected construction costs for the MC Quarters building is for on-site construction by local trades, with the other half allotted for the purchase of 30 prefabricated container modules. Lo -- who has already hired and architect and built a prototype with his own money -- said he has offered to put up the cost of the containers, and help raise the cost of the local trade work.

"This is basically a semi-commercial project as far as we're concerned," Lo said. "We want to do something for the community."

C-Bourne offered to lease rooms for $350 a month

Vancouver-based C-Bourne Structures is among MC Quarters' competitors.

Though C-Bourne's container housing proposal was neither as elaborate nor ultimately as generous as MC Quarters', it did include one particularly intriguing element: C-Bourne offered to lease the city however many units it needs for $350 per month per unit.

"We lease these units all over the world," said C-Bourne partner Grant Powell, who joked that mining juniors "never actually buy anything."

C-Bourne is the Canadian distributor for Isopod modular housing. Isopod is a Canadian-owned company that has built thousands of units of container housing in places as far flung as Afghanistan, Dubai, Russia and Saudi Arabia. Isopod owns one-third interest in a proprietary factory near Shanghai.

C-Bourne submitted a conceptual proposal for dormitory-style housing that could be quickly erected on any city-owned lot, and then just as quickly disassembled when the real estate was needed for some other purpose.

"I basically said to the city, 'Tell us what type of units you want, how many you need, and where you want to put them. We'll engage engineers and architects and bring you a proposal,'" Powell told The Tyee.

Powell offered to lease the city as many dormitory-style rooms -- with a shared bathroom down the hall -- as the city wanted for $350 a month per room. That's $25 less than the $375-a-month housing allowance the province provides welfare recipients.

After seven years, the city would be eligible to buy the rooms for $10 each.

"These units are virtually indestructible. There's no drywall to mildew or wood to rot," Powell said. "If the city didn't want to keep them, we would happily take them back."

C-Bourne is also working with developers in Saskatchewan who hope to erect pre-fabricated apartment buildings in communities near the tar sands.

"It's nuts out there," Powell said. "Some of those towns are facing an even worse housing shortage than Vancouver."

Plans for the prairie apartment buildings call for sprawling three-story walkups surrounded by parking

lots. Most of the apartments would be 480-square-foot bachelor suites with full kitchens, bathrooms, Murphy beds and in-suite laundry facilities. Each 20- by 24-foot unit would feature a large glass wall overlooking a 20-foot-long balcony. (See a plan in the slide show at top of this page.)

Powell said C-Bourne can deliver and construct these instant apartment buildings in six months or less at a cost of about $100 per square foot (excluding land). He said the developer aims to rent these apartments for between $550 and $700 a month.

"We can do two-bedrooms, three-bedrooms, anything," Powell said. "This is just the tip of the iceberg."

Mogil offered to build in Coquitlam

While less detailed than either of its competitors, the third proposal offered the prospect of bolstering the B.C. economy by building its entire complex in Coquitlam.

Mogil Modular Structures was founded by Phil Wang and is run by his son Nam Wang. The family is from Korea, where shipping containers are more frequently used as offices and small shops.

"Japan manufactured shipping containers to start off. But the cost was just too high, so it shifted to Korea," the younger Wang noted. "Then the same cycle happened again, and the production shifted to China."

Mogil builds 10-foot-wide containers that better lend themselves for use as construction components. Because Mogil is focused on the North American market, its super-sized containers do not have to fit on container ships.

"That extra two feet makes a lot of difference," Wang said. "Shipping containers are nice. But the width is eight foot. It's just too narrow. By the time you do the walls, you put in a desk, and all you have is a little space as a corridor."

Mogil invested in all the tooling to make shipping containers from scratch, including massive metal-bending machines, precision plasma-cutting tables and a giant painting booth.

"We are pretty much self-contained," Wang said. "We bring in raw materials. We stamp, we bend, we produce our own components. We don't source out any work."

Mogil's camp business has slowed down considerably during the past couple years. "We had a good deal with the oilfields," Wang said, "but when that slowed down there just weren't any more orders."

So the family leapt at Vancouver's invitation to propose homeless housing. Mogil built a table-sized mockup intended to show off both its design and its local fabrication abilities.

"We built this miniature model just to show that we were really into it 100 per cent," Wang said. "We think these structures are ideal for housing. We would very much like to find a way to build some housing."

New vs. used containers

All three firms told The Tyee that the benefits of purpose-build containers outweigh the advantages of reusing end-of-life shipping containers.

"I am biased against used containers," said Lo. "I was in the shipping business. These containers go all over the world. You don't know what kind of freight they carry. And then you expect people to live in them?"

Lo added that new containers come from the factory with certificates that civil engineers can use to assess the load-bearing ability of the steel frame.

"You can't even tell them what kind of steel an old container was made of," Lo said. "If you have volume, your price difference on a per-unit basis is not large."

Nam Wang agreed. He said that even without the volume discounts available to larger firms, the cost of cutting, re-flooring and repainting a used container can wind up costing as much a new container.

"It's like you converting your hatchback into a pick-up," Wang said. "A lot more effort is going to go into it to convert it, and it's not really made for that."

Both the MC Quarters and C-Bourne units come fitted out with fixtures that would seem familiar to any North American.

"Remember that nearly everything we install in our homes is already made in China," Powell observed. He said C-Bourne installs the same American Standard sinks and Bosch appliances available at the local Home Depot or Future Shop.

Powell added that the next generation of urban apartment buildings could just as easily include larger windows, LED lighting, bamboo floors, solar hot water heating or other green features.

'We are still doing this'

Another thing all three firms agreed upon was a sense of confusion about whether or not either the city or province will ever follow up on their proposals.

"Several months went by. We heard nothing. And then one day I got a call saying, 'You've got to come pick up your stuff.'" Powell said.

In response to his questions, Powell said the city told him only that, "BC Housing was not going to give them any money for this."

Wang recounted a similar experience.

"The whole idea with this was that we were going to give them a sweet deal so that we could help promote our product, right?" Powell said. "But if they don't see it, they don't see it."

City Councilor Kerry Jang, whose Vision Vancouver party has promised to end street homelessness by 2015, acknowledged that the process was dropped.

"We welcomed these proposals in order to raise awareness about this type of housing," Jang told The Tyee. "And then we referred them to BC Housing for consideration, because at the end of the day it's BC Housing that has to decide whether or not these units would fit their needs," Jang added.

"Nothing came of it after that. It just sort of stalled in provincial hands," he said.

On his own initiative, Lo recently met with Housing Minister Rich Coleman.

"It's a chicken and egg situation," Lo said. The city won't grant a site without some signal that the province will help fund the support services. And the province won't commit to a project that doesn't have a site.

Lo said he is neither discouraged nor dissuaded.

"We are still doing this. I think the key is to have patience. Because the whole idea is for the community to benefit." Lo said. "I believe that it will work."

Excerpts from the ensuing discussion in The Tyee's comment section:

is it best to keep the
posted by "frank2" on April 14, 2010

is it best to keep the homeless housed on the streets and in shelters -- rather than allowing some to try affordable full-time accommodations? Why not try some new options? We might learn something. Maybe even find low cost ways of dealing with the problem.

Great idea!
posted by "greengreen" on April 14, 2010

I think this is fantastic! I would live in any of the structures shown. Really, we have people living on the streets because the city and province can't coordinate, get their shit together, and solve the problem! How absolutely pathetic! When the roof on BC Place got a slight tear last year, It took no time at all to come up with a solution. Cost was no problem. When Falcon couldn't get a taxi, f---, there was a bill of rights for passengers-problem solved immediately.

The homeless problem has been going on for at least 15 years and will be with us for the forseeable future. These accounts have shown a very workable, affordable solution. Stop the bulllshit-get on with it.

Empowering People
posted by "jim1966" on April 18, 2010

I don't think that the BC Liberals are listening. How come our society values $350.00 per month instead of the value of everyone's lives?. I live in a BC Housing building. I am lucky because I had a social worker who gave a crap and a doctor that did not want me to die on the streets. There are always 2 sides to an issue and this is one of them. We all want people to be safe, fed and have a quality of life that Canadians have come to enjoy. Problem is though is our "view" of the poor, the addicted and the mentally ill. How can we build or refurbish anything when the taxpayer knows that within a few short years it all be trashed or wrecked anyways. I had to prove that I was worth the effort and take some responsibility for my own life. Then I got help. More importantly people have got to want to change and that is not always that easy to do. The second part of this is our current government. I have been saying this for a very long time and that's British Columbia's Social Services are not able to handle the real human deficit.If it could we would have a system in place that really works 99% of the time. Because of my disability I was lucky enough to get PWD and CPPD . I am one of those people who our society considers "The Deserving Poor", as opposed to the "Undeserving Poor", this is how our safety net really works, hence the various catagories from social services, IE: Expected To Work, $610.00, PPMB (Or Level 1) $667.00 and PWD $906.00 per month. These are the real numbers for a month. I would like to see this entire ministry do a complete overhaul of it's own policies etc. I can also tell you this, I will not be voting for the BC Liberals in the next election. In my case a graduated program worked really well. Could we not try this out in the future. We would have a much much smaller homeless population and a lot of people could take there own lives back?

Five Myths About Green Building

Green doesn't have to mean expensive, exotic or uncomfortable.

By Monte Paulsen

Article first published on January 6, 2011 by TheTyee.ca.

Green buildings have earned a reputation for being large, complicated and absurdly expensive. This is particularly true in Vancouver, where taxpayers are still forking out millions of dollars a month in interest payments on the world's first LEED Platinum neighbourhood -- the 2010 Olympic Village.

But this reputation is increasingly at odds with the next-generation of green homes, schools and workplaces. These green buildings -- most of which are certified by organizations such as the Canada Green Building Council or Built Green -- tend to be small, simple, and surprisingly affordable.

What's more, these green buildings represent the fastest growing sector within the North American construction industry, one that McGraw-Hill Construction estimated to be worth $60 billion last year.

During the next several weeks, The Tyee Solutions Society will explore trends within green building -- call it Green Building 2.0 -- with an eye for ideas that could pay off by helping create sustainable jobs in British Columbia, lower energy bills and make a real dent in emissions causing costly climate change.

Today: A look at five common misperceptions about green building.

Myth #1: Green buildings cost more.

It's easy to see what spawned this idea.

The Vancouver Convention and Exhibition Centre

ABOVE: Vancouver Convention and Exhibition Centre: Giving green an expensive name.

(pictured below) is the world's first LEED Platinum conference hall. It boasts an artificial reef as well as a five-acre living roof. And it cost B.C. taxpayers more than double the promised price.

Likewise, the Olympic Village and Southeast False Creek neighbourhood were also awarded Platinum status by the Canada Green Building Council's LEED (Leadership in Energy and Environmental Design) program. The 32 hectare reclaimed industrial site features an innovative district heating system as well as one of Canada's first net zero buildings (designed to produce as much energy as it consumes). But the project bankrupted its developer and left Vancouver taxpayers on the hook for hundreds of millions of dollars.

These high-profile megaprojects appear to confirm the widely held opinion that green design costs more. Indeed, respondents to a survey by the World Business

Council for Sustainable Development were found to believe that green buildings cost an average of 17 per cent more than conventional buildings.

But there's another question to be asked: Did Vancouver's signature green projects run over budget because of sustainable design? Or did costs skyrocket because these megaprojects were spec'd by ambitious politicians, built by loosely supervised public-private partnerships and rushed to completion at the peak of a record-smashing real estate bubble?

There's evidence that green design does not influence construction cost. A study that compared 221 new buildings found no difference in cost between 83 LEED buildings and 138 similar conventional buildings.

"There is no significant difference in average costs for green buildings as compared to non-green buildings," concluded Davis Langdon, the firm that conducted the 2006 study, Cost of Green Revisited.

The Davis Langdon study compared LEED libraries to non-LEED libraries, LEED community centres to non-LEED community centres, LEED laboratories to non-LEED laboratories, and so forth. The study found "no significant statistical difference" between the average costs per square foot for LEED versus conventional buildings.

Developers who persist in thinking about green building the same way they think about Sub Zero kitchens -- as something to be "added" on to a conventionally designed building -- will incur higher costs, the study warned.

"We continue to see project teams conceiving of sustainable design as a separate feature. This leads to the notion that green design is something that gets added to a project -- therefore they must add cost," the Davis Langdon study concluded. "Until design teams understand that green design is not additive, it will be difficult to overcome the notion that green design costs more."

Myth #2: Green building materials must be imported.

This notion appears to combine the misunderstanding that green design is an additive feature with the misimpression that the preferred additions include elements such as European plumbing, exotic plants and tropical materials such as cork or bamboo.

The truth is that none of the major green building certification systems require exotic materials, and several actively discourage the use of such products.

Granted, as recently as a decade ago, it was still difficult to obtain green fixtures such as efficient lights or low-flow toilets. But that's no longer the case. High-efficiency fixtures of all types are now available at competitive prices in nearly every hardware store in North America.

Likewise, some first generation green roofs did experiment with exotic plants. But LEED and other certification systems now reward the selection of native and locally adapted plants, as well as the use of building products manufactured within 500 miles of the construction site.

Where forest products must be shipped from afar, most green building certification systems reward the use of wood that is grown and harvested in certified forests. These policies create a competitive advantage for Canadian wood products because Canada boasts more hectares of certified forest than any other nation.

Myth #3: Green buildings' energy savings are more hype than reality.

Buildings account for up to half of energy use and consume up to 72 per cent of electricity, according to statistics compiled by the U.S. Energy Information Administration.

Reducing the amount of energy used in buildings is widely regarded as the cheapest and easiest way to lower dependency on fossil fuels and reduce emissions of associated greenhouse gasses. (Green building may also be among the few carbon reduction strategies that create jobs in both the short and long terms.)

But misperceptions and misleading claims about green building have left many with the impression that green buildings are not energy efficient.

Since the 1970s, many green technology promoters installed expensive solar photovoltaic arrays or geothermal heat pumps on existing buildings as a way of demonstrating their products. In so doing, they created facilities that generate carbon-free power, then squander that energy in drafty and poorly insulated buildings. Such kluge-like constructions are the antithesis of green design, but it's understandable that passersby could confuse them for green buildings.

Likewise, the prototypical Vancouver condo building -- towers of (poorly insulated) glass separated by (heat radiating) concrete balconies -- provides about a tenth of the insulation value that a wood-frame home does. Yet, through the addition of a few energy efficient appliances, unscrupulous (or merely ignorant) marketers have succeeded in labeling condo towers as "green" buildings.

The truth is that mainstream green building certification systems such as LEED, Built Green Canada, and Green Globes all reward strategies that lower energy demand, while next-generation standards such as Passivhaus and Living Buildings are whittling building energy use very close to zero.

Research has confirmed that certified green buildings save energy and money. A study by the New Buildings Institute found energy use in green buildings to be 24 per cent lower than in conventional buildings. And a survey by the US General Services Administration found that the first dozen LEED buildings in its portfolio consumed 26 per cent less energy and produced 33 per cent lower carbon dioxide emissions than comparable government-owned buildings.

Myth #4: Green buildings are less comfortable.

This idea may be rooted in a Victorian perception of "comfort," which cherishes plush drapes and thick carpets and lavish wallcoverings.

The Victorian approach to interior decorating made good sense in an era when homes were exceedingly drafty and everything was made from natural materials.

But buildings changed. By the 1970s, curtain walls had led to office buildings with controlled ventilation. And by the 1990s, better quality windows and doors had made many homes relatively air-tight.

So did furnishings. By the late 20th century, the use of toxic chemicals had become commonplace in the manufacture of paint, carpet and furniture. Many of those chemicals, such as formaldehyde and vinyl, continue off-gassing for years. For a time, consumers were persuaded that the resulting "new car smell" was a benefit. But as buildings became tighter, people started to get sick.

Studies by the U.S. Environmental Protection Agency found that, on average, Americans spend 90 per cent of their time indoors, where they are exposed to concentrations of chemical pollutants that are 100 times greater than outdoors.

Green design aims to improve indoor air quality by eliminating toxic building materials. Many first-generation green buildings eliminated carpet and drapes altogether. These were replaced with nontoxic -- but hard -- surfaces such as wood or concrete. Some people found the hard surfaces within these first-generation green structures to be cold, uninviting and acoustically annoying.

In the past decade, the supply of non-toxic finishings and furnishings has caught up with the demands of air-tight green buildings. Nontoxic paints and carpets are now commonplace. And the choice of interior finishings is once again a matter of taste rather than toxicity.

Myth #5: Green building is a fad.

As was the case with the previous myths, past is prologue.

Alternative building exploded in the 1970s. Backyard inventors pioneered ideas about solar design and natural material selection that have evolved into today's green building standards. But an awful lot of those do-it-yourself homes were, in a word, awful. A few buildings survived, but the movement did not.

Having watched that fad come and go, construction industry veterans should be forgiven for believing that this green building boom will do the same. Many are quick to point out that few of those early alternative

buildings held value relative to conventional properties.

But there is evidence that in addition to spawning a $60 billion-a-year industry, this generation of certified green buildings is fetching a premium in the marketplace.

A University of California study compared the rents at 694 certified green office buildings with 7,489 conventional office buildings. All of the comparison properties were located within a quarter mile of the green building.

The study found that, on average, certified green building rent for two per cent more than comparable buildings. After adjusting for factors including age and occupancy levels, the University of California researchers figured that green certification added an average of $5 million to the market value of each green office building.

Excerpts from the ensuing discussion in The Tyee's comment section:

Industial practices in materials production.
posted by "Chernoe Znamia" on January 10, 2011

First, thanx for the great article. It has been many years of greenwash in the building trades, focusing on energy savings rather than curing the sickness of industrial production and shipping of green, or any other building materials that we use to build with...

...Every community in B.C is surrounded by wood, stone, clay, almost everything needed to build with local materials. I think its a mistake to to try to build green like the rest of the world. A world lacking the abundance of NATURAL resources that B.C enjoys. Wood is the obvious answer and if it is kept dry and out of the sun will last indefinitely.

Here in B.C the option to step away from the industrialization of the planet and embrace from harvest to installation without industrial practice. We can be industrious without industry.and bring back skills instead of division of labour and assembly line hell.

future topic
posted by "icare_dou" on January 10, 2011

I'd love to see more coverage on the negative impact on indoor air quality in green and energy efficent homes. During the first energy crisis we sealed up commercial buildings and people got sick. We subsequently required commercial buildings to have fresh air ventilation. We are still in the phase of sealing up homes without requiring adequate fresh air. Researchers have already documented that 'green' or energy efficent homes have higher concentrations of pollutants than traditional homes built at the same time.

As a residential builder
posted by "cynic" on January 10, 2011

As a residential builder, I like to stay abreast of the latest building science and I feel fairly well-versed. I can think of a point or two that are worth keeping in mind.

First, the greenest thing you can do is not build. Construction materials contain so much embodied energy that the green choice is to buy an existing building and renovate. Obviously there are many considerations in that scenario.

That said, over the life of a building, heating is by far the largest cost. The two main factors for achieving a low energy use home are good insulation and a properly detailed air barrier.

I think that achieving a green certification like R2000 or LEED can be too costly for individuals and might even be unnecessary. We're lucky here in our marine coastal area where temperature and humidity fluctuations are relatively flat. Imo, (and starting with a waterproof envelope), good insulation, a meticulously detailed air barrier, and a heating system that mechanically controls air changes will produce a comfortable, energy efficient home without costing the earth.

Right on Chernoe Znamia!
posted by "Stayweird" on January 10, 2011

What a clear statement of a building ethic I have tried to live out in the real world, mostly in isolation. I was fortunate to aquire raw land in a district without an enforced building code. It seems to me no real change can happen without radical land reform. Is it not a human right to occupy some small piece of the planet we were born on without huge mortgages or rent to a landlord? Owner built housing is a luxury very few can achieve. The average logging slash pile contains enough materials to build a small home and heat it for two winters(I've done it). Our greatest resource here is land and no way to occupy it without oppression.

CASE STUDY #2: The Brook

Photo by Justin Langille

The Brook
Delbrook, North Vancouver

Completed: 2009
Use: Residential
Distinction: Certified LEED Platinum, the highest available rating.

Features like geothermal technology for heating and cooling and a solar thermal system for hot water helped The Brook secure a LEED platinum certification, the highest available, when it opened in 2009. A unique water recycling system (groundwater from the geothermal system is re-used to flush toilets, do laundry and wash cars) means The Brook uses 83 per cent less municipal water than conventional buildings. Its developer, Streamline Properties, used its ground-breaking design elements to raise initial investment from the green-focused Evolution Fund, among others, before seeking bank financing. According to Streamline's Jeff Wiegel, The Brook cost about six per cent more to erect than a conventional build, but is saving 67 per cent of an ordinary building's energy costs.

Green Homes For Less

Three affordable homes that could change that way you think about green building.

By Monte Paulsen

Article first published on January 7, 2011 by TheTyee.ca.

In New Orleans, on the very spot where Hurricane Katrina breached a levee, more than 50 LEED Platinum homes have been built for an average cost of about $150,000 each.

In Philadelphia, on an inner-city infill site deemed worthless by mainstream developers, a two-storey LEED Platinum home has been built for only $100,000.

And on Lopez Island, just east of Victoria, B.C., a group of families have built their own net-zero homes for a net cost of just $112,000 apiece.

While megaprojects such as the Olympic Village helped introduce green building to the public, small homes like these may come to define green building in the next decade.

In New Orleans, a green neighbourhood rises

Hurricanes Katrina and Rita destroyed more than 350,000 homes. Another 146,000 suffered major damage. Five years later, much of New Orleans remains a ghost town.

The Make It Right foundation was created to help rebuild a 16-block area within the city's Lower Ninth Ward. Its founder, actor Brad Pitt, sought not only to rebuild one of New Orleans poorest districts but to transform it into a neighbourhood of green homes that cost less to operate, provide better indoor air quality, and are built to survive the next hurricane.

Make It Right has built 50 LEED Platinum homes

housing 179 people. A hundred more homes are under construction.

Property owners are able to choose from more than a dozen green home designs. Some of the designs incorporate elements of the neighbourhood's architecturally distinct "steamboat houses." Others are distinctly modern.

The first 50 homes cost about $150,000 each to build. Make It Right hopes to build the next group for even less.

Though inexpensive, these homes aren't cheap. The list of features is impressive. Metal roofs absorb less heat and reduce the need for air conditioning. Photovoltaic panels, tankless water heaters and Energy Star appliances slash monthly power bills. Bluwood framing, spray foam insulation and mold-resistant

drywall reduce moisture problems. Zero-VOC paint, formaldehyde-free cabinets and green carpet improve indoor air quality.

And the Make It Right homes -- the first of which was built on the very spot where the Industrial Canal levee breached on Aug. 29, 2005 -- are designed to withstand the next hurricane.

They are built with advanced framing techniques designed to withstand winds of more than 130 miles per hour. They are elevated beyond U.S. government requirements to ensure they will stand above the next flood. They are landscaped with pervious concrete sidewalks and driveways that allow stormwater to drain freely. And they include roof hatches, just in case.

The new houses have been estimated to be 10 times more sustainable than the homes they replace. And the Lower Ninth Ward now boasts the largest community of LEED Platinum homes in the world.

In Philadelphia, a LEED home for $100K

Proof that one does not need to build 50 homes at a time in order to lower the cost of building green is provided by Philadelphia developer Postgreen, which built a 1,150 square foot LEED Platinum row house for a construction cost of only $100,000.

“The 100K House was conceived as an attempt to prove that green construction can be affordable if properly designed and executed,” said Postgreen president Chad Ludeman.

The two-storey row house demonstrates how the modern construction methods (such as structural insulated panels) can update a familiar urban floor plan: two bedrooms separated by a bathroom upstairs, a living room and kitchen downstairs.

The 100K house’s roof uses solar energy to heat the house’s hot water, and collects rainwater for use in the garden. Its walls are constructed from prefabricated panels of rigid foam insulation sandwiched between sheets of oriented strand board (called “SIPs”) and fitted with high-performance casement windows to create a tightly sealed envelope.

The home is cooled through a ductless (mini-split) air conditioner, heated via a radiant in-floor system, and tempered year-round with a small energy recovery ventilator. The interior features low- or no-VOC finishes, while the small yard is landscaped with drought-tolerant plants and 100 per cent permeable walkways.

In addition to being certified LEED Platinum, the 100K House won a LEED for Homes Project of the Year award from the U.S. Green Building Council.

“Wherever possible we reduced complexity and finish level until we had a very clean, modern, simple home. Then we focused on those areas of green building where we saw the most value... location, site and energy efficiency,” Postgreen wrote in accepting the award.

Postgreen’s post-100K experience also proves there’s money to be made in small green homes. The company sold the 100K House for more than twice what it cost to build, and is now developing a Passivhaus and other projects in the Fishtown, Kensington and Northern Liberties neighborhoods of Philadelphia.

On Lopez Island, a net zero co-op

By pooling their resources and providing much of their own labour, a group of Washington State families have succeeded in building 11 net-zero homes for a net cost of just $112,000 apiece.

Lopez Island lies due east of Victoria, B.C., in what the Americans call the San Juan Islands. As is the case on the Canadian Gulf Islands such as Mayne or Salt Spring, home prices in the San Juans have spiraled beyond reach of working families. According to a government report, “Working people and people who grew up in the islands have a hard time finding permanent housing in the county at prices local wages can support.”

The Lopez Community Land Trust was created to address this problem. And Common Ground, a cooperative project of 11 family homes, is Lopez’ newest development.

The project has functioned like a green building workshop since its inception. Residents were involved

in the design and construction, and remain responsible for efforts to maximize ongoing performance. Dozens of volunteers, professionals and interns also participated.

Though the site is only seven-tenths of an acre, the project's design takes advantage of its strengths. These include solar gain for heating water, prevailing winds for ventilation, rain fall to offset potable water demand, and a climate suitable for gardening. Passive design strategies enable the project to minimize heating and cooling demand.

Lopez Common Ground uses 60 per cent less energy and 30 per cent less water than similar buildings. A solar photovoltaic system -- funded through a grant and a rebate program provided by the utility -- provides much of what power is required.

The total price per unit (including land, construction and soft costs) was $236,000. But after deducting grants and incentives such as those for the solar power panels, the net cost per household came to about $112,000 -- plus a lot of labour.

The Lopez homes were designed to produce as much energy as they consume, and data collected in the past year show that several have achieved net zero energy consumption.

Though the Common Ground project did not pursue any certification, the cooperative used the LEED for Homes, Built Green, and Energy Star programs as guidelines.

And last fall, the Home Depot Foundation awarded Common Ground its Award of Excellence for Affordable Housing Built Responsibly. The award came with $75,000 to help the Lopez Community Land Trust get started on its next project.

'Polishing the turd'

Consider what these three projects have in common with one another, as well as how they differ from the sea of (unsold) new housing built in the past few years.

Here's what you'll find in each of these affordable green homes: A high-performance building envelope. Each of these homes have walls that are almost twice the thickness of the minimum that code requires. Each of those walls contain high-performance insulation. (None of these builders use fiberglass batts.) The doors and windows in each of these homes are not only double-glazed but also tightly sealed. And each of the gaps between doors, windows, junction boxes and the high-performance walls are foamed, taped or otherwise sealed to prevent air leakage.

Here's what you won't find in any of these homes: Italian marble countertops, European faucets or Sub-Zero kitchen appliances.

In other words, these builders invested in the parts of a house that last for 100 years or more, rather than squandering money on fixtures that are typically replaced every 10 to 20 years.

Postgreen partner Nic Darling put it this way:

"Why do production home builders and established developers, people who have been building homes for many years, have to spend 15 per cent more to get to LEED Platinum while us rookies are getting there at a discount?" Darling asked.

"Most of the builders and developers reporting high premiums for pursuing LEED are still trying to build the exact same home they have always built. They are simply adding features to make that same house energy efficient, healthy and sustainable," Darling continued.

"So, they polish the turd. Rather than redesign the house that has been successful for them in the past, they add solar panels, geothermal systems, high-end interior fixtures, extra insulation and other green features. The house gets greener. It gets certified, but it also increases significantly in cost. Since the features are add-ons and extras, the price rises as each one is tacked on."

Excerpts from the ensuing discussion in The Tyee's comment section:

Neighbourhoods won't accept 'polished turds'
posted by "Tommy Boy" on January 10, 2011

Good stuff, Monte. It's not a matter of if, but when this type of housing will be the norm. I'm impressed by the cost savings in construction. These type of homes are ideal for our relatively moderate climate, and the Philadelphia model shows that they are also practical and viable in the the harsher climes as well.

However, land prices in New Orleans and Philadelphia are not though the roof. As well, most Lower Mainland neighborhoods would not accept a polished turd, a golden turd or a titanium one. The rallying cry is that we must preserve the 'character' of the neighborhood (a character that most of them had nothing to do with creating). If NIMBY attitudes and neighborhood vehemence against any change persists, you won't be able to build a bird house, never mind having a sustainable society. People who live in towers against people living in more towers. What a world! Looking forward to the series and hope more young folks read it.

Wood frame construction
posted by "mcik prince" on January 11, 2011

I believe the use of more wood within the construction of new homes and commercial buildings will reduce the amount of gravel.
This would also reduce the massive use of cement that tilt up buildings use and save our environment from the gravel producers.

Photovoltaic panels?
posted by "Sask Resident" on January 11, 2011

Except for the inclusion of the uneconomic photovoltaic panels, most of these building make a lot a sense. The knock against fibreglass was unwarranted since the life cycle of fibreglass is well known while the blown foam is still relatively new. The keys to any building is, in order of priority, the foundation, the building structure, the envelope then the basic hard wear (the electrical wiring, the water and sewer piping, any heating system),then everything else. I liked the focus on not spending lots on short-term fixtures and more on the building itself.

The cheapest energy?
posted by "Countrytype" on January 12, 2011

Is the energy that isn't used. Passivhaus is the way to go. Biogas from humanure is another engineering frontier that has been crossed in Asia but not in Canada yet. But, can we afford to ignore one of our only growing and free resources?

Great to read about the green and affordable
posted by "Countrytype" on January 12, 2011

My folks built a passive solar and wood furnace house in Ontario at the end of the 1970s alt building boom. We were squarely in the centre or slightly lower of the middle class, without inheritances, and with one 9-5 breadearner and one housewife. Labour costs were kept down by my dad and friends supplying much of the labour of framing, laying floors, drywalling, and such on weekends and in summer, and by hiring student labourers.

Thick walls and ceilings, and thermally broken windows, doors and foundation were the secret to holding indoor temperatures at comfortable levels. Large windows were a big cost, but in winter let in heat, while in summer they let in breezes. Overhangs provided shade and cooling in summer, and protection from rain on the walls in winter. A lot of wood was used in siding, as it was more insulating than vinyl. The house I live in in Vancouver now has such thin and poorly insulated walls that they feel chilly even when the furnace has been on for an hour.

With a little design help (to avoid the awkward look of my parents home), the energy savings available to dwellers in better insulated buildings would be very attractive. No sick home there, it was not an office building or full of foams and glues.

How Do They Decide a Building is 'Green'?

The Tyee Guide to green building certification systems in Canada.

By Monte Paulsen

Article first published on April 14, 2010 by TheTyee.ca.

LEED. Built Green. BOMA BESt. Green Globes. Passivhaus. Living Building. Got it?

Of course not. No worries, though. You've found The Tyee Guide to green building certification systems in Canada. Give us 10 minutes, and we'll teach you enough about green building certification to fake your way through a cocktail party with the arrogant architect of your choosing.

Leadership in Energy and Environmental Design

LEED, as this mouthful of awkward acronym is more easily described, is the leading green building rating system in the U.S. and Canada. There are now more than 32,000 projects registered in the LEED program, plus 7,748 projects already certified.

The LEED standard is set -- and repeatedly rewritten -- by the non-profit U.S. Green Building Council, and administered by the Green Building Certification Institute.

The Canada Green Building Council is one of 16 international green building councils that maintain a mirror-like standard that preserves the structure and intents of the American version, while adapting minor details for domestic conditions and building codes. Through such affiliations, LEED is now in more than 90 countries.

The U.S. Green Building Council (USGBC) and its many sisters are on a mission to change the (built) world. Setting green building standards is only the beginning of an agenda that includes rewriting building

codes, transforming the marketplace and educating the public. The USGBC warns that buildings are responsible for 39 per cent of American CO2 emissions, and promises that a commitment to green building can meet 85 per cent of that nation's future demand for energy while generating 2.5 million new jobs.

LEED was drafted through a consensus-based process in the late 1990s, and the first rating tool, LEED for New Construction, was launched in 2000. The LEED standards are continually revised by a sprawling network of committees.

There are now six LEED Canada rating systems, including LEED for Commercial Interiors, LEED for Core and Shell, LEED for Existing Buildings, LEED for Homes and LEED for Neighbourhood Developments.

All LEED certification systems are structured around

six core categories: sustainable sites (using urban brownfields good, ripping up prime farmland bad), water efficiency (both indoor and landscaping), energy and atmosphere (extra points for reducing carbon emissions) materials and resources (the 500 Mile Diet), indoor environmental quality (no New Car Smell) and innovation in design.

LEED rating systems are points-based. A candidate project must meet a slate of minimum standards in order to be eligible. Once those prerequisites are met, candidate projects earn points by documenting that they have met or exceeded additional green building criteria. Projects that earn 40 per cent or more of available points are deemed LEED Certified. Projects that get 50 per cent earn LEED Silver rating, 60 per cent earn LEED Gold, and 80 per cent earn LEED Platinum.

Such a multifaceted rating system is neither simple nor inexpensive to administer. In order to make it work, the Green Building Certification Institute has certified more than 157,000 professionals to navigate the LEED maze. (About 10,000 of whom are in Canada.) The USGBC also offers training at its annual Greenbuild conference. (The next is in Toronto.)

LEED's complex and continually evolving nature is also the source of much criticism. Large developers gripe about the cost of hiring LEED professionals and the time it takes to receive certification, while many small builders avoid LEED altogether.

Built Green Canada

Built Green Canada, which has enrolled more than 15,000 homes, is everything that LEED is not.

Whereas LEED has been applied primarily on large projects, Built Green Canada was created for single-family homes and small multi-unit residences.

Whereas LEED often requires the use of paid consultants, Built Green Canada posts its online checklist atop the front page of its web site and encourages all comers to give it a spin.

Whereas LEED was imported from the states, Built Green Canada is a made-in-Alberta program.

And whereas the Canadian Green Building Council is on a mission to gradually upgrade laws and building codes, the Built Green Canada is committed to a "non-regulatory market-driven approach to optimize the use of innovative industry-based solutions to potential environmental problems."

Built Green began as a discussion among some Alberta homebuilders, and evolved into a project of the Canadian Home Builders' Association (CHBA). Its founders examined several Built Green programs in the United States, as well as the U.S. National Association of Home Builders green home building guidelines. Built Green Canada was launched in Alberta in 2003, nationwide the following year. (Click here for B.C.)

The Built Green program is pointedly simple: (1.) The builder must complete a two-day Built Green Builder Training course and become a Built Green Certified Builder; (2.) The certified builder submits an enrollment form, the completed checklist and a standardized assessment of the home's energy efficiency; (3.) A third party energy auditor conducts a blower door test and confirms the energy assessment. Upon completion and inspection, the builder receives an EnerGuide for New Houses rating label and a Built Green seal for the home. Both are affixed to the furnace.

The EnerGuide for New Houses rating and labeling system is the mandatory requirement at the heart of the Built Green program. EnerGuide is not unique to Built Green, but is a Canadian government program. It is based on a 100-point scale, with zero being the least energy efficient and 100 being the most. In 2005, the average Canadian home rated 66 on the EnerGuide scale.

A Built Green home must achieve an EnerGuide for New Houses rating of at least 72 to be certified. An EnerGuide rating of 75 is required to earn a silver rating, 77 earns a gold, and 82 earns a platinum.

In addition, the online checklist offers variety of green features from which the builder selects a minimum number to meet a chosen achievement level. The checklist is revised annually.

Advocates of the accessible and transparent Built Green Canada program note that it has educated

hundreds of builders and improved the energy performance of 15,000 homes, very few of which would have participated in the much more rigorous LEED system.

Critics complain that Built Green requires little in the way of site selection, water savings or material selection. They further note the EnerGuide R-2000 standard -- which forms the basis for both the training of Built Green builders and the bar above which Built Green platinum homes must rise -- was drafted 30 years ago by the federal government, and represents a narrow and outdated definition of green building.

BOMA BESt (aka Go Green, aka Green Globes, aka BREEAM-Canada)

Just to spice up this alphabet soup of acronyms, the other major Canadian green building certification system has operated under several different names.

More than 800 commercial buildings have been certified under the system now known as BOMA BESt.

BOMA BESt shares a common ancestry with LEED. Both evolved from the United Kingdom's BRE Environmental Assessment Method (BREEAM), which in 1990 was first to offer an environmental label for buildings.

The Canadian Standards Association published BREEAM-Canada as a guideline (but not a rating system) for existing buildings in 1996. The American authors of the first LEED standard have acknowledged borrowing ideas from BREEAM and BREEAM-Canada.

A program called Green Globes was created in 2000 as an assessment and rating tool based on the BREEAM-Canada guidelines. And in 2004, the Building Owners and Manufacturers Association of Canada (BOMA) adopted a version of the BREEAM-Canada/Green Globe standard for existing buildings, and rebranded it Go Green.

BOMA subsequently renamed its program BOMA BESt (for Existing Buildings). BOMA BESt features four levels of certification and a simplified online application procedure. Participants assess their own facilities, then hire a third-party verifier to achieve certification.

Major commercial real estate firms such as Cadillac Fairview, Bentall Real Estate, SNC Lavalin Profac and GWL Realty Advisors use BOMA BESt, which claims its certified buildings use 11 per cent less energy and 18 per cent less water than the industry standard.

Complicating the brand a bit further, an American group called the Green Building Initiative was created in 2004 to launch an industry-led version of Green Globes in the states. That system is based on a 1,000-point scale divided into categories similar to LEED: site, energy, water, resources and materials, emissions and effluents and project management. As is the case with LEED, roughly a third of the total points are allotted in the energy category.

A University of Minnesota team published a detailed comparison of the American LEED and Green Globe systems. The 2006 study found "the Green Globes system appears to be doing a fairly good job in improving upon the delivery mechanisms employed by LEED which are so often criticized. The online approach to assessment not only improves efficiency and reduces costs, but also provides opportunities to influence the design and planning processes of the project through immediate feedback not available from a primarily paper-based system."

Next-generation rating systems

While Built Green and Green Globes serve the green building industry by providing less complicated alternatives to LEED, a new pair of labels have challenged LEED's dominance by offering even more stringent standards.

Passivhaus is a European standard focused solely on energy use. Passivhaus certified buildings must consume no more than 15 kilowatt hours of energy per square metre per year. In order to achieve this rigid requirement, Passivhause structures are super-insulated and astonishingly airtight. Many are built without furnaces, even in northern countries.

There are an estimated 25,000 Passivhaus buildings in Europe, but only a handful in North America. One is in Whistler. (Click back for more about passivhaus next week in this series.)

Living Buildings, on the other hand, produce their own energy, capture and process their own water and release minimal toxins. The Living Building Challenge describes itself as "a philosophy, advocacy platform and certification program" that aims to be the most stringent in the world. (More about Living Buildings later in this series.)

A project of the Cascadia Region Green Building Council -- the only multinational chapter of the U.S. and Canada green building councils -- the International Living Building Institute will convene its fifth annual unconference in Vancouver this April.

Excerpts from the ensuing discussion in The Tyee's comment section:

Tough Question, Monte
posted by "VivianLea Doubt" on January 12, 2011

But after a little reflection, I think transportation has to come first among elements. In the face of peak oil and water shortages that have hit many Canadian municipalities, this may seem, gosh almost frivolous... In thinking about the best community I ever lived in, it was actually also the poorest. What this meant was that people walked, took the bus, rode their bikes - obviously because they had to - and the corollary was that anywhere one went there were opportunities to meet ones' neighbours.

On any given day then, I had brief, friendly conversations - or even simply exchanges of greetings, as I moved about my neighbourhood. The impact of this on obesity, or traffic jams, or a myriad of other factors probably cannot be overstated. Certainly, its' impact on social relationships cannot be overstated; here was a place where school children walked to school, and neighbours looked out for them, where elders were looked out for, too, where we felt mostly confident and safe in our place. This is in stark contrast to the sterile subdivision where I now reluctantly reside - where everyone has a car and no one talks to each other because they never see each other.

Maybe, just maybe, if we had neighbourhoods where people walked to the store, the coffee shop, the bus - maybe this might be the catalyst for the other deep changes that need to be made.

Why the need to prioritize?
posted by "stevesatow" on January 13, 2011

Monte, firstly I want to say that I have enjoyed reading this series of articles on green building. Thank you.

That being said, I question the premise that there is a need to artificially prioritise ANY element in favour of others when drafting a certification programme.

I currently am involved in the research, design and (eventual) construction of a Living Building registered project just outside Victoria and, for me, the priority is to try to BALANCE all the elements in order to create a building that sits comfortably in its environment.

That being said, sometimes the elements are self-selecting. For instance; we may not have a choice as to our site, and this could have implications with regards to transportation, etc. that are outside our control (short of not building at all).

I believe we need to have an holistic approach which recognises the conditions that apply and works to maximise the potential of all the elements.

CASE STUDY #3: Choi Building

C.K. Choi Building
Point Grey, Vancouver

Completed: 1996
Use: Office
Distinction: 1995 Progressive Architecture Award (among others)

Ahead-of-its-time passive design elements give the C.K. Choi building standout energy performance. Opened in 1996 to provide 30,000 sq. ft. of resource and office space for the Institute of Asian Research at U.B.C. in Vancouver, the C.K. Choi was the first green building on campus. Architects Matsuzaki Wright Inc. relied on large operable windows for ventilation and natural lighting, reducing energy costs by 192,000 kilowatt hours per year. The building itself was built of 50 per cent reused and recycled materials, including recycled bricks from university's decommissioned militia armouries. The Choi saves approximately 100,000 gallons of water a year by using composting toilets that require no flushing, and recycling grey water from urinals and sinks for irrigation. The $6 million building won numerous awards, including the 1995 Progressive Architecture Award for Green Architecture and the 1996 Earth Award from the Building Operators and Managers' Association of B.C., for its unprecedented (at the time) sustainability.

Building Jobs By Tearing Down Houses the Green Way

Vancouver aims to boost a new employment sector: recycling buildings.

By Colleen Kimmett

Article first published on January18, 2011 by TheTyee.ca.

If there's one guy in the world that Barry Joneson can't stand, it's Mike Holmes, all-Canadian reno hero. Seems strange, coming from this burly, bearded contractor wearing a hard hat adorned with red maple leaves, but it's true.

"He's the worst guy," Joneson insists. "I'd like to meet him some time and just tell 'em that."

The reason, he explains, is because of this spray foam insulation that Holmes likes to use on his hit show, Holmes on Homes. The stuff is a quick and effective insulator. But it sticks to wood like glue, making every piece it touches impossible to salvage. To Joneson, it's like watching someone throw money in the garbage. Then again, he sees things a little differently than most.

Joneson is in the business of taking buildings apart, separating the materials -- this is key -- so that they can be recycled or reused. It's called deconstruction, and compared to demolition, it's time-intensive, labour intensive, and way better for the environment. A typical deconstruction projects sees 90 to 95 per cent of the entire building reused or recycled. A demolition project typically results in 90 per cent of the building going to the landfill.

But that's not the reason why the U.S. government has poured millions into deconstruction projects in the states, or why Joneson's latest project is being held up as a case study for deconstruction in Vancouver. The reason is jobs.

The city, and Metro Vancouver, have been talking

ABOVE: Cher Whatley, a student in Pacific Community Resources' Work and Learn Program, attacks drywall in a deconstruction project.

about deconstruction for several years, mainly as a means to boost recycling in the construction, renovation and demolition sector -- a sector responsible for one-third of the region's total waste, or roughly 35 million tonnes.

Then Ian Mass, executive director of Pacific Community Resources (PCR), a non-profit that offers job-training skills for people with barriers to employment, approached the city.

"Service Canada had some extra training dollars for this fiscal year," explains Mass. "They asked if we had any ideas on what to train youth about."

Mass made the city an offer: if they provided the manual labour, would the city find a house that they

could train on? For the city, it was a perfect fit. The city would get a pilot project to study, the students would get hands-on job training, and the homeowner would get the job done at the same price as it would have cost for demolition.

PCR now has two pilot projects with the city; one will begin in February, and one is in its second week.

When I got to visit the site, a stripped-down bungalo near Point Grey, Joneson toured me around pointing out everything of value; a bathtub, stove, aluminum awnings, even door frames, could be cleaned up and resold.

Even the very structure of the home itself -- the asphalt roof shingles, concrete, drywall, bricks and wood frame, can be recycled if they are separated, for a lower cost than taking the whole jumbled mess to the dump.

For example, with a recent increase in tipping fees, it would cost Joneson $250 to take a load (a 30-yard bin truck) of mixed wood and metal to the landfill. To get rid of the same amount of wood alone would cost him $37.

Joneson started his business, Pacific Labour and Demolition, in 1994. “I don’t like using the word demolition, because it’s the anti-deconstruction,” he says. “But when I started, if I had of put deconstruction on there, no one would have known what I was talking about.” He figures he’s done about 3,000 homes, and takes pride in hiring people who have a hard time finding employment. After the death of his son in 1987, Joneson went through a rough patch himself and ended up on the street addicted to heroin.

He sees deconstruction as a chance to salvage materials, and also lives -- and this perspective makes him a good instructor for Pacific Community Resources, which helps at-risk and inexperienced youth find jobs.

Joneson is in charge of training all 20 students in PCR’s Work and Learn program. First, they go through six weeks of safety training in the classroom. Then, two groups of 10 will participate in a two-week complete deconstruction project, and then they get interview and resume skills training before graduation.

I meet one trainee, Cher Whatley, knocking down drywall in the basement. It’s one of the easiest materials to deal with, she says. The 19-year-old has worked as a general labourer before, but says this is quite different.

“With a construction site, when you’re doing demo, you just basically throw everything away. This is more eco-friendly.” Whatley says the classroom part had some benefits, but being on the job is more interesting. She gets paid $8 an hour in this program, and starting wage in this field is about $15 per hour. Does she see a future in this line of work?

“I guess it really depends on what people think,” Whatley says. “I think there’s more awareness now, that we should be recycling and doing things different. If we get the word out there a bit more, this could be a very good business.”

That’s what the city is hoping too.

“Any new construction has to have a demolition associated with it... there aren’t really any lots,” says David Ramslie, sustainable development program manager with the city of Vancouver. “We, on average, see anywhere between 500 and 750 homes demolished in Vancouver a year. If less material is going to our landfill, it extends the life of the landfill. It’s kind of selfish, from an asset management perspective.”

It’s also a sign, says Ramslie, that the city is getting serious about green and local economic development.

“When people talk about the creation of green jobs, they always think of the green architect, or the green designer. We would also like to have green jobs that are low threshold, so people that have typically had barriers to employment before can access these jobs and get involved in the green economy too.”

For its part, the city contributed a $2,000 grant to Pacific Community Resources. It also fast-tracked the homeowner’s building permit application. The condition of the grant is that Joneson, with the help of an MBA student, is carefully tracing what comes out of the house and where it goes.

“We want to get a sense of the order of magnitude of time and what’s involved,” says Ramslie. City staff

are developing a broader program that they will bring to council later this month.

“The draft strategy we’re putting together right now is to work on an incentive program that promotes voluntary uptake of deconstruction,” Ramslie says.

He adds that while the city “wouldn’t rule out the possibility of moving to a policy requirement over time,” they’re not going there yet.

Without policy requirement around deconstruction, it’s dubious that residents will voluntarily choose this option.

Todd Senft is the president of Revision Renovations, a company specializing in high-end, eco-friendly renos.

Revision is currently involved in pilot projects with Metro Vancouver and Lighthouse Sustainable Building Centre, focused on how to maximize recycling from a large renovation project.

So far, says Senft, they are reaching about a 97 per cent recycling rate.

The cost of separating and recycling all the materials removed from the site has not been that significant, Senft says. At least, he wouldn’t call it significant. Some might disagree.

“People are okay with green as long as it doesn’t cost them more,” he explains. “It is a short conversation to try and convince them that a thousand-dollar over a $25,000 renovation is very minor compared to the long-term environmental benefits of keeping those materials out of a landfill.”

“It’s hard to make it work no matter where you go,” says David Bennick, a deconstruction consultant based in Bellingham, Washington. Bennick advised both Metro Vancouver and the city of Vancouver as they launched their pilot projects, and recently launched a Canadian website to try to focus deconstruction efforts here.

Bennick has been in the business for 18 years. For most of his career, like Joneson, he was a voice in the wilderness. Then, several years ago, in an effort to create jobs (and deal with the thousands of homes left vacant in the wake of the housing crisis) the U.S. government started pouring money into deconstruction projects. Since then, Bennick has launched five new deconstruction companies in 2010.

He says job training programs are essential to helping make deconstruction cost-competitive with demolition, at least at this early stage.

“To build this industry in the Lower Mainland, we need contractors providing an efficient version of this service, we needs lots of recycling options available, we need people with projects to choose deconstruction and work with this young industry,” Bennick says.

“There are as many social benefits as environmental. These are local jobs, that create local businesses and local manufacturing. It’s a win-win.

Excerpts from the ensuing discussion in The Tyee's comment section:

costs
posted by "sebastian toombs" on January 18, 2011

surely the simplest thing to do would be to charge $1 for a deconstruction permit, but an arm and a leg for a demolition permit? this would make it far more advantageous to hire a deconstruction crew.

Gotta keep those fifth-rate homebuilders in clover!
posted by "ASKBiblitz.com" on January 18, 2011

LOL! They've been flogging their fith-rate leaky, inaccessible, barrier-FULL condos and indeed quite a few brand new single-family homes on an unwary public for 20 years now without abatement, with Victoria's and Canada's full support, so nothing about this new scheme to fleece us for a few remaining housing dollars should surprise us.

Our next provincial vote should reflect our collective view of govt's paticipation/ facilitation of B.C.'s leaky housing crisis, which continues unabated, bankrupting young families and senior

Is deconstruction really such a good idea?
posted by "jcaputa" on January 18, 2011

Surely keeping houses on lots is better than tearing down (or deconstruction) to make way for lower quality McMansions. The approval process for getting a passable house torn down, particularly a heritage house should be strengthened.

"We would also like to have
posted by "DenisB" on January 18, 2011

"We would also like to have green jobs that are low threshold, so people that have typically had barriers to employment before can access these jobs and get involved in the green economy too" About time. Technology has taken away these kind of jobs from the disadvantaged. About time someone worked to give people a sense of worth.

Municipalities take note
posted by "D Smith" on January 18, 2011

Last year in Richmond, three 1960-70 split-level homes that surrounded my friends home (same era) were demolished and new ones build in their place. Nothing was recycled from these buildings. It broke my heart to see what could have been recycled into affordable building materials into nothing. The killer was when the excavator smashed down a two year old deck and hot tub…..what a waste.

MOVIES AND TELEVISON SHOWS
posted by "rantnic" on January 18, 2011

Producers spend millions of dollars building big beutiful sets for their movies and television shows. They use the best of materials and make sure that all of the fantastick structures they make are totally safe for our 10 million dollar actor to strut upon.
Then they demolish it, with excavators, in order to get out of the studio space which cost's them thousands of dollars per day.

That same space may sit un-rented for weeks after the studio is cleared The producers of the film or television show are no longer responsible. They have made the studio ready for the next rental. Meanwhile thousands of dollars worth of materials and labor have been lost to the land fill.

Between the film workers union and the studio owners there may be room for a "materials recovery program" that creates employment and reduces the pressure on the land fill

Step Inside the Real Home of the Future: Passivhaus

Canadians helped invent a house so efficient you could heat it with a hair dryer. Then we forgot about it

By Monte Paulsen

Article first published on January 25, 2011 by TheTyee.ca.

The home of the future was built 34 years ago in Regina. It was called the Saskatchewan Conservation House. It used less than a fifth of the energy consumed by comparable homes. More than 30,000 people came to see it. But Canadian homebuilders ignored the ideas it offered, and the Canadian public forgot about it.

The world would have forgotten the Saskatchewan house, too, were it not for a quirky German physicist interested in energy-saving buildings. After studying the Saskatchewan house and a handful of similar buildings, Dr. Wolfgang Feist wrote a mathematically precise -- and elegantly simple -- criterion for designing buildings that require less than a tenth of the energy of average buildings. He called it the Passivhaus standard.

Feist's formula has gone viral. There are now more than 25,000 certified Passivhaus buildings in Europe, and thousands more under construction around the world.

But, here in Canada? There's just one.

Sans furnace in Saskatchewan

The Saskatchewan Conservation House was built in 1977 by the Saskatchewan Research Council, with support from partners including the University of Regina and the University of Saskatchewan.

It was built without a furnace. Instead, the northwest Regina home features a nearly airtight envelope with

ABOVE: Saskatchewan Conservation House, c. 1977.

R-40 wall insulation and R-60 roof insulation. This enables a small hot water system to heat the house, even through the winter.

The house is cube-shaped to expose a minimum amount of exterior surface area per square foot of floor space. Dark-brown cedar siding enables the house to absorb heat from the sun. And deciduous trees on the south side of the house provide shade in summer and allow solar heat to enter the windows in the winter.

Together with the "Lo-Cal House" at the University of Illinois and the "Leger House" in Massachusetts (both of which were built about the same time) the Saskatchewan house was among the earliest conservation demonstration projects in North America. American physicist William Shurcliff summarized the common elements of these cutting-edge buildings in a

1979 paper.

"Truly superb insulation," Shurcliff observed. "Not just thick, but clever and thorough. Excellent insulation is provided even at the most difficult places: sills, headers, foundation walls, windows, electric outlet boxes, etc."

Shurcliff continued: "Envelope of house is practically airtight... No conventional furnace... No weird shape of house, no weird architecture." And he noted how these buildings were pointing the way toward affordable green homes.

"No big added expense," he wrote. "The costs of the extra insulation and extra care in construction are largely offset by the savings realized from not having huge areas of expensive [windows], not having huge well-sealed insulating shutters for huge south windows, and not having a furnace or a big heat distribution system."

After the researchers finished their monitoring and the curious departed, the Saskatchewan house was sold as a residence. A garage was later added at the back of the property, and the solar thermal collectors were removed once maintenance became untenable.

Guido Wimmers, a Passivhaus consultant who trained in Europe but now lives in Vancouver, visited the house a few years ago. Wimmers was surprised to find that the current owner knew little of the home's legacy.

"He was somewhat aware that his house is a little bit special," Wimmers said. "But he was not aware that his house is actually kind of a milestone in building history."

Airtight buildings that sip energy

A decade passed before professors Bo Adamson and Wolfgang Feist began refining the concepts pioneered in Saskatchewan, Illinois and Massachusetts into what would become the Passivhaus standard.

"[Adamson] insisted on really building one," Feist told journalist Martin Holladay in a 2007 interview. "At the time we knew about other similar buildings -- buildings made by William Shurcliff and Harold Orr -- and we relied on those ideas."

They coined the term "Passivhaus" to express the idea that these buildings would include no traditional "active" heating or cooling systems. The first building, a row of four townhouses, was built in Darmstadt, Germany in 1990.

Feist founded the Passivhaus Institute in 1996. And from 1997 to 2002 he conducted a research project called CEPHEUS (Cost-Efficient Passive Houses as European Standards), which collected data on 221 superinsulated housing units at 14 locations in five countries.

At the heart of the Passivhaus standard are two requirements:

1. Every building must pass a blower-door test demonstrating exceptional airtightness. The Passivhaus airtightness standard (0.6 AC/H @ 50 Pascals) makes the Canadian R-2000 standard (1.5 AC/H @ 50 Pa) look lax by comparison.

2. Every building must consume no more than 15 kilowatt-hours of energy per square meter of floor area. While R-2000 and most other green building standards govern only energy used for heating and cooling, the Passivhaus standard applies to all energy -- including lights, appliances, entertainment and hot water heating.

How a building meets these performance requirements is left to the discretion of its designers and builders. However, it is not possible to meet the Passivhaus airtightness standard using windows and doors manufactured to lax North American standards. They leak too much air. So triple-paned windows manufactured to the Passivhaus standard are de facto requirements. Likewise, it is virtually impossible to meet the Passivhaus energy requirement without superinsulated roofs, walls and foundations. Wood-framed buildings usually have 16-inch-thick walls.

The Passivhaus Institute therefore recommends a short list of strategies for achieving its standards. These include: high levels of insulation, reduction of thermal bridges, use of "energy-gain" windows and (shown above) a heat-recovery ventilator (HRV).

‘Green building is Passivhaus’

“Forget Energy Star and LEED,” the influential blog TreeHugger declared last year, “Green building is Passivhaus.”

Among Europe’s more than 25,000 certified Passivhaus buildings are homes, school, office buildings and a supermarket. And a growing number of local governments are incorporating variations of the Passivhaus standard into their building codes.

The boxy first-generation Passivhaus buildings have evolved into elegant suburban apartment buildings such as the one shown above in Bern, Switzerland, and natural country homes such as this one in France.

Still on the boards is a Passivhaus tower in Austria. At 30 stories, it promises to become the tallest wooden building in the world.

The Passivhaus standard has taken root in the U.S. more recently.

Semantic confusion may partly explain the delay. Since the 1970s, the phrase “passive solar house” has been used in the U.S. and Canada to describe houses with extra thermal mass and big south-facing windows. Such homes are the antithesis of Passivhaus. Indeed, after decades of computer modeling and field monitoring, engineers at the Passivhaus Institute have concluded that passive solar design is far less significant than airtightness and insulation value. Nonetheless, aging advocates of that problematic design approach insist on using the terms interchangeably, thereby fostering confusion. The first building in the U.S. that aimed to meet Passivhaus standards was a home built by architect Katrin Klingenberg in Urbana, Illinois, in 2003. Klingenberg subsequently founded the nonprofit Passive House Institute US.

Klingenberg’s houses are remarkably affordable, costing only about 10 per cent more to build than comparable code-minimum construction. “The real cost advantage occurs... when the standard HVAC system can be eliminated. It is then replaced by a smaller ventilation system, a so-called fresh-air furnace. This system’s significantly reduced ductwork is used to deliver the remaining 10 per cent of heating and cooling needs.”

Among the two-dozen-odd American Passivhaus projects are this Salt Lake City home, and this New York City office building.

Canada, on the other hand, has turned its back on the Saskatchewan Conservation House, in much the same way it abandoned the Avro Arrow and the TurboTrain.

There is only one certified Passivhaus in Canada.

Excerpts from the ensuing discussion in The Tyee's comment section:

PH in canada
posted by "mike eliason" on January 25, 2011

there is one in whistler (the austria house)
there is one underway in toronto
there is a stunning one in planning for calgary plains.

and there are probably many more underway in BC, judging from the membership of their passivhaus group.

Just goes to show...
posted by "bfearn" on January 25, 2011

that the average Canadian is more interested in flash than substance. While truly green homes like this have been ignored governments and citizens have built hundreds of thousands of buildings that are too big and selfish energy gluttons.

Our grandkids are going to pay for this foolishness big time.

Nothing new needs to be invented...
posted by "freebear" on January 25, 2011

Everything needs to be rediscovered!

Blame the architects!
posted by "alive" on January 25, 2011

So, what should we expect from architects who cannot make a watertight building?

Their problem is that they all want to create a "style" that can be identified as their trademark, instead of simply designing buildings that do the job that is required.

That again can be blamed on the laws that requires a new plan when for example we already have dozens of functional designs for schools, and no need to have some architects frills incorporated on the next one.

Originally an architects first obligation was to oversee how construction was happening, but now they never even show up at construction sites and their plans often are ambigious leaving room for mistakes.

Leadership required
posted by "Conductor274" on January 25, 2011

Leadership is required before ideas like this will take hold and produce appreciable results. The government must provide this leadership and endorse this product and others that reduce our energy reliance and carbon footprint. Instead we have Prime Minister Harper and his far right wing agenda supporting the tar sands while ignoring environmentally friendly alternatives. At this point he's ready to climb into bed with China and sell them our dirty oil despite their human rights violations and lack of any environmental protection policies. He's a political prostitute who's trying to spin the dirty deed by calling it ethical oil.

Ventilation/ air movement
posted by "edjahn" on January 25, 2011

Whenever I read stories like this about airtight super-insulated houses, I am left to wonder about ventilation and air movement. How can gases like radon and other problematic vapors escape? What approaches are being incorporated to balance air movement and ventilation with air-tightness and insulation value? How do builders strike a balance between these competing needs without defeating energy efficiency goals?

CASE STUDY #4: The Centre for Interactive Research on Sustainability

Photo by Justin Langille

The Centre for Interactive Research on Sustainability
Point Grey, Vancouver

Completed: 2011
Use: Office/laboratory
Distinction:Built for 'Net-Zero' impact

UBC's Centre for Interactive Research on Sustainability (CIRS) goes beyond low-impact to achieve a standard set by the Living Building Challenge of actually using no off-site energy or water on a 'net' basis. The building captures heat from waste steam from the nearby Earth and Sciences Building—the kind of symbiotic relationship that John Robinson, Executive Director of UBC's Sustainability Initiative, hopes will be a model for the entire campus. The building also acts as its own water treatment plant: collecting, storing and treating rainwater and using it in toilets, urinals and irrigation. During slow times on campus—summer and holiday breaks—it will treat and re-use sewage from other buildings as well.

In Snowy Whistler, a House with No Furnace

Canada's first Passivhaus points to the future of green building with wood.

By Monte Paulsen

Article first published on January 26, 2011 by TheTyee.ca.

It took three decades for the ideas embodied in the lone, landmark Saskatchewan Conservation House to return back home to Canada. And it took a group of Austrian businessmen leveraging the 2010 Winter Games to make it happen. The house itself may prove worth the wait.

Austria House, nestled just north of Whistler Village, is so well insulated that it needs no furnace. The 2,700-square-foot building requires less heat than is produced by a common household hair dryer and generates most of that meagre heating energy on-site.

The house itself now serves as a cross-country ski centre, where visitors can rent equipment or obtain directions to the Lost Lake Loop and other backcountry trails.

The way this particular Passivhaus was built also presents British Columbia policy makers with a trail map to the future of green building -- and points the way to new opportunities for the struggling B.C. wood products industry.

Shipped from Europe in containers

Canada's first certified Passivhaus was inspired -- provoked might be a better word -- by remarks Minister Colin Hansen reportedly delivered to a reception in Vienna during the build-up to the 2010 Olympics.

Europe was already home to more than 20,000 Passivhaus buildings at that time. Hansen was speaking to an audience that included some of the most experienced green builders in the world when he promised

ABOVE: Canada's first certified Passivhaus is in Whistler.

that the 2010 Winter Games would be the first "green" Olympics. When they finished chuckling, a group of Austrian builders saw an opportunity.

"They thought, 'Hey, we can show the world what green really is,'" said Matheo Dürfeld, a Whistler builder who worked on the house.

The Austrian Passive House Group was quickly formed. It included Sohm Holzbautechnik, a woodwork company that prefabricates Passivhaus buildings; Optiwin, a manufacturer of Passivhaus windows; and Drexel und Weiss, a manufacturer of heat recovery ventilators. Their plan was to prefabricate a Passivhaus in Austria, assemble it in Whistler, and rent it to the leading Austrian television network for use as a broadcast studio during the 2010 Winter Games.

"The intent of the building was not so much to show the Canadians what the Austrians can do," Dürfeld said. "Really it was more to show the Austrians what the Austrians can do."

Though prefab construction is not part of the Passivhaus standard, it has become a common method of construction in Europe. Austria House arrived in Whistler aboard six 40-foot shipping containers.

Dürfeld was hired to coordinate local construction. A log home craftsman who evolved into a builder of high-end chalets, Dürfeld and his meticulous crew chief, Manfred Haas, completed the construction.

"We didn't build the house," he said. "The Austrians sent a crew over to assemble it. We started the house for them. And after they left, we finished the house."

A soft-spoken Canadian of Austrian decent, Dürfeld is prone to self-deprecating humour. When asked why his firm was selected for the job, he quipped, "I don't know. Maybe it was only because we speak German."

In the ground: An insulated foundation

Passivhaus aficionados are obsessed with the reduction of what are called "thermal bridges." A thermal bridge is any hard material that readily conducts heat from the interior of the building to the outdoors (in winter), or vice versa (in summer). Picture the cooling fins on an air-cooled engine, or the concrete balconies that stud near every Vancouver condo tower.

"Thermal bridging is your big enemy when you are building," Dürfeld said. "The first lesson in thermal bridging is going to be in your foundation."

So while nearly every other Canadian building stands atop a concrete foundation in direct contact with the earth, Austria House stands on a concrete foundation poured atop ten inches of expanded polystyrene (EPS) foam. The foam also wraps around the sides of the foundation walls.

"This gives us in thermal mass inside the insulation," Dürfeld explained.

The air inside the house slowly heats (or cools, in summer) that thermal mass. In return, the thermal mass works to maintain a steady air temperature inside the house, rather than continually working to lower the indoor air temperature to that of the surrounding earth.

Standing atop the insulated foundation are 18-inch-thick walls that are more than twice as well insulated (R-50) as a typical British Columbia building. And atop those walls is an even more heavily insulate (R-70) roof.

But it's not just the thickness of the walls that make Canada's first Passivhaus unique. It's the way they are built. Just as veteran skiers dress in many thin layers of clothing rather than one thick parka, so the Austria House is constructed from a series of carefully designed layers.

Layer one: Solid wood mass wall

And in stark contrast to the way Canadians build, nearly every layer in this Austrian-built Passivhaus is made of wood.

As noted yesterday, the Passivhaus standard is less prescriptive than alternative green building systems like LEED or BuiltGreen.

Passivhaus doesn't tell builders how to build. Instead, it sets firm limits on the amount of energy a building is allowed to consume, then lets individual builders decide how to meet those limits.

Sohm Holzbautechnik, the general contractor that prefabricated the Austria House, not only met the standard, but did so by layering wood in ways that few British Columbians have imagined.

"The heaviest wood is on the inside," Dürfeld said during a recent tour.

Indeed, where nearly every Canadian builder installs sheets of gypsum drywall, Sohm Holzbautechnik mounted solid walls of spruce two-by-fours. The boards are stood vertically, and lined up one after another, so that only a two-inch side is visible. All of these boards are held together using patented diagonal wooden dowels, which eliminate the need for toxic glues or chemicals of any kind.

"That's not a Passivhaus standard," Dürfeld noted. "That's just the way this company prefers to build."

Like the insulated foundation, this attractive wall of

solid spruce provides thermal mass that helps hold the building at a consistent temperature.

"This inside wall, the four inch mass wall, is your structure," Dürfeld said. "The rest is just a blanket."

Layer two: Plywood vapour barrier

Where Canadian builders place large sheets of plastic behind the drywall, the Austrians mount yet another layer of wood.

Austria House's vapour barrier is built of plywood. Where one sheet of plywood joins the next, the seam is carefully taped.

"They have amazing tapes," Dürfeld said. "We have one tape we're all familiar with, the red stuff. They have different tapes for wood-to-wood, for wood-to-concrete. They have about five or six different tapes, depending on the product they are taping."

And while Canadian vapour barriers are typically punctured every few inches by staples, drywall screws and junction boxes, Passivhaus vapour barriers are sacrosanct. Wiring and plumbing is run inside the barrier (in the sold spruce wall), not through it.

"When we build dimensionally, we tend to penetrate our vapor barrier everywhere. A typical home probably has three to four hundred penetrations in its vapour barrier," Dürfeld said.

Not surprisingly, such buildings are not even close to airtight.

When subjected to a blower door test, which is designed to create a pressure difference of 50 Pascals between the interior and exterior air, a typical Canadian home might measure between four and six air changes per hour. (This is described as 6 AC/H@50Pa.) That's not ventilation; that's just leakage.

The R-2000 standard to which BuiltGreen homes aspire is 1.5 air changes per hour at the same pressure. The minimum Passivhaus standard is 0.6 air changes per hour.

Austria House rated only 0.26 air changes per hour.

"This is probably the most critical component," Dürfeld observed. "If you fail air tightness, you're simply not going to get the rest of it right."

More layers, more wood

The Austrian fetish for wood products extends to the outer layers as well.

Beyond the vapour barrier, where Canadian homebuilders install 2x6 studs (aka. thermal bridges) and fibreglass batt insulation, the Austrians install 2x12s and non-toxic insulation such as blown-in cellulose (a wood product) or mineral wool.

"The preference over there is for wood-based insulation," Dürfeld said.

The outside wall, where Canadian builders install yet another layer of plastic (such as Tyvek), the Austrians mount what they call defusion board.

"It looks like fiberboard. It's denser than a donna conna. But it can pass vapour," Dürfeld said. "Again, it's a wood-based product."

In Northern Europe, a (wood slat) rainscreen is attached to the diffusion board, and (typically wooden) siding is mounted on the outside.

The Whistler house, however, is clad with distinctive black cementations siding similar to Hardiplank. This, too, was provided by one of the building's sponsors.

Windows that shut tight

Windows are a notable exception to the Passivhaus standard's performance-based approach. This is because there is virtually no possibility of meeting the Passivhaus air tightness requirements with the relatively poor quality windows sold in North America.

"The windows are absolutely key," Dürfeld said. "That can be the biggest heat loss in your house."

In Europe, the Passivhaus standard specifies windows tested and registered by the Passivhaus Institute or affiliates. These windows are typically constructed from three panes of coated glass separated by two gas-filled chambers, each of which is more than a half-inch

thick. Also, the window frames are exceptionally air-tight, typically incorporating two ore more rubberized gaskets. The frames are also quite thin.

“The frame is your enemy, because the frame is less efficient. There’s more thermal conductivity through the wood than through the glass and the air,” Dürfeld said.

The doors are similarly constructed. And all are sealed to the vapour barrier with more specialized tapes.

“To my knowledge there are no North American made wooden doors or windows that will meet the Passivhaus standards,” Dürfeld said. “This could be a business opportunity for the right company.”

Buildings that breathe easy

One of the most common misconceptions about Passihaus and other airtight buildings is that they are stuffy. The truth is that because they are actively ventilated, they tend to harbour significantly higher indoor air quality than comparable buildings.

The name Passivhaus was selected to describe the intention that such buildings eschew “active” heating (such as a boiler or conventional forced-air furnace) or air conditioning systems. But nearly every Passivhaus building does include an active ventilation system called a heat recovery ventilator, or HRV.

An HRV is a device that draws cold air from the outside through one side of a series of baffles that act as a low-pressure heat exchanger. Indoor air passed through the other side of those baffles as it is expelled from the building. Thus the indoor “heat” is “recovered,” as fresh air entering the building is warmed.

Heat recovery ventilators typically operate quietly and blow air much more gently than a forced-air furnace. The airflow is barely perceptible, but by running continually. In Austria House, the air is completely exchanged every 90 minutes.

“It’s constant. You can never shut this thing off,” Dürfeld explained.

The final 10 per cent

Superinsulation and extreme air-tightness are the core of the Passivhaus approach, and provide most of the energy savings. Dürfeld estimated that Austria House uses about 10 per cent of the energy of a comparable building.

“During construction, we were able to heat the house with one of those little 1,500-watt ceramic heaters,” he said. “One day I remember, it was about seven below outside. Just really, really cold. But all your interior surfaces, floors ceilings windows walls, were all within about a degree and a half of each other.”

Austria House generates much of what little heating energy it requires from a low-tech ground-source system.

Dürfeld and his crew buried three long ABS plastic hoses beneath a 20-meter-long yard in front of the building. Dürfeld described them is “giant slinkys,” and said they were placed about two meters deep then covered with gravel.

The fluid that runs through these hoses is cooler than air in summer, and warmer than air in winter. It runs through a compressor, thereby creating about four kilowatts of energy. That’s enough to heat the building’s hot water and at times further raise the temperature of incoming air flowing through the HRV.

Lost Lake Passivhaus

Austria House worked for its builders. As seen on Austrian TV, the 2010 Winter Games looked at times like an infomercial for the Austria Passive House Group. When the games were through, they gave the house to the municipality of Whistler for use as a cross-country ski base.

The building has since been renamed Lost Lake Passivhaus.

Lost Lake Passivhaus -- nee Austria House -- is working for Whistler, too.

“We always had the vision of trying to leverage some sort of a country house in this location to help support our cross-country operation,” said the city’s Roger Weetman.

“It worked out fabulously,” he continued. “From a sustainability perspective, it was a perfect marriage, right? It was exactly in line with what Whistler is trying to do.”

And the project worked well for Dürfeld.

“This is the most interesting thing I’ve done in all the years I’ve been here,” he said. “It’s like taking a car from 30 miles per gallon to 100 miles per gallon.”

Dürfeld’s company is headed in “a whole new direction” in the wake of the Austria House project. (More about that tomorrow.)

“We’re going to reinvent the envelope we live in,” he said. “And then we can recreate how we build.”

What remains to be seen is whether the lessons embodied in Austria House will be learned by the British Columbia wood products industry -- or, like the Saskatchewan Conservation House, politely forgotten.

Excerpts from the ensuing discussion in The Tyee's comment section:

Green needs to be affordable to be widely adopted
posted by "rhea" on January 26, 2011

While stories like this are really great for letting people know what the ultimate possibilities are, the cost of building a house like this is out of reach for most families, so they are likely to simply discount the entire thing as being "too expensive" or "greenwash". Same reason so many people don't buy super energy efficient windows or heating systems. Either that or building codes are so restrictive that really efficient and cost effective buildings are not allowed (like http://earthship.com).

It is very possible to build a highly energy efficient home for the mass market. It's also possible to encourage people to build and renovate green through the use of incentives. Look at how many people took advantage of the homeowner grant or the energy efficient grant. Changing building and tax codes to make green building and renovating cheaper than traditional renovations would do a lot more to solve climate change than setting a standard too high for most people to achieve in the current market.

What a lot of green cheerleaders miss is the fact that we have a lot of existing housing stock that's not going away right now. We're not going to tear down all the 50's neighbourhoods to build passive houses. What can be done is to change taxes, codes and practices to ensure that it's cheaper to renovate this housing stock and make it as efficient as possible than to keep building new McBurbs with crappy construction. Where new construction is put in, THAT should be held to a higher standard.

Some things I'd like to see:

1) Permanent and significant tax breaks on all energy efficient upgrades and new builds
2) Energy efficient windows and heating etc. required in all new construction
3) Public education, tax breaks and support for solar, wind and geothermal power
4) All new construction required to incorporate solar power, water conservation, geothermal heating and cooling or heat pumps where practical
5) Less emphasis on building cookie cutter developments that look exactly alike and perform like crap and more on building or renovating to a higher standard.

There's tons more, but those are what I can think of right now.

Re: Green needs to be affordable to be widely adopted
posted by "Bytesmiths" on January 26, 2011

I agree that you have to be able to make an economic justification, but I disagree that "green needs to be affordable to be widely adopted."

Rather, what is needed is a public education campaign to convince people that, in the long term, investing in a low-energy house is probably the best economic decision they will ever make.

The basic problem is that we're trained to make stupid comparisons based on current prices. With coming carbon taxes, "peak oil," and the spectre of millions of electric cars driving up electricity prices, it seems a no-brainer to do whatever you can to reduce your home energy needs NOW!

Consider that if you wait, the cost of the energy improvements in going to go up in lock-step with the cost of energy. That will leave you "behind the eight ball," since you'll not only be paying more for the energy between now and when you decide to improve, but you'll also be paying more for the energy upgrade.

Low-energy homes are ALWAYS going to cost more. The tough job ahead is to convince people that the cost is worth it.

Low-Energy Homes Mean Thousands of New Jobs

In Europe, that is, where Passivhaus principles are going into building codes. Could B.C. do it?

By Monte Paulsen

Article first published on January 27, 2011 by TheTyee.ca.

Thirty-two years elapsed between the invention of the Saskatchewan Conservation House and the erection of Austria House in Whistler (structures this series profiled in the previous two stories).

Canada's second certified Passivhaus was completed just a year later. And a dozen more Canadian Passivhaus projects are underway.

Passivhaus buildings -- which include schools, offices, apartments as well as a growing number of renovated structures -- use 90 per cent less energy for heating and cooling than conventionally built buildings. Since buildings consume up to half of all energy in North America, the prospect of a 90 per cent reduction poses what green building advocates believe is the most affordable way to reduce energy costs and slash the emission of greenhouse gasses.

Europe has embraced the idea. The continent already has more than 25,000 Passivhaus certified buildings. And by 2020, every new building in the European Union must be a "near zero energy building." With that shift has come a steep rise in new green construction jobs.

Given that both the City of Vancouver and the Province of British Columbia have committed to cutting greenhouse gas emissions by 33 per cent by 2020, it's worth asking: Is B.C. ready for Passivhaus building codes?

On the Rideau, a Passivhaus duplex

Canada's second Passivhaus was certified last November. It's a three-storey duplex overlooking the Rideau River in Ottawa. The building sports a green roof (with 12 inches of soil for gardening), a heat recovery ventilator, a geo-thermal system and a rainwater cistern.

Chris Straka designed the building, and lives on one of the two 1,650 square foot residences.

"I focused my attention on the building's envelope, using triple-glazed windows, a combination of foam insulations, and I sealed the house carefully to avoid thermal bridges that would transfer energy across the outer walls. All of this plus a south-facing rear wall of windows overlooking the Rideau River, keeps the cold out while inviting heat inside," he said. (Photos here.)

Straka built his duplex, which is also seeking platinum certification under the LEED for Homes pro-

gram, without importing high-tech windows from Europe.

"I knew that a very high performing building could be created using Canadian materials and mechanical systems," he said.

Stratka said his house cost about 10 per cent more (per square foot) than a conventional house. He estimates that expense will be recovered through energy savings within six to 10 years.

"Any custom home in Ottawa will cost about $225 a square foot to build," Stratka said. "For $250 a square foot, you can have the ultimate in energy efficiency."

Stratka is already at work on another Passivhaus/LEED Platinum design, which he said will be built for the same construction cost as a conventional custom home.

At least a dozen more Passivhaus building projects are underway across Canada. In British Columbia, the list of projects on the boards includes two multifamily homes in Vancouver, a winery in the Okanagan, and a warehouse on Vancouver Island.

In Whistler, an affordable Passivhaus

Matheo Duerfeld, the veteran Whistler contractor who helped build Austria House, is also planning a Passivhaus duplex.

"So you get a project like this [Austria House]. Part of it is construction. Part of it is, you make some friends. And part of it is you look at new technology," he said.

Duerfeld had been investigating BuiltGreen and the R-2000 standard, but was discouraged by what he described as the heavy use of foam and other chemical-laden building products in many of those homes. The Austrian emphasis on wood products changed his mind about energy-efficient building.

"So we looked at this [Austria House], and we said, 'You can actually build an airtight house that is a wood-based house. You don't have to build a petrochemical-based box.'"

Duerfeld's company bought a lot through the Whistler Housing Authority in a new subdivision called Rainbow, where he expects to break ground in April on a Passivhaus duplex. The side-by-side duplex was designed by Alex Maurer of Marken Design. The housing authority expects the Passivhaus homes to be affordable (by Whistler standards).

"That is really going to be the challenge," Duerfeld said. "If I build a custom house for someone in Whistler, and I have a $2 million budget, I know I can build that person a Passivhaus. Here, our challenge is going to be to build an affordable envelope."

Duerfeld isn't yet certain what the homes will cost. He plans to invest in insulation and airtightness, while eschewing expensive alternative energy systems. And, like Straka, Duerfeld plans to build using local materials.

"That means made in B.C.," Duerfeld said. "We're going to try to do it so that almost everything can be locally based."

In Williams Lake, hope for new jobs

"The other thing we are looking at is doing this in modules," Duerfeld continued.

"If I was only ever thinking of doing one house, I wouldn't think of doing it in modules. But we're thinking that this is a new little business we might get into. We have a shop up north. We have space where we could actually build walls," he said.

Thus the Whistler duplex will serve as a pilot project where Duerfeld plans to showcase the walls he will prefabricate in Williams Lake.

"Ultimately, our goal is we will get to the point that we would become a subcontractor for a developer or a builder. We would build the envelope. We would test the envelope. And then we're out of there," Duerfeld smiled. "We'd provide a quick build at a fixed price."

Duerfeld's plan is to prefabricate a wall system that would combine a two-by-four inch service wall inside a two-by-ten insulation wall.

The exterior (2x10) wall would be insulated with rockwool, and sheathed with oriented strand board.

The inside sheet of OSB will double as an all-wood vapour barrier. “This is our insulating and structural wall,” he said. “We won’t penetrate it. No plumbing, no electricity there.”

The interior (2x4) wall would contain all the mechanical systems. “We won’t pre-insulate this. We can run all our plumbing, our wiring, anything else,” Duerfeld said. “When we finish the wall, just before we put the drywall on, we’ll insulate that as well.”

Though it won’t include the sold-wood interior that makes the Lost Lake Passivhaus (nee Austria House) so visually attractive, Duerfeld’s affordable wall system will provide more insulation.

“We have more R-value in this wall than the Austrians have in that wall,” Duerfeld said. “Our philosophy is: We are going to show that you can do this using Canadian products and Canadian labour.”

In Germany, jobs grew quickly

In the European Union, all new buildings must be “nearly zero energy” by 2020.

“They’re headed toward a Passivhaus-equivalent building code. Your thermal envelope is going to have to be this good,” Duerfeld said. “I think that will slowly follow here, too.”

Guido Wimmers is a Dutch architect who now works as a designer in Vancouver. He wrote the city’s Passive Design Toolkit for homes, and he trains Canadian architects, builders and engineers through the Canadian Passive House Institute.

“Quite a few European cities are already doing [Passivhaus or near-zero building codes],” Wimmers said. “By 2020. A lot, actually.”

Wimmers shares Duerfeld’s view that Canada is ready for Passivhaus.

“The time is right. LEED has sensitized the market over the last few years. They did an awesome job in educating people. My personal opinion is just that they have not focused correctly on energy, but it doesn’t matter. Overall, they have changed the building industry,” he said. “Now, the market is open for the next big leap, for something more. And they’ve seen that Passivhaus is fairly successful.”

Wimmers, who consults on numerous Passivhaus projects, expects to see between five and 10 more Passivhaus buildings in B.C. this year. “I could imagine that a year later we are already at 50. And double that the following year.”

He watched it happen in Europe.

“These ideas transformed the industry in a relatively short period of time,” he said, adding that the rate of job creation in Germany was staggering.

“The automobile industry in Germany is huge, as everybody knows. We’re talking about Mercedes, BMW, Audi, Porsche, Opal, Toyota, Volkswagen,” he said. “By 2008, there were more jobs in energy-saving technologies and the renewable energy sector than in the whole German automobile industry.”

Slouching toward Passivhaus

Wimmers sits on a committee that advises the City of Vancouver on its plan to become the Greenest City in the world by 2020.

He paused when asked whether he believed the city should adopt Passivhaus-like standards for its building code.

“Over time, yes,” he replied. “But I think the industry is not set up to accept this as a general rule by 2020. We cannot implement it over nine years. That’s too much.”

In Europe, he noted, “They’ve been working on this for 20 years.”

Asked what he thought Vancouver should do to meet the green building component of its promise to reduce community greenhouse gas emissions by 33 per cent (from 2007 levels) by 2020, Wimmers replied promptly and in detail.

“First of all, push the code. Make it more challenging. So that legally allowed worst-case scenario? Just push it a little bit higher. Raise the bar,” he began.

“Then educate. Because without education, it’s not gonna happen,” Wimmers continued.

“Then, it is a money issue. As long as we get electricity more or less for free, where is the motivation to save energy?” he asked. “The city could come up with a very provocative model, and put some tax on our electricity ... is not a very popular tool. But it is an extremely efficient one,” he said.

“And finally, make it simple. For every new bylaw, throw away 10 existing ones. Just get rid of all this jungle of bylaws and make them clear and performance-based,” like the Passivhaus standard. “Nothing proscriptive, only performance-based.”

Wimmers added that, based on the feedback he receives at his Passivhaus training seminars, he believes the green building market is ready.

“I think the time is right,” he said. “I’m convinced that Passivhaus is about to take off in Canada.”

Excerpts from the ensuing discussion in The Tyee's comment section:

Headline drew me in, but...
posted by "P. Markunas" on January 27, 2011

Interesting series. The headline to this article suggests thousands of new jobs, but perhaps that's a bit of an oversell. Thousands of jobs involving more sustainable practices than in the past, quite possibly, but electricians are still electricians even if they are now involved in installing solar panels. It is largely the currently employed skilled and knowledgable trades people who will take on the challenge of new materials, technologies and architectures. The possibility of employing more workers does increase if we assume increased rate of replacement of existing housing stock above business as usual or an increase in new housing starts for other reasons, for example, but I don't think I hear the author advocating for that. A greater demand for workers would also result from increased activity in retro-fitting existing housing with new technologies, as has occurred in Germany, but again, don't see the author arguing for that in this article.

First Passive House house in Canada
posted by "Homesol" on January 27, 2011

Monte, you've really done a great job on this and other stories about the growing Passive House movement in Canada, it really is capturing the imaginations of many who can no longer believe in houses that suck energy. I like to make the analogy that if one car maker was selling cars that went 100 kms. on less than one litre of gas, while the competition continued selling basically the same cars that used 10 litres, which one would everyone buy? On top of that, a Passive House is more comfortable, is "future-proofed" against rising energy costs, and provides "passive survivability" in that it would probably never freeze inside even if the power was off all winter. Although Passive House might not be possible for all locations and designs, it's certainly an ideal worth striving towards.

One clarification to your story: although the Austrian ski chalet in Whistler was certified by the Passive House Institute as a "Leisure Facility" (and I'm not knocking that accomplishment, it's a very innovative design, I toured the building at last spring's Passive House conference), Chris Straka's house in Ottawa, which our company Homesol certified, is the first Certified Passive House residence in Canada.

Regardless of firsts, the really exciting news about Passive House is that by this time next year we may see dozens of Certified Passive House buildings of all kinds all over the country, and I look forward to more green building news from Tyee!

More jobs?
posted by "JSoet" on January 28, 2011

P. Markunas, I think the author's point is that it could create more jobs by creating the materials and things that are needed to create these passivehauses. Although in this article Duerfeld says he can do it using all canadian parts and labour, they do mention that there is not really that many options in terms of highly energy efficient windows, etc. so fabricating that could create jobs?

Ideal for retrofits?
posted by "edoherty" on January 30, 2011

"Duerfeld's plan is to prefabricate a wall system that would combine a two-by-four inch service wall inside a two-by-ten insulation wall."

This sounds like a typical 2X4 Canadian house, but with a vapor barrier and 2X10 insulated wall added on the outside. Where do I sign up to get a 2X10 insulated wall with triple pane windows nailed onto the outside of my house?

CASE STUDY #5: Creekside Community Centre

Photo by Justin Langille

Creekside Community Recreation Centre
False Creek, Vancouver

Completed: 2009
Use: Community Centre
Distinction:LEED Platinum

The 4,000-square-foot Creekside Community Recreation Centre is a building that does its best to act like a part of nature. A legacy of the 2010 Olympic Village development in Vancouver's Southeast False Creek, half the building's site is vegetated, including a living green roof. The features create wildlife habitat, minimize storm-water runoff, and reduce the building's contribution to the urban "heat island" effect. Storm water collected in cisterns in the basement mechanical room is used for landscape irrigation and toilet flushing. A little more than a quarter of Creekside's building materials were locally source; nearly was much was recycled from other uses.

How Green School Buildings Help Children Grow

Students and teachers are more healthy and productive in sustainably-built schools, research shows.

By Katie Hyslop

Article first published on February 9, 2011 by TheTyee.ca.

When the provincial government decided all new school buildings must meet the LEED Gold standard in 2008, the motive was making B.C. the province with the first carbon-neutral government in Canada, with the added benefit of saving school districts some energy costs.

But new avenues of research into the effects of school buildings on human health and productivity are producing evidence that the government's move towards greener schools could be producing healthier, more productive and more environmentally aware students.

A tale of a green Dickens

The new Charles Dickens Elementary School was the first to achieve LEED Silver status in the Vancouver School District when it opened in May 2008; however, the government wasn't enforcing LEED Gold certification then, so the district had to use their own funds to reach their goal.*

Some of the green features include an underground rainwater cistern for non-potable water, geothermal rods that mine the earth's heat to warm and cool the building, and electronic sensors that monitor the number of people in the room to determine how much light and heat is required.

But while the custodial staff estimates significant energy savings in comparison to the old buildings -- as much as 50 per cent less gas than previously required -- there is little more than anecdotal evidence the building is producing healthier, more productive students and teachers.

"I think the air quality is definitely different, I noticed that right away from all the buildings that I've worked in," says principal Kathy O'Sullivan.

"And we do have some sickness, colds and the occasional flu, which is during certain seasons, but I don't see a high absenteeism due to illness, so I think that's a positive thing. I do see less dust and dirt."

Researchers in Canada and the U.S. want to turn anecdotes into hard facts by monitoring the affects of natural light, air quality, and acoustics on children's ability to learn, and as a result are discovering many requirements of sustainable structures are meeting the educational and health needs of children far better than traditional buildings can.

Let there be (natural) light

When Dickens was under construction, the Ministry of Education required at least 10 per cent of classroom walls to be windows. But the designers at Stan-

tec, who designed and built the school, decided this wasn't enough to get the energy-saving benefits of natural light, and opted to go with three times as many windows for the school.

But it wasn't just to save energy -- they were also aware that natural light just looks nicer than artificial.

"This is a fantastic school for access to daylight," says Rebecca Holt, sustainability specialist for Stantec.

"I think being able to see what's going on outside and have real daylight rather than artificial light makes for a much nicer quality, too."

The pleasing aesthetics of natural light is an area Jennifer Veitch has devoted her career to studying.

"In a space that is well day-lit we have better knowledge of what's going on outside and a connection, both to the passage of time and to exterior conditions, so you know if it's cloudy or sunny, is it raining or what-not, and people like that sense of connectiveness to the outdoors," says Veitch, a senior research officer in lighting for the National Research Council's Institute for Research in Construction.

Veitch studies the effects of office lighting on people, and says many report feeling healthier when exposed to natural light, as compared to electric light. She cites a 2003 study by the Heschong Mahone Group, a California-based green-building consultant firm, which found elementary school classrooms with the most daylight saw a 21 per cent improvement in productivity compared to students in classrooms that had no daylight.

Fellow lighting researcher Mark S. Rea of the Rensselaer Polytechnic Institute conducted research in 2010 in North Carolina where Grade 8 students wore orange, short-wave light-blocking glasses to school one week, and not the next week. When students wore the glasses their sleep onset was delayed, and they weren't getting adequate sleep to prepare them for school.

"The results presented here are the first to show, outside laboratory conditions, that removal of short-wavelength light in the morning hours can delay DLMO in 8th-grade students. These field data, consistent with results from controlled laboratory studies, are directly relevant to lighting practice in schools," reads the study.

Breathe easier

Part of attaining LEED Silver status means using materials with low volatile organic compounds (VOCs) only. Everything from the glue, to the paint, to any coatings could only have a certain amount of VOCs -- which cause everything from "new paint smell" to eye irritation and respiratory problems -- before points would be deducted.

"Essentially you get very, very little off-gassing, and it protects the people who are applying the products, as well as the people who are living in the building after that," says Holt.

Another credit required a two-week flushing of the ventilation system using outside air, flushing out any construction materials, emissions or dust left behind, before anyone could enter the building.

"It makes for a much, much better indoor environment. And you just don't get that smell that you do when you get fresh paint and you come into a new building, that smell you're getting is VOCs," Holt told The Tyee.

Green buildings weren't always known for their pristine air quality. Efforts to make more energy-efficient buildings in the 1970s resulted in airtight buildings, where designers attempted to prevent any air from escaping the building in order to save on heating and cooling, but didn't allow for the circulation of clean air to breathe. This was known as "sick building syndrome."

"What they did was they were trying to reduce infiltration rates, and there are changes per hour, so they sealed them very tight. But then of course nobody could breathe," says John Robinson, executive director of the UBC sustainability initiative.

"The department of the environment buildings in Hull, Quebec, were at a place called Les Terrasses de la Chaudiere, I believe, and anyway the joke was Le Terrace de Shoddy Air, because the air quality was so bad."

Airtight buildings can also create mold, where moisture produced by students has nowhere to escape and instead collects on, and sometimes in, the cold points of walls.

"If it's really cold outdoors, you could have a cold point on the inside, or in the middle of a wall, and you could easily take room moisture and it finds its dew point and condenses and those surfaces," says Vivian Loftness, a professor of architecture at Carnegie Mellon University.

"And the same is true in your hot, humid climates from the outside: you air condition the building, if you don't manage the thermal bridges, you could have the moisture outside the building actually condensing in the walls, which then will breed mold and create long term issues."

Dickens is not airtight: each classroom has windows that open, and the cafeteria features garage doors that roll up in order to incorporate more light and air into the space during the warmer months.

"Access to outside air is another feature that we reward through LEED. It also allows your occupants to control the environment, so if I feel stuffy I can just open a window," says Holt.

Keep it quiet

One of the issues with open-concept spaces such as the Dickens cafeteria, where natural airflow replaces the need for mechanical systems, is acoustics. While cafeterias are not necessarily quiet places, other green buildings have found their open spaces are an acoustical nightmare for teachers and students.

"Because they have open airways in order to allow natural ventilation, as well as concrete floors, a lot of green buildings, if you combine those with leather shoes, you get a real acoustic problem," Robinson told The Tyee.

"And so in general green buildings have been designed in ways to maximize environmental benefits and not enough attention, I believe, has been spent on the human dimension."

Not only are noisy classrooms disruptive for learning, but also they can create health problems for students and teachers who have to strain their voices to be heard.

"Teachers trying to overcome outdoor noise will project their voice at a higher level, and teacher health was being compromised -- they were getting hoarse," says Loftness.

"And as soon as you provide better acoustic environments teachers don't have to project their voices as hard and those health problems are greatly reduced."

Loftness suggests sustainable building designers go beyond standard LEED by combining the measurement with other green building standards, such as ASHRAE or CHPS, in order to maximize acoustics, energy savings and the use of natural light.

"Even though the standard gives you the single checkbox for daylight, and one checkbox for natural ventilation, I think we have to actually take a far more dramatic and concerted effort to increase the number of checkboxes, whether through regional credits or through just a local commitment," she says.

'Buildings should make people's quality of life better'

Much of the research on the benefits of green schools is still in its infancy, less than 10 years old, but Robinson hopes to further the field with the completion of the Centre for Interactive Research on Sustainability (CIRS) building on the UBC Vancouver campus later this year. Billed as the greenest building in North America, with its own waste treatment system onsite, a combination of solar and geothermal heat, and a water system based on rainfall collection, it will also serve as a living laboratory, where inhabitants are monitored for their happiness, health and productivity.

"We think the old sustainability agenda was being less bad, just reducing damage. The new sustainability agenda is being net positive, both environmentally and in terms of human quality of life," says Robinson.

"So the buildings should make the environment better, and the buildings should make people's quality of life better."

Robinson hopes the CIRS building, if successful, will change the way people think about buildings. But green schools are already doing that for B.C. children like the ones attending Dickens Elementary today, who are knowledgeable enough about the school's green systems to conduct their own tours.

"They're very proud when they're taking people around and they're saying the gym has recycled materials on the wall and on the gym floor, they talk about the water that we're saving, there's no paper towels in the washroom because they have hand dryers, all those kind of things," says O'Sullivan.

"They're just very used to it becoming part of their lives. So I'm sure that as they move through the school system and they look at buildings in general that they will see the importance of that."

Excerpts from the ensuing discussion in The Tyee's comment section:

nice fancy schools
posted by "ooolaah" on February 9, 2011

Well, it's nice that the provincial government has set these rules about how new schools are to be built and such. What about all of the children that are not living in Vancouver/Lower Mainland area, where these new schools will not be built? Does the government have funds for improving their schools?

To Ooolaah
posted by "KHyslop" on February 9, 2011

Yes, the money is for all new provincial schools. I was trying to keep my word limit down so I didn't mention the other schools in the province, but the Ministry of Education told me that the following schools are LEED Gold:

Crawford Bay Elementary (SD 8)
Coldstream Elementary (SD 22)
Woodward Hill Elementary (SD 36)
Steveston-London Secondary (SD 38)
Glen Elementary (SD 42)
Duchess Park Secondary (SD 57)
Penticton Secondary (SD 67)

There are 31 schools in the province in the design/development stage, and 10 in the planning stage. They are not, however, providing funds to any districts in the province for updating existing schools to bring them up to LEED Gold standards.

And more wood too!!
posted by "USWoodWorks" on February 9, 2011

With the Wood First Act, our children will not only have nice new schools but they'll be built out of wood too - right?

Students and teachers are more healthy and productive
posted by "freebear" on February 10, 2011

Students and teachers are more healthy and productive in sustainably-built schools located in unsustainable neighborhoods and cities!

How Smart Is 'Power Smart', BC Hydro's Try at Saving Energy?

Not very smart, says economist Mark Jaccard. But are we brave enough for California's far more successful approach?

By Christopher Pollon

Article first published on March 9, 2011 by TheTyee.ca.

I recently joined BC Hydro's Team Power Smart, joining the nearly 300,000 British Columbians who have signed up to date. Months of saturation marketing -- through TV, the Hydro Power Smart Olympic Village and pitches from ambassadors at scores of public events -- finally compelled me to take a closer look.

A personalized online analysis of my townhouse and hydro bill revealed what I've known all along: I'm a glutton for power and need to change. My family hot water tank is hemorrhaging energy, the crawlspace needs insulation, and my cursed electric baseboard heating will exact a horrible toll as utility rates rise by 50 per cent over the next five years.

By luring me to the Team, BC Hydro hopes to change my consumption habits: not only do they provide personalized information on how to conserve, they promise to pay me $75 if I can reduce my electrical consumption by 10 per cent in a year.

That $75 carrot is a tiny piece of the $30 million BC Hydro spent on its eight residential Power Smart programs in 2010, which collectively saved the utility an estimated 78 gigawatt hours (gWh) last year (see sidebar). This is a drop in the bucket when you consider that BC Hydro produced more than 50,000 gWh of electricity in 2009 (including independent production), and is counting on conservation and energy efficiency to account for 66 per cent of its incremental electricity needs by 2020.

So I approached Simon Fraser University environmental economist Mark Jaccard, a man who makes a living pondering such things. I asked him about all the residential customer-focused rebates and cash incentives -- including cash to scrap old fridges, buy energy efficient appliances and replace incandescent light bulbs.

Power hogs? Don't offer them rebates, says SFU's Jaccard. Jack up their rates, and mandate efficient appliances.

Was the cost of all that, I asked, a smart investment in conservation?

Jaccard said my question was "coherent" but backwards. "If you have an objective like energy efficiency, why do you assume we have to spend money to achieve that? We should spend zero dollars. . . eliminate the Power Smart budget, and use electricity pricing and regulation instead."

The erosion of conservation benefits

When it comes to meeting our future electricity needs, BC Hydro has a few options: Increase system efficiency ("Resource Smart"), develop Site C, pay for new supply via long-term contracts, or invest in conservation. Conservation is cheapest, and so BC Hydro will continue to spend increasing amounts on demand side management (DSM) this decade. But the electricity you avoid using still costs money.

Jaccard is the co-author of an unpublished December 2010 study that investigated whether the money spent on Canadian utility "subsidies" (like a rebate to buy an efficient appliance) actually works, and he says the news is not good. "DSM expenditures by Canadian electric utilities have had only a marginal effect on electricity sales," the report concludes.

Yet residential rebate programs remain popular with politicians, utility executives and the public, Jaccard says, because they make us all feel good about conservation. The only problem is that our energy consumption keeps growing in spite of these measures, while utilities continue to oversell the benefits.

Most utilities can only infer the impact of this spending. This is because many of the people who actually use the rebates -- referred to as "free riders" -- are the same people who would buy the appliance in the absence of the rebate. "Free riders add to the utility cost of a subsidy program without contributing to its effectiveness," says Jaccard's report, which highlights a 2004 U.S. study that estimated an "overall free rider-ship rate of 50-90 percent," based on a consideration of all utility DSM programs in all sectors.

Then there is the "rebound effect" -- when the improved energy efficiency of a given appliance, technology, etc. reduces the cost of using that device to the point that it actually spurs greater energy use. So our lives are filled with increasingly energy-efficient devices, but we have many more of them, consuming ever-greater amounts of electricity.

Jaccard's prescription

Money would be better spent, says Jaccard, focusing our efforts on "radical rate design" and regulations that force manufacturers to build efficiency into their products.

BC Hydro has already moved to what are called Conservation Rates -- most of us now pay two separate prices for electricity -- a lower rate for a set period of time, followed by a second, more expensive rate that kicks in after a set period of consumption.

Jaccard says the setting of that higher rate by BC Hydro has been too conservative. This "top step" rate needs to go way up, and reflect the full costs of bringing new supply online; this could see the highest rate moving into the 12-15 cents/kWh range. (On my February 2011 residential BC Hydro bill, the first and second steps were 6.2 cents and 8.7 cents/kWh respectively).

On the subject of standards and regulations, Jaccard says BC Hydro has made progress here too. A case in point is the new lighting efficiency standards that will see the phase-out of incandescent light bulbs.

"[BC Hydro] has started to realize that it's better to give the money to encourage manufacturers or retailers in a certain direction, rather than final customers," says Jaccard.

They're doing it in California

California leads the way in North America when it comes to the types of regulations and "standards" Jaccard refers to. Since they emerged in the early 1970s, the state's building and appliance efficiency standards have made California the most energy efficient state.

"Our per capita energy consumption has been absolutely flat for nearly 40 years, and this is directly because of these standards," says Adam Gottlieb, spokesperson for the California Energy Commission, the state's primary energy policy and planning agency. He says standards for everything from air conditioners to fridges have enabled Californians to consume an average 7,400 kWh of electricity annually while the rest of the country averages at 12,000. (Note: a typical BC household -- 1,600 square feet, not reliant on electricity for space or water heating -- currently uses about 14,000 kWh.)

California's utilities -- a broad mix of public and privately-owned concerns, reliant on everything from imported coal power and hydro, to locally-generated power from natural gas and nuclear -- still spend a

lot on traditional DSM approaches like our residential Power Smart. There like elsewhere, the impact is often dubious.

"There's no magic bullet, and there's no sure-fire way of getting a lot of people on a regular basis to conserve a lot of energy," says Alan H. Sanstad, staff scientist and energy policy analyst at the Lawrence Berkeley National Laboratory in Berkeley, California. "Even when DSM is effective, the results on the whole are modest."

What is clear, he says, is what does not work. "There's this idea that providing information gets people to conserve energy, and that idea is false, and was demonstrated to be false decades ago. When demand side management works, it works because there are money flows."

BC Hydro strikes back

BC Hydro's Patrick Mathot, manager of residential marketing for Power Smart agrees with one major point made by Jaccard: BC Hydro does a lot of scrutiny of the effectiveness of their conservation spending, including accounting for free ridership.

"We ensure that there are many more people who are influenced by our incentive activities and all the other work it takes to get that product in front of them. The sheer volume of those people overwhelm the free riders to ensure the program still makes business sense." (Jaccard stressed that his research shows BC Hydro to be one of the best utilities in North America when it comes to being "self-critical" and taking pains to accurately evaluate the effectiveness of their DSM programs.)

Like in California, the light bulb has been the primary focus of BC Hydro's residential programs since Power Smart began in 1989. He says their programs focused on lighting have had the best return on investment for BC Hydro -- they've spent about $30 million over the last 10 years, resulting in a savings of 600 gWh in the residential sector alone. But he concedes the job will get harder moving forward.

"It's getting to be more of a challenge to find more energy savings to have, because we are running out of the low-hanging fruit and are now moving up the tree."

The incentives will only grow

To date, more than 4,000 BC households have reduced their energy consumption enough to collect their Team Power Smart $75 cheque, leaving about 55,000 other Team Power Smart households out there -- including mine -- to take action.

Mathot says BC Hydro's installation of 1.8 million digital smart meters in B.C. homes and businesses starting this summer (projected to cost over $900 million) will make it possible for customers to see when and how much electricity is used in the home. "But ultimately," he says, "it will be up to people to make the decision to use less and take action to reduce their consumption."

Which brings this all back to me. Team Power Smart's online tools -- developed by social marketing experts to spur my conservation, show that my small townhouse consumed nearly 13,000 kWh in 2010 -- almost double what the average Californian residential utility customer consumed.

And therein lies a glimmer of hope for residential electricity conservation across British Columbia. When the day comes that I have to pay the same rates as a Californian, I'll have much more incentive to act.

Excerpts from the ensuing discussion in The Tyee's comment section:

Smart meters
posted by "Steve Cooley" on March 9, 2011

Smart meters would be smart if they cost the same as or less than the dumb meters to manufacture, install and service. Smart meters would be smart if they last as long as the dumb meters or last longer. I have seen only one comment about this aspect of smart meters and it said they cost more and fail sooner. Their primary virtue appears to be the elimination of meter readers and the possibility of raising rates during peak periods. It is disguised as reducing rates during low periods. The powers that be seem to think that automated devices buy their service or product. Automate everything and there will be no market for anything. There is a better return to society by spending money for people to do things than spending the same amount for a machine.

One of things that has me
posted by "Van Isle" on March 9, 2011

One of things that has me baffled is that we allow the sale of high energy consumption electronic gadgets. As I understand it there are some new 'flat' HD TV's that consume twice the power than an ordinary old style bulky tube-screen TV.

Variable Rates
posted by "RBV" on March 9, 2011

We were part of the variable rate pilot program for two years. The idea was that you were supposed to schedule power use to take advantage of the low rate periods (essentially before 4PM, after 9PM and on weekends). Doing all of the reasonable things (eg. turning on the dishwasher before you go to bed, doing laundry on the weekend, turning off lights in empty rooms at night) still got us a power bill that was higher than our single fixed rate bill. Power Smart's suggestions to actually save money involved doing things like "preparing your meals for the upcoming week on the weekend and reheating them in your microwave" and "not watching television or listening to music before 9 PM". Whatever other merits the Smart Meter program may have, don't plan on saving any money unless everyone in your house works afternoon shift.

Another charade a la Carbon Tax
posted by "freebear" on March 9, 2011

Conservation ma work to reduce a houselholds energy bill; but then hydro takes that saved enegy and sells it to someone else to consume using their electronic gadgetry.

The individual household/customers may save energy/consume less electricity (the per captita measure; per unit); but there are more of them so in the end more electricity is being consumed!

Similarly, the Comox Valley wants me to conserve water, to openm up room for more consumers of water - the projected 45,000 new residents coming in the near future!

You can't talk conservation out of one side of your mouth; while pushing growth in consumption!

Wait, that is what most people seem to be advocating

If BC Hydro was serious about saving energy
posted by "Gordon_Ramble" on March 9, 2011

If BC Hydro was serious about saving energy, they'd retro-fit all the street lights throughout BC with solar panels ... basically utilizing the same solar technology that is now found throughout construction sites in BC for powering temporary lighting.... however, BC Hydro isn't serious about saving energy, so that'll never happen in our lifetimes... the only thing BC Hydro is serious about is; reaching deeper into your pocket to enrich a small group of insiders at your expense.

CASE STUDY #6: Killarney Community Centre Ice Rink

Photo by Justin Langille

Killarney Community Centre Ice Rink
East Vancouver

Completed: 2009
Use: Ice rink and arena
Distinction:Recycled most of previous building on-site

It's not just what the 250-seat Killarney Community Centre arena is now that earned it a LEED Gold certification, but what happened to the crumbling 40-year-old skating rink it replaced. Built initially as a venue for the 2010 Paralympics, the Killarney Community Centre holds an NHL-size rink and a swimming pool. Heat that's generated from cooling the ice in the rink warms both the building's air space and the community pool—boosting energy efficiency by an estimated 38 per cent. Dual flush toilets reduce water use by 40 per cent. Low-intensity illumination reduces light pollution, and a white roof minimizes the heat island effect. But it's not just its own performance that makes this building stand out: it's the care taken to recycle 95 percent of the concrete from the old rink it replaced.

So Much Rain! Why Not Put It To Work?

Exasperated that our wet winters turn into water-scarce summers? Get your own 1000-gallon rain barrel.

By Christopher Pollon

Article first published on March 24, 2011 by TheTyee.ca.

DANGER: Drinking this toilet water could be hazardous to your health.

That's the message required above every rainwater-flushing toilet installed at Vancouver's Olympic Village, where water is collected from the roof, stored in a giant holding tank, and pumped as needed for each flush.

The sign is necessary, because bringing rain indoors breaches a fundamental orthodoxy of the North American plumbing world: behind the walls, pipes carrying potable municipal water mingle with those carrying potentially unsanitary rain. On paper, building codes for Vancouver and elsewhere in B.C. do not currently allow the practice of indoor rain water plumbing. In a post-Walkerton regulatory environment, there is immense discomfort on the part of building inspectors at the prospect of mixing private and public water supplies. (See sidebar.)

In spite of this, there are about 25,000 rain water capture systems operating across B.C. today -- used to water lawns and crops, flush toilets and provide drinking water for people and livestock. There are about 5,000 rain systems on Vancouver Island and the Gulf Islands alone, in areas where seasonal droughts and dodgy well water make it a necessity.

As municipalities and cities explore ways to work with the deluge of water that falls from the sky (more than a metre of rain typically falls annually in Vancouver), the most promising use will be for irrigation of lawns and gardens in the near future. This could be good and bad.

"I have a worry that rainwater is starting to get trendy," says Bob Burgess, a B.C. rainwater harvesting pioneer and founder of The Rainwater Connection which designs and builds all sorts of rain capture systems. "More and more people are doing it, and doing terrible jobs of it. It may not be too long before we have our little Walkerton for rainwater."

Looking to the skies

A basic rain harvesting system captures water from a roof and channels it to a storage tank, where it is then pumped to where it is needed. Along the way, the rain undergoes any number of different filters and cleaning methods depending on the end use: to make it potable for drinking, it will require filtration and any combination of UV sanitizing and chlorine-injection; water strictly for watering plants will be cleaned less.

Big municipal fleets are among the early adopters: White Rock currently washes some of its trucks with rain, as does Vancouver; the Regional District of Nanaimo captures rain off two large Parksville recycling transfer buildings and uses it to wash their interior

concrete floors.

Commercial greenhouses in places like Delta and Langley have already taken rainwater recycling to a high art: many operations capture and use rain for watering, then continually recapture from the soil, filter and reuse.

Toilet flushing with rain is more complicated, often requiring a separate indoor plumbing system to move it within the building, as well as time-consuming consultations with municipal building officials to get approval. (See sidebar.) Such projects often occur in big "green" building developments like the Olympic Village. Developers often earn points toward LEED certification for such water conservation measures, providing the incentive to go through all the trouble.

Then there are those who use rain water out of dire necessity -- usually for drinking. As early as the 1960s, farmers in the Lower Fraser Valley and on Vancouver Island started to notice their groundwater was being contaminated by synthetic fertilizers and manure. Burgess still gets regular calls from farmers looking for cleaner sources of water for their cattle, horses, and families.

Many rainwater drinkers started out like Burgess himself: he retired to a piece of land served by a bad well (he lives and works on Thetis Island in the Gulf Islands) -- and looked to the sky for solutions.

He says 75 per cent of the people currently using rain for potable water in B.C. have no choice; another 25 per cent have the option of drilling a well (with no guarantee of success), but choose rainwater. There is also a tiny but growing number of people who want to conserve water for the sake of conservation -- a move that also provides more control over the contents of the water. (See sidebar for ballpark rain system costs, including potable.)

A barrel of possibilities

Burgess says using rain for irrigation holds the greatest promise in changing how residential consumers and many municipalities consume and conserve water.

Each summer, the demand for treated water almost doubles across the Lower Mainland, due almost entirely to lawn watering, at the very time when rainfall is lowest. Peak summer water demand typically occurs sometime in July each year, when the masses are soaking their lawns to keep their grass green. It is this peak demand that drives the costs of our entire water system -- everything from budgeting water needs to determining the size of our pipes.

"The single best thing municipalities could be doing is providing the means for Mr. And Mrs. Smith to have a 1,000 gallon rain barrel full of water in July," says Burgess. He says ubiquitous rain watering systems, fitted with a simple fixture to allow rain tanks to be topped up with municipal water as needed at night, would solve the costs and strains of meeting this peak demand.

Many others agree. As lawn sprinkling rules get more onerous, rain harvesting is going to start making more sense, says Bruce Hemstock, a principle at Vancouver landscape architects PWL Partnership -- which designed the Vancouver Convention Centre's 2.4-hectare "living roof." "Summers are starting to get a little longer and drier, and we'll get to a point where we won't be watering our lawns [with potable water] at all."

What needs to change?

Kenneth Chow says rainwater irrigation has a bright future, and he should know. Chow is a "building code consultant" with Pioneer Consultants -- basically an enabler who helped Olympic Village developers earn the "equivalencies" required to get rain water toilets installed and approved. He says using rain for irrigation is much simpler, cheaper and safer than trying to put it in toilets -- and you don't have to post those silly hazard signs either.

"If we use rain harvesting for irrigation, it's very low risk, and much easier to control the hygenics of the water... if there's a mistake, the consequences are minimal. A plant might get a little water with bacteria in it, but there's already lots of bacteria in the soil."

He says regulatory agencies need to sit down with experts and "publish" the basic rules that will govern how rain water systems are designed and built -- instead of evaluating each system on a case-by-case basis, and forcing developers and other aspiring rain harvesters to devise custom "solutions" every time.

Discussions to this end are already happening: last year the City of Vancouver engaged in talks with Metro Vancouver, industry and neighbouring municipalities exploring sanitation standards for rainwater. This includes adding chlorine to stored rainwater to protect municipal potable water supply -- in the same way we currently use chlorine to treat water for swimming pools.

Burgess has practical suggestions of his own. “Allow the use of [rain storage] tanks as tall as the legislated fence height (like this one), and make it so they can go anywhere within a foot of the property line. That one little change would take away a whole bunch of hassles for people.”

Excerpts from the ensuing discussion in The Tyee's comment section:

Why keep summer grass green?
posted by "airwin" on March 24, 2011

Homeowners here in Victoria are pretty smart; they let their lawn grass turn brown in the summer. This means much less time/energy spent on mowing the grass. And the grass seems to thrive on this treatment. When the fall rains come, the grass turns emerald green and grows like crazy.

Thus for me installing an expensive system to store and distribute rain water simply so I can mow the lawn more just makes no sense at all.

On the other hand, I can see the point of such systems for keeping a home vegetable garden going through the summer. Food is important, green grass is not.

Is rainwater less pure.....
posted by "Stewart MacKenzie" on March 24, 2011

..... when it falls, or are collection and storage the issue?

I am having a hard time understanding how rainwater could be less safe than water standing in a reservoir. I assume therefore that the issue is storage and treatment, which is influenced by convenience and also by convention. People need to start thinking "out of the box" on issues like this and realize that getting greener without changing our social models and constructions is doomed to failure. The underlying model has been developed with an assumption of cheap energy, food, and other essentials; and will not be sustainable under future conditions.

The middle class in North America has been raised with the expectation that one should be able to own a home, drive a vehicle of one's own, and have a large "disposable income" even after all essentials are covered.

In other words we are spoiled rotten, and spoiled people are really bad at working together cooperatively in crises. Many if not most are not going to deal well with enduring the erosion of their standard of living and the destruction of their fundamental assumptions about the world they live in.

Victoria rainwater storage Freya Keddie
posted by "BrianWhite" on March 24, 2011

Our own rainwater guru is Freya Keddie
She was one of the first in Vic to really work to inform people about the issue. I think their tank is 1000 gallons. She was the trailblazer.
On the gulf islands you can find some of the companies which are expert on sizing your tank and on potable water from the rain. (Because rainwater storage for summer use is essential there).
Here they have started landscaping for rainwater storage for plants too. Raingardens, etc are cropping up all over the place.
One thing about rainwater storage is that it leaves more water in the rivers in summer for the fish (and it produces less runoff in the winter when the rivers are flooded.
http://www.urbanraincatchersgazette.ca is Keddie's site with lots of info.

the second single-best thing they could do...
posted by "mjscox" on March 24, 2011

Would be to encourage people to get rid of their stupid lawns. I mean, what's the good of grass, now that its chewed up each year by crows, starlings, raccoons, etc? Plant vegetables, flowers, use low-flow drip irrigation, GET WITH THE TIMES, people. Lawns are wasteful. Vegetables are beautiful.

How to Design a Building that Restores the Earth

UBC's Centre for Interactive Research on Sustainability aims to set a new North American standard by actually benefitting the environment.

By Katie Hyslop

Article first published on March 28, 2011 by TheTyee.ca.

What if a building wasn't just sustainable, but actually benefitted the environment? It's a lofty goal, but the University of British Columbia is trying to achieve it with the construction of what they believe will be the greenest building in North America.

Right now, the Centre for Interactive Research on Sustainability (CIRS) is a two-story shell of a building: there are no doors, the stairs are rough, and rebar and plywood are the main decor instead of office furniture and potted plants. But by the time it's completed this June, CIRS will be more than just a stylish campus building: it will meet both the LEED Platinum and Living Building Challenge standards, and give back more than its taking in air, water and energy, upping the productivity and happiness of the people who inhabit it.

"The aspiration is for a regenerative building, essentially a building that can live within its footprint, what's available to it in terms of mass and energy flow on the site or within the site," says Alberto Cayuela, associate director of UBC's Sustainability Initiative, which is in charge of the CIRS project.

Not just a bunch of hot air

CIRS relies on a series of heating systems, including 16 geothermal rods, solar hot water and a heater exchange connected to the adjacent Earth and Ocean Sciences Building.

In a climate where the amount of heating in winter matches the cooling in summer, geothermal rods could successfully mine the earth's cooling and hot air to operate a building like CIRS.

Due to open in June, CIRS is being touted as a 'regenerative' building.

But in a place like Vancouver, where the amount of heat required is three times the cooling, a geothermal system runs the risk of taking out too much heat and cooling the earth, causing a system decline over time. To avoid this, CIRS takes as much heat out of the ground as it does cool air, and relies on heat exchangers capturing wasted air from a nearby building to warm up the rest.

"(Earth and Ocean Science Building) consumes 1,600 megawatt hours a year of steam from the steam plant, and 990 goes through the roof, the fume hoods. So that building, by law, that's 10 air changes in hour in every fume hood, and that's 990 megawatt hours through the roof," says John Robinson, executive director of the Sustainability Initiative.

"We're taking all of that heat, bringing it into CIRS, we only need 300, we're giving 600 back to that

building. So we're reducing their steam use by 600, which reduces natural gas burning by 860 at the steam plant -- that's 150 times a year. So the net affect of adding this building is to reduce natural gas burning at UBC."

Robinson hopes building symbiosis models such as this will not only inspire future construction to rely on existing systems and improve them, but will inspire others to think of sustainability as being about more than just one building.

"Sustainability is not a building scale phenomenon, it's an actual neighbourhood or community scale," he says.

Water, water everywhere

Few places in the country get as much rain as Vancouver, so it seemed unnecessary to the Sustainability Initiative that all the water for CIRS had to be pumped in from the city reservoir when less than five per cent of the building's water had to be drinkable.

Instead, CIRS will act as a water treatment plant, collecting and storing rainwater, treating it to grey water standards, and using it for the building's non-potable water needs, like toilets, urinals, and irrigation.

"This location we get around 1,200-1,300 millimeteres of rain per year, and we have a catchment area of around 500-600 square metres, so there's a lot of water we can harvest during the year," says Cayuela.

"We have a 100 cubic metre system essentially that will be our main repository for rainwater harvesting, and we're going to treat water on demand."

The treatment process will be aerobic: pumping oxygen into the water to encourage bacteria to eat waste matter and turn it into carbon dioxide. It's a more energy intensive process than anaerobic treatment, which doesn't require oxygen but produces methane gas, making it a potentially more dangerous method of water treatment.

During slower periods of the year, such as the summer and Christmas break, CIRS will treat sewage water from other buildings, thereby reducing the amount of wastewater they produce. Excess water or storm run off will be treated and redirected into a well drilled into the aquifer, not only improving the quality of water returned to earth, but preventing the erosion of nearby cliffs.

"The runoff from every building on campus right now goes down through the soil, hits the clay layer, and goes off through the cliffs and erodes the cliffs," Robinson told The Tyee.

"Our water discharge will go down the well and recharge the aquifer. So it won't contribute to the cliff erosion."

Inhabitants vs. occupants

"We think the new sustainability agenda is about making peoples lives better, not just environments' life better," says Robinson.

"We define an occupant as a passive recipient of building systems: you go in, you can maybe turn on your lights, you can maybe open your window, and that's it. Everything else, you don't know about, you can't control. Can we instead create a building where people are inhabitants, where they have a sense of place and engagement with their actual building and with the spaces where they work."

Robinson aims to do that by having each of the building's inhabitants sign a sustainability charter, committing themselves to achieving CIRS goal of benefitting the environment. But Robinson doesn't expect people to work towards a new level of sustainability out of the goodness of their own hearts. Instead, he's offering inhabitants five benefits: high air quality, access to daylight everywhere, individual control of your workstation's atmosphere, real time feedback on how the building is doing, and the ability to vote on the building's control systems.

With the exception of the 450 seat auditorium -- the largest lecture hall on campus and the only one lit by skylights -- Robinson and Cayuela like to boast that every horizontal surface in CIRS is covered in windows, not only allowing in natural light, but giving people control over the air quality by using windows that open manually.

"We're putting a sensor in each window -- the reason

is we want to make sure we know at any given time who's using natural ventilation when conditions allow it," Cayuela told The Tyee.

"Or, for instance, to what degree our building inhabitants are responding to our requests, for instance if we're expecting a very warm weekend, and asking people to leave their windows open so that the building doesn't overheat, to what extent people are doing that."

'Net positive in structural carbon': Robinson

Control over personal environment extends beyond opening and closing windows and flicking a light switch, however. Each workstation at CIRS will feature a power and data station, offering updates on the building's energy and water consumption, as well as an air diffuser you can control.

CIRS will also feature removable partitions instead of drywall, and all the wiring will run through the raised floor system: a full 18 inches of space providing not only the ability to move workstation power systems, but also act as a natural air ventilation system. If you want to convert two small offices into one meeting room, it will take only a handyman, some tools, and a couple of hours to make the change.

In addition, most of the building is made of wood from B.C. and Oregon certified by the Forest Stewardship Council, with the floors and ceilings constructed out of two-by-fours made from pine beetle infested wood -- just as strong as reinforced concrete or steel, but better for noise attenuation and prorogation.

"The amount of wood we have in this building represents more carbon being sequestered, locked away, than all the carbon emitted by the construction process and the decommissioning process at the end," says Robinson.

"We're net positive in structural carbon, which you don't hear as much about, you hear a lot about operational carbon, energy use, but we think cities should really take seriously, especially in Canada, of any place on the planet, their responsibility as carbon sequestration engines."

Driving to work would miss the point

But being the most sustainable building in North America only counts for so much when many people drive their cars to get there. A study by the university's office of Campus and Community Planning found that in fall 2009, more trips were made to campus by transit than any other method: 58,000 in total. But cars were close behind, with 40,200 trips in the same time period -- a 13 per cent decrease in car use since 1997.

Robinson says part of the existence of CIRS will be to house the Sustainability Initiative, dedicated to reducing the University's carbon footprint through improvements to transit as well as buildings.

"We have very specific goals in all of those areas, a very active program of reducing transport by cars," he told The Tyee, adding that almost half of the campus' parking above ground parking spaces have been reclaimed in the last decade, and U-Pass membership has increased transit ridership by 43 per cent.

Don't expect to see housing projects based on the CIRS model anytime soon, however. Robinson believes the building will inspire other universities in the country to try similar models, especially after the report on the construction costs, estimated to be 15 per cent above the normal rate, is released later this year. But he doesn't see net positive houses being modeled after the UBC building.

However, Robinson is hopeful some elements of the building are already catching on outside of university campuses.

"You may have seen (news articles about) the cross laminated timber potential for actually building high rises out of wood; it's never been possible. Right now, six stories, I think, is the max," he says. "But the new technology, cross laminated timber, opens the door to significant construction and Canada should be leading the world in this stuff. We have a lot of wood."

Excerpts from the ensuing discussion in The Tyee's comment section:

many thanks
posted by "SharingIsGood" on March 28, 2011

Kudos to John Robinson and his colleagues for taking the initiative.

Thank you UBC for letting these people show us how to live and build.

Many warm thanks to Katie Hyslop and the Tyee for bringing this informative article forward.

Building Green
posted by "Talon" on March 28, 2011

Thank you very much for this information about UBC and its Green Building initiative. It is good news when so little news is good. Stories like this need much wider dispersion so that it is seen on all the media, not just the most progressive like The Tyee. Tell your friends about it and write to UBC and say thank you for being a friend of the planet. Many thanks to Ms. Hyslop and The Tyee.

A Wolf in Sheep's clothing?
posted by "stevesatow" on March 28, 2011

Ms. Hyslop says it herself, 'Don't expect to see housing projects based on the CIRS model anytime, soon, however.'

Why?

Firstly; this project is 'estimated' to be 15% more expensive that conventional construction - a major barrier to the mainstream uptake of sustainable building practices.

Secondly, this appears at first glance to be a conventional building (vast amounts of concrete, steel and glass - all with massive embodied energy and resources - overlaid with some complex and/or expensive technology in the form of ground-source heat recovery, massive PV arrays and recaptured heat from neighbouring buildings (amongst other things).

What disappoints me about high-profile projects like this - particularly ones conducted by universities - is the missed opportunities. They have at their disposal an almost limitless pool of fervent young minds just over-flowing with new ideas that they could work with. But instead they build another fancy concrete and glass block.

Why? Probably because it conforms to the building code requirements?

stevesatow: mostly wood
posted by "KHyslop" on March 28, 2011

stevesatow, the building is actually made mostly of wood. Professor Robinson didn't have a percentage value on how much of the building was wood, so I unfortunately can't give you specifics on that. But it is more wood than concrete.

CASE STUDY #7: Austria PassivHaus

Austria PassivHaus
Lost Lake, Whistler Photo by Justin Langille

Completed: 2010
Use: Day Lodge, café, meeting space
Distinction: Heats For Under a Dollar a Day

Built to house Austria's Olympic Committee delegation and national broadcaster during the 2010 winter games, then gifted to the citizens of Whistler, the 2,700-square-foot 'PassivHaus' boasts super-thick insulation and detail in the building design (especially thermal 'breaks' between exterior cladding and interior spaces) that reduce its energy needs by 90 per cent from those of a traditionally-built home—beating even LEED platinum home standards by 50%. According to its new owner, the Resort Municipality of Whistler, heating the Austria PassivHaus for all of last year cost about $280.

A Smarter Way to Help You Pay for Greening Your Home

On-bill financing is making energy saving upgrades more affordable in the US. And soon here?

By Colleen Kimmett

Article first published on March 31, 2011 by TheTyee.ca.

It was the air coming out of the light socket that opened their minds, and their pocketbooks.

When Laura Lee Schultz and Jacqueline Gullion bought their East Vancouver bungalow last year, they knew going in that it would need a lot of work. Their first priority, like many of the newly "house rich, cash poor" set in Vancouver, was building a basement suite they could rent out to help cover mortgage payments.

Energy efficiency was not a priority, explains Schultz, at least not until they found out they could get a $1,200 rebate from the provincial government's LiveSmart program to replace their 60-year-old furnace. As part of the deal, they were required to have an energy auditor come in and do a standard test that measures air leakage in the house.

"His eyebrows shot waaaay up," recalls Schultz. "He made me put my hand in front of the back outlet, where the light socket is, and there was air blowing into my hand -- a lot of air.

"And he said, that's just one spot where you're having air leakage in this house. It's really, really bad."

Learning just how much heat their house was hemorrhaging was the impetus for a host of other energy-efficient retrofits -- including weather stripping and insulation -- that Schultz and Gullion eventually undertook. They ended up spending $35,000 renovating their entire home, and $15,000 on energy retrofits alone. They talked to contractors, did research online, watched how-to videos on YouTube and ultimately turned their renovation and retrofit project into a website, Lez Renovations. "We took this on, as not just buying a house together, but to have fun with it," explains Schultz. "So we kind of enjoyed the research."

Laura Lee Schultz, above, and Jacqueline Gullion undertook $15,000 worth of energy retrofits on their East Vancouver home. Photo: Justin Langille.

Most people have no idea how inefficient their homes really are, much less what to do about it. More than a third -- 35 per cent -- of British Columbia's greenhouse gas emissions come from buildings, and more than 50 per cent of the buildings that will be around in 2050 -- the year by which B.C. is supposed to have reached its targets -- already exist now.

We know technically how to green this existing housing stock. But the question of doing it on a larger scale, of how to finance millions or billions of dollars worth of private home energy retrofits, is one of the biggest challenges facing municipalities today in their quest to reduce greenhouse gas emissions.

Beyond rebates

One thing is clear: it will take more than rebates. As Christopher Pollon reported previously in this series, rebates like the SmartEnergy program add up to just a drop in the bucket.

In December, Mayor Gregor Robertson announced the city was developing a pilot program that would allow homeowners to pay for home energy retrofits through on-bill financing.

On-bill financing means the homeowner doesn't have to dip into savings and pay a lump sum up front, and it's more convenient than asking a person to go to a bank and take out a separate loan. It's easier to track as the cost of running a household, too. Retro-fit loan charges can be folded into tax or utility bills the resident is already paying.

"We want to make it easy for everyone so you can opt in and you pay over time but the cost is offset by the savings in energy," Robertson said when he launched Vancouver's version.

The program will allow a homeowner to borrow money to finance home energy retrofits -- things like new furnaces and boilers, more efficient windows, insulation and weather stripping. That loan can then be repaid over time on the homeowner's property tax.

This kind of long-term, low-interest financing model is already being adopted many U.S. jurisdictions, including Portland. Two years ago, it launched Clean Energy Works Portland, a pilot similar to the one Vancouver is proposing, which has reached 500 homeowners in the city.

Moving energy savings to a top priority

Marlowe Kulley is a clean energy specialist with the city who helped develop and implement the pilot. One of the biggest challenges, she explains, was convincing homeowners that energy retrofits were something they want, or ought, to do.

"Most people would like to save energy at their home, but it's not necessarily at the top of their list of projects," Kulley says. "Especially when you think about other home improvement projects they might do -- a bathroom remodel, or a new addition."

To combat this, Clean Energy Works Portland did widespread advertising, but also targeted outreach in one particular neighbourhood -- the Cully neighbourhood -- in a working class part of the city. They contracted a team who canvassed door to door, held neighbourhood potlucks and approached people through local churches and community centres. According to Kulley, approximately 2,300 people responded.

Those who qualified for the program first received a visit from a home energy auditor to assess energy use and potential savings. Then, they got an estimate of what work needed to be done and how much it would cost. If the homeowner decided it was worth it, they signed the loan agreement and work began.

The average loan through this pilot program is $12,600, with a 20-year fixed interest rate of 5.99 per cent (residents who qualify for federal income assistance get a 3.99 per cent interest rate). The average payment per month is $76 per month, but combined with lower utility bills, real costs are more like $25 per month.

Through the whole process, Kulley and the team at Clean Energy Works Portland guided homeowners.

This is key, according to Eric de la Place, a senior researcher on climate and energy policy at the Sightline Institute.

"Even if you've got $10,000 in hand to do energy-efficient upgrades, how do you spend it? It's hard for the average person to determine the right investments," he says. "We've been advocating for an energy concierge for municipalities -- someone to help you do energy audits, tell you about the return, hire out contractors, have the work done and do a post-work audit."

Kulley measures the program's success in part by its conversion rate; that is, the number of people who received an energy audit and actually went on to get a loan and do the work. Clean Energy Works has a 66 per cent conversion rate. In a free market, without the benefit of an on-bill financing program, that number is more like 16 to 20 per cent, according to Kulley.

On-bill financing not only gets more people to invest in retrofits, but they tend to do more work overall, says Peter Sundberg, executive director of City Green Solutions, a Vancouver non-profit that provides energy efficiency services for single-family homes, as well as commercial and multi-family buildings.

"What you can afford to do now is obviously a huge part of it for the majority of people," Sundberg says. "A lot of people who go through the LiveSmart program... don't go through the whole potential because they don't necessarily have cash in hand."

In addition, he points out, grant programs like LiveSmart are often prescriptive, rather than focused on overall energy use in the home.

"The program, behind the scenes, is weighted so that it's giving larger amounts of money to upgrades that result in more greenhouse gas emission reductions," Sundberg says. Which means even though energy efficient windows may cost more than a new furnace or boiler, there is a lower rebate attached.

"I think the on-bill financing would be a really good solution for a lot of different people," says Sundberg. "What's the interest going to be on on-bill financing? How does that compare to just getting a regular loan? Is it more attractive?"

David Ramslie, Vancouver's sustainable development program manager, says the city's priority is to use its position to offer economies of scale and certainty to potential lenders, but will not be a lender itself. "We are trying to be absolutely responsible to the Vancouver taxpayer," says Ramslie. "Taxpayer dollars are not being utilized to finance private homeowner energy efficiency retrofits."

At this stage of development, the city offers few details on the pilot it's developing. It's not clear where the loans will come from, what the terms will be, and if there will be one lender or several lenders.

While sources say that VanCity Credit Union is a likely financial partner, Ramslie says the city has not yet entered into a formal agreement with any financial institution, and is open to proposals.

"We're not guaranteeing that the loan will be commensurate with energy savings," explains Ramslie, "but we're trying to get so that in most cases, the energy savings will be around what you're paying extra on property taxes."

Greening Homes Can Be Big Boost to Economy

As U.S. programs show, Canada could 'win-win-win' by doing more to help homeowners retrofit.

By Colleen Kimmett

Article first published on April 1, 2011 by TheTyee.ca.

The story (preceding) of how new Vancouver homeowners Laura Lee Schultz and Jacqueline Gullion took a $1,200 government rebate and turned it into $15,000 worth of energy-efficient upgrades is just one example of how a little investment can go a long way.

On average, for every dollar that government spends on these kinds of incentive programs, homeowners who use them spend another 10 on materials and contractor services.

And every million dollars of government investment in energy efficiency programs creates 10 to 15 new jobs in the green building sector.

In the U.S., Clean Energy Works Portland and programs like it have begun to proliferate, thanks in large part to millions of dollars in stimulus funding from the federal government. Without that advantage, can similar efforts here take off?

Jeremy Hays is the special program director of Green For All, a national non-profit in the U.S. with a mandate to build an inclusive green economy. It was a partner in Clean Energy Works Portland, a provider of green home retrofit financing, and similar initiatives across the states.

"Retrofitting buildings can reduce bill payments for homeowners, reduce energy use and carbon emissions -- depending on the energy -- and it creates jobs that folks desperately need," says Hays. "Why we're behind this issue is that it's just such a win-win-win."

In the U.S., federal stimulus proved the key piece.

US law stimulated green projects

According to Hays, Green For All successfully lobbied the federal government for a key piece of legislation -- the Energy Efficiency and Conservation Block Grant program -- that is helping more communities develop programs like Portland's.

The program earmarked $2.7 billion from the 2009 Recovery Act to assists U.S. cities, counties, states, territories and Indian tribes to "develop, promote, implement, and manage energy efficiency and conservation projects and programs..."

Green for All is now helping those communities

spend the money wisely, says Hays. Clean Energy Works Portland, for example, received $20 million from the program to scale up its program, which gave 500 homeowners in the city access to low-interest loans for energy retrofits, and allowed them to pay it back on their utility bills.

Now, Clean Energy Works Portland has become Clean Energy Works Oregon, and is targeting 6,000 homes across the state.

Marlowe Kulley, an energy advisor with the city of Portland who helped run the program, said they used part of the funding to set up an IT program.

"There's just a lot of data that has to come back and forth between a lot of different agencies," explains Kulley. This includes information about utility bill payment and credit history, information from partner utilities on energy use before and after, and information from contractors on the work that was done and its impact.

"It's a huge undertaking that requires a fair amount of capital to start up," says Kulley. "Right now there's just a lot of paperwork that's being handled by hand... and it's just not feasible when you're looking at thousands of units."

When asked whether programs like this one would be possible without that federal stimulus funding, Hay's immediate response is "No."

"Well, it would be possible," he adds. "But it would be happening at a very different scale than it is now."

Canada lags in green stimulus

In Canada, the federal government policies around energy efficiency and conservation have been spotty, at best. The EcoEnergy program, which provides retrofit rebates and incentives to individual homeowners, has stopped and started in various forms over the past several years, creating little stability for a retrofit market.

Similarly, B.C.'s retrofit program, small rebates targeted towards individual homeowners, was cancelled abruptly in 2009, shaking the retrofit and renovation sector here.

Funding uncertainty around these popular programs indicates energy retrofits are not a priority for federal or provincial governments, which leaves Canadian municipalities to pick up the slack.

Approximately eight years ago, the Pembina Institute began exploring how local governments could finance energy efficiency and renewable energy retrofits in their communities. In particular, they looked at Local Improvement Charges, or LICs, a financing mechanism already used by local governments. These charges are levied on residents, via their property taxes, when neighbourhood-specific improvements are undertaken, such as fixing sidewalks.

"What we started to explore was whether they could use this same mechanism, but use it as a way to provide loans to homeowners, so they could do energy-efficient retrofits on their home, and they would pay it back over time through their property taxes," explains Claire Beckstead, who works in Pembina's sustainable communities group.

"The reason that this is sort of innovative and interesting is because the loan itself would be attached to the property, rather than the individual. The benefit and the cost of those retrofits would be passed on should the homeowner move."

Provincial regs 'need clarification'

Pembina even looked at testing this in Dawson Creek. What they found was that there was legal ambiguity around whether communities in B.C. can use LICs for individual homeowners.

"The main challenge in B.C. around using local improvement charges is that the Community Charter doesn't explicitly allow this use of local improvement charges," says Beckstead. "Provincially, there does need to be clarification of the legislation."

Beckstead says while the province has shown an interest in how LICs could be used to finance home energy retrofits, the message needs to come from local governments.

"We're working out a way to move this forward. We know what the program could look like, it's just a matter of getting that explicit permission form the

provincial government."

There is potential in the LIC model for municipalities to partner with financial institutions -- like Vancouver will do with its retrofit program.

'How do we stimulate a new market?'

Indeed, it's hard to imagine a cash-strapped municipality putting up the capital investment to fund these kinds of loans. Ultimately, if we are to make a dent in the U.S. and Canada's greenhouse gas emissions, retrofitting has to happen on a large scale. That requires private investment, says Hays.

"The dollar figures are in the trillions," he says. "There's not that much public money ever. And that's not what public money is for. The question is, how do we stimulate, literally, the creation of a new market?"

While Green for All doesn't have an official position on the matter, Hays says he believes that on-bill financing through utility bills, rather than property tax, is a better way to provide the security and stability that will attract private investors.

He cites a couple of reasons for this, which are being modeled in Portland. One is that default rates on utility bills are typically quite low, about two per cent. So lenders can be confident that they will be repaid.

The second is fairly unique to Oregon, but could be potentially adopted anywhere. This is the Energy Trust of Oregon, a non-profit focused on efficiency and conservation that is funded by a three per cent "public purpose charge" that is levied to customers of all four of Oregon's utilities. This levy model has provided the means to collect 10 per cent of each loan which is deposited in a loan loss reserve for the program in the event that a homeowner falls behind or defaults on their payments.

"We have a platform where risk is low, we've got a loan loss reserve, 10 per cent, so you're covered," says Hays. "We've got you covered. Things like that are attracting investors. Now got other lenders to come in and use their own capital to make loans to our customers."

BC Hydro avoids question

And there are broader, perhaps more ideological reasons why utilities should become involved in financing for customer's energy retrofits, says Hays.

"I personally think that utilities, if we are looking long term, should become energy service providers, rather than vendors of kilowatts," he says. "Having them play a role in terms of helping customer finance ways to get energy services at lower costs, that just seems more like a role they should be getting in the habit of playing if we're getting into a green and equitable future."

BC Hydro conservation vice president Bev Van Ruyven did not respond to a Tyee email asking if the utility would consider becoming a lender for retrofit programs. BC Hydro's communications department offered this emailed statement from senior manager of marketing for Power Smart, Jim Nelson:

"We're exploring a wide variety of energy-efficiency retrofit financing tools under BC Hydro's Power Smart program, taking into account our customers needs in this area and the current options available to them."

Excerpts from the ensuing discussion in The Tyee's comment section:

Resolving B.C.'s ongoing decades-old 'leaky condo syndrome' BEST
posted by "ASKBiblitz.com" on April 1, 2011

Taxpayers shouldn't even LISTEN to these self-appointed mo'feshnuls wax bafflegab on experimental building technologies when the truth is that B.C. architects/engineers/homebuilders cannot yet reliably keep out the dribble of weather we get on the Left Coast!

Are they paying you for these stories, Tyee?

It sure looks like it. No journalist with eyes to see the tarps still going up all over the Lower Mainland would accept anything the industry said at face value.

The real story: WHY are 62 buyers at the experimental, green, sustainable Athlete's Village/Millennium Water joined in a class action to get the heck out of their condos?

First, let's stop the waste of resources and money on 'repairing/reconstructing' fundamentally flawed product. We need housing the meets CSA durability guidelines as a matter of law.

To protect the environment and consumers, we should make the construction of housing that fails before at least 25 years a strict liability offence! At the moment there is NO incentive to construct quality housing - no penalty for infecting the environment with toxic, unstable garbage still under tarps regardless of age. New stuff leaks just like the old stuff from the '70s when Canada on the advice of National Research Council (NRC) scientists enacted energy-saving provisions.

How much energy have we wasted repairing experiments intended to save energy?

How long will we allow it to go on?

And you are being generous at that!
posted by "RickW" on April 1, 2011

Quote:
In Canada, the federal government policies around energy efficiency and conservation have been spotty, at best
ASKBiblitz: Excellent point! The condo tents are so ubiquitous that no one sees them anymore. It was a superb PR move, getting the owners to shoulder the blame for the deficient construction - and getting them to pay for the (temprorary) repairs as well!

Don't ya just love the free market!

leaky condos aren't the whole story
posted by "jnewcomb" on April 1, 2011

While BC's leaky condo crisis has certainly resulted in massive, multi-billion-dollar multiplication of economic development, it isn't exactly a poster-child for good conservation. I think the Barrett Commission tried to place all the blame on shoddy real estate developers, builders, architects, and municipal inspectors. However, as bad as the leaky condo crisis has been for so many BCers who thought they were buying their retirement haven - and just got deeper in debt - residential energy conservation is much more than that.

If we can reduce electrical energy going into homes, the energy saved can be used for industry, export - or even just to delay the need to build another dam. If its oil or natgas heating, BC will be reducing its greenhouse gas emissions - thats good too.

I don't think that Bev Van Ruyven can easily respond because policies with such financial implications like BC Hydro loans would probably have to be vetted by BC Utilities Commission first.

CASE STUDY #8: The Okanagan College Centre of Excellence

Photo by Justin Langille

The Okanagan College Centre of Excellence
Penticton

Completed: 2011
Use: Trade school/laboratory
Distinction: Built for 'Net-Zero' impact

Plucking heat and power out of the air, the Okanagan College Centre of Excellence in Sustainable Building Technologies is vying with UBC's CIRS to become Canada's first certified 'Living Building'. Already a 'living laboratory' for green building trades, the $27.6 million, 7,085-square-foot Penticton Centre features the largest array of photovoltaic solar panels in Western Canada. Despite its sunny and (in summer) hot locale, it has no air-conditioning; rather, it relies on operable windows to cool and ventilate, while 'solar chimneys' draw warm air up and out of the building. Those and other features meet the Living Building criterion of net-zero energy use. In a touch of its own though, the Centre's mechanical and electrical systems are left exposed wherever possible, so its building-trade students can see how the technology works.

How Many 'Miles-per-Gallon' Does Your House Get?

Home buyers deserve labels revealing future utility costs, say efficient building advocates.

By Colleen Kimmett

Article first published on September 20, 2011 by TheTyee.ca.

Most people wouldn't buy a car without knowing its fuel economy, or sign up for a cell phone plan without comparing service rates. Yet when it comes to one of life's biggest investments -- buying a house -- few stop to question how much it will end up costing them to operate that house in the long term.

Ideally, a thorough energy audit of your prospective new home would tell you not only how much it will cost to keep cool or warm, but also what you may need to do to improve that performance, how much it will cost, and where to find the help you need.

Government and climate advocates would also like it made easier to compare the average utility bill and greenhouse gas emissions of one house to those of another. They believe it's the secret to turning good intentions into action—a key part a green building strategy.

"Any [home energy] audit that happens via a utility or conservation program has one goal in mind: the ability to translate the audit into an actual retrofit," explains Sean Penrith, executive director of the Earth Advantage Institute, a non-profit green building centre based in Portland. "Being able to communicate information about a home's energy [use] is key to getting people to change," he says.

Yet that information can be surprisingly hard to find -- or figure out when you do. Existing home energy rating systems have been criticized for being too complicated and unwieldy for the average person to make sense of, and have so far had little impact on the housing market.

You check the label at the grocery store, why not buying a house?

HES and HERS energy ratings: apples and oranges?

It's no new idea. In fact, there's already a whole alphabet of rating systems out there: the EUI (Energy Use Index), HERS (Home Energy Rating System) Index, HES (Home Energy Score), the EPS (Energy Performance Score), and the ERS (EnerGuide Rating System), to name only a few.

The two most widely adopted in North America are HERS (which is used in the United States to deter-

mine EnergyStar certification for new homes) and its Canadian equivalent, the EnerGuide Rating System or ERS, developed by Natural Resources Canada.

Both HERS and ERS use a 'yardstick' method of measure a home's energy use.

At one end of the stick is a hypothetical house of the same size and location that scores low or zero on energy efficiency. At the other end of the stick is a hypothetical house of the same size and location that uses no energy at all. Where the home being examined falls between these two points determines its level of efficiency.

The Canadian-made ERS scale goes from 0 to 100. For a conventional new home, a score of somewhere between 65 and 72 is fairly standard. A home with some energy efficient additions will score between 72 and 79. A home that falls between 80 and 90 is considered energy-efficient and is eligible for certain perks, for example, a better mortgage insurance rate through the Canada Mortgage Housing Corporation.

But ERS has its detractors. In a 2007 assessment, the Canadian Home Builders Association identified a "logarithmic bias" with the ERS scale that makes it difficult to compare performance between homes. For example, a home with an ERS score of 80 uses half the energy of one scoring 13 points lower at 67. But it uses twice as much as a home with an ERS score of 86, only six points higher.

In other words, the higher up the scale you go, very substantial differences in energy efficiency appear to be minor. At the lower end of the scale, modest differences in energy efficiency appear to be significant. "These sorts of results will not make it easier for builders to sell energy performance using ERS ratings," concludes the Builders Association report.

Also, because both ERS and HERS score existing homes against hypothetical ones, they don't offer meaningful home-to-home comparison. "You could have a HERS index for a mansion and a cottage and they could be exactly the same," explains green building advocate Penrith.

An 'MPG' for home energy efficiency

Earth Advantage conceptualized the idea of a "miles-per-gallon" home energy rating system in 2006. Its staff tested five different energy calculating logarithms, comparing results to an actual utility bill, and eventually settled on a tool developed by an independent consultant named Michael Blasnik.

They next developed software to translate that information into something the average person would understand. The resulting system still comes with an acronym -- EPS, for Energy Performance Score -- but it provides a real-world estimate of a home's energy consumption and greenhouse gas emissions, as well as information about where it ranks on a national and regional scale.

The institute has tested EPS as part of a home energy retrofit pilot program, funded by the U.S. Department of Energy, that will eventually see it applied to 24,000 homes across four states. The two fully-operational programs in Washington state have secured 50 and 60 per cent conversion rates, Penrith says, meaning half the people who received an audit and Energy Performance Score actually went ahead with the recommended retrofits. (Data from a 5,000-home Seattle pilot is pending.) Compared to participation rates in older retrofit programs, typically ranging from one to 10 per cent, these numbers are significant.

The institute has recently launched the EPS platform in Canada. Auditors pay a $199 fee to learn how to use its associated software, then a fee of $15 to $35 each time they use it.

Penrith says that EPS complements popular home energy retrofit programs that match energy audits with low-interest loans for upgrades that can be repaid through utility bills or property taxes. However, he adds, the most striking difference between EPS and other home energy rating systems is that it doesn't require outside expertise to interpret.

He contrasts that with a system his hometown uses to approve financing for energy retrofits under its pioneering Clean Energy Works Portland (which offers on-bill repayment of a loan attached to the homeowner's property, a system profiled here). "They use an energy advocate to walk people through. Which is fine, but you can't take that to scale," explains Penrith. "A typical audit looks like 15 pages of gobblety-

gook."

"The EPS is something that an auditor can share with the homeowner and the contractor," says Penrith. "The consumer gets a scorecard that shows where they are and where they can get their home to. It generates a recommendation report and turns it into a scope of work for contractors to provide. It really distills that information down, like a weight-loss program."

Will it change the market?

Peter Sundberg is executive director of City Green Solutions, a non-profit that does home energy audits and other consulting work in green building with offices in Victoria and Vancouver. Knowing the energy use of one home in comparison with another, he says, is valuable to buyers -- especially any considering a fixer-upper -- but information that is currently missing from the marketplace.

While some major builders like JB Homes, one of the largest home building companies in the U.S., have picked up on energy labeling as a way to get an edge in a market full of lower-priced foreclosures, it remains to be seen whether new and improved home energy labels will gain real traction in the housing market.

Greenworks Realty and Development Group, a Seattle-based realtor specializing in green home sales, studied whether positive green ratings boost a property's value -- and found mixed results. Greenworks mined data from the Northwest Multiple Listing Service, which allows users to search for homes certified under various rating systems including Built Green, Energy Star and LEED. Its 2010 report found that certified homes in Seattle sold faster, and for 8.5 per cent more per square foot than non-certified homes. Outside the city, the opposite was true: certified homes took longer to sell and fetched lower prices.

In an interview with the Seattle Daily Journal of Commerce, GreenWorks owner Ben Kauffman chalked the difference up to education. In places where agents and buyers are taught about green building, they're more likely to put a value on it.

Anecdotal evidence, at least, suggests the same may be true in Canada. Helen Goodland, executive director of Vancouver's Lighthouse Sustainable Building Centre had her home renovated to improve energy efficiency in 2004, under the federal government's ecoEnergy retrofit program. When she recently put her house on the market at the same time as several others in her neighbourhood, hers sold first, in just six days.

"It was up front and absolutely explicit that this is an energy efficient, high performing home, with healthy interiors and designed with occupancy comfort in mind," Goodland says. "The whole package together was attractive. I wouldn't say the price was affected, but certainly the speed was affected. It's a differentiator."

In the end, it will be up to homebuyers like Goodland's to decide whether HES, HERS, EPS or some other scorecard can help them differentiate an energy hog from an energy miser.

Excerpts from the ensuing discussion in The Tyee's comment section:

Property disclosures
posted by "alive" on September 20, 2011

Energy consumption is only one concern for people buying a home these days.

By law the previous owner must supply a list of deficincies on a disclosure form, but if it is a strata lot that form only pertains to the interior, while the strata corportion reluctantly may provide minutes from AGM's and monthly meetings.

Sifting through those documents a prospective buyer has to spot possible concerns that was brought up and dealt with (or not).

Asking a simple question like : "How old is the roof" does not get answered that way!

Minutes are by their nature short and reveal little, leaving a buyer wondering if perhaps major repairs are about to come due, and extra levies imposed.

Compared to a possible levy in the thousands, an energy bill is a small concern!

Slight error.
posted by "stevesatow" on September 20, 2011

I am a certified Energy Advisor licenced under the NRCan EnerGuide system and I'd like to point out one small error in your article where you state that:

"At one end of the stick is a hypothetical house of the same size and location that meets the very minimum standards for energy efficiency..."

This is not completely true, because the lower end of the scale has nothing to do with 'minimum' standards. A new house, being built to today's minimum code requirements will achieve somewhere in the region of 65 - 75 under the EnerGuide rating system depending on the design, materials, quality of construction, heating and ventilation equipment.

Older houses, tested under the ERS system can, potentially, score zero or very low ratings, because they were built without any insulation or attention to airtightness before the advent of modern building codes.

But apart from this minor error, I enjoyed your article and agree that this is the direction we need to be going! Thankyou, Steve.

Re: Slight Error
posted by "Colleen K" on September 20, 2011

stevesatow, thanks for the clarification! Glad you enjoyed the article.

Brown building in a green location the way to go.
posted by "lowvkt" on September 20, 2011

The energy efficiency of buildings is important, but the amount of energy used to travel to and from your home can dwarf the energy used for heating, lighting, cooling,etc. A "brown" home in a "green" location(that is accessible by transit, walking, cycling and requiring little or no vehicle) is a much better environmental investment that the greenest house in a location that is not accessible by active transportation or public transit.
So before you worry too much about building codes, consider the transportation options if you really want to save on energy and reduce carbon.

On older homes it has been common practice to ask
posted by "Fish-counter" on September 20, 2011

"Can I see your energy bills?"

On new homes, I hate to think how many games could be played to sell a home with its energy footprint. The only eway to tell how much it will cost to heat is to try it out. It depends on the thermostat settings.

Building Green from the Ground Up

We asked experts how to make true sustainability the norm. Here's what they told us.

By Colleen Kimmett

Article first published on September 21, 2011 by TheTyee.ca.

From modest homes made of recycled shipping containers, to living laboratories that actually produce more energy than they consume, The Tyee's 'Green from the Ground Up' series illuminates the many roles buildings play in creating a sustainable future.

With buildings responsible for approximately 35 per cent of our greenhouse gas emissions, and energy prices on the rise, there are good social and environmental reason to make significant shifts in our building standards and expectations.

In the past decade, there have been positive developments in British Columbia, and particularly Vancouver, toward greener building practices. But we still have a long way to go.

How can we make green building the norm, rather than the exception? The Tyee Solutions Society sought the insights of knowledgeable veterans from across the building industry, people with the experience to know what works and the vision to see where it might take us. Here's what they had to say.

Make it code

In 2008, British Columbia introduced a green building code that raised the bar for the industry across the board. It included new construction standards to save water, improve energy performance, and make it easier to install renewable technologies, such as solar hot water systems.

Blair McCarry, a mechanical engineer with architectural firm Perkins & Will says these "code forces" are key to advancing green building techniques.

Mechanical engineers like McCarry design the heating, ventilation and air conditioning (HVAC) systems that make our living space comfortable. These systems consume most of the energy a building uses, so how efficiently they run determines to a large extent what the building will cost to operate as well as its environmental footprint.

McCarry says that up until recently, codified reductions in energy requirements moved very slowly, "just kind of oozed down a gentle slope."

Then in 2004, the American Society of Heat-

ing, Refrigeration and Air-Conditioning Engineers (ASHRAE) introduced the latest iteration of its internationally-recognized standards and raised the bar considerably for energy efficiency in buildings.

Jurisdictions across North America adopted ASHRAE's stiffer standards. Among them was Vancouver, which is unique in Canada for maintaining its own bylaws to regulate building design and construction. Now Vancouver is considering adopting the even more stringent 2010 ASHRAE standards.

"The 2010 version [of AHSRAE] is a 30 per cent energy reduction on the 2004 version," says McCarry. "The energy norms or standards are plummeting, going down dramatically, as various jurisdictions adopt them."

McCarry compares HVAC systems to the engine system that drives a car. "When you think of making a more efficient vehicle, the vehicle becomes lighter, uses different materials, maybe it's a little smaller, so it doesn't need the V6 engine," he explains. "By looking at the design processes... you can figure out how to get more use out of a component."

Design a building with energy in mind -- a tighter envelope, for example, or window shades that let in light and heat when you need it, and block it when you don't -- and automatically you require less 'fuel' to keep it operating. The PassivHaus is a radical example of this; a building so tight, so well-designed that it needs no systems at all.

Sell them on comfort

All of which gives an architect, a client's first point of contact when a building is going to be developed, a large role in determining a structure's eventual efficiency.

Architect Helen Goodland is the executive director of Vancouver's Lighthouse Sustainable Building Centre, an enterprising non-profit whose website declares its dedication "to advancing and catalyzing sustainability in British Columbia's built environment."

Goodland agrees that with the 2008 provincial building code, "everything got better." Even so, Goodland says, Vancouver's architectural aesthetic of a "city of glass" is inherently unsustainable. While that gleaming glass office tower with ample mountain views might be alluring, all that glazing also makes it inescapably inefficient to heat and cool.

Goodland notes that those fab expansive views of mountain and ocean may lure office tenants into a commercial tower at $40 or $50 dollars a square foot -- but that when the client actually moves in, the first thing that happens is usually that blinds go up and partitions go in.

"No one gets to see that view," she says. "And people in the prestigious offices in the corner are either boiling or freezing."

Yet "utility paybacks are not enough" to persuade consumers to choose energy efficiency, Goodland says emphatically. "What we find much more compelling is comfort." She says European firms have been quicker to catch on to the fact that a more comfortable work environment makes for happier and more productive employees.

"I need light, I need to be acoustically protected, I need to be thermally comfortable, I need to have fresh air. All of those things are hard to pin down... you can't have a number, necessarily," says Goodland. "But when you have it, you know you've got it."

LEED standards are one way to balance all of these things; daylight and ventilation without excessive energy loss through windows; acoustic protection without using hazardous materials. As Katie Hyslop reported in this series, the B.C. provincial government's push towards LEED-certified schools is making them more efficient, but also more comfortable and conducive to learning.

"Unfortunately," says Goodland, "what we're seeing a lot still [in the marketplace] is this emphasis on form and style -- as opposed to performance. I would love to see the architectural community step up and truly embrace the notion of performance in their design."

Change is difficult. But like McCarry, Goodland believes government can play a decisive role. When government is willing to "throw down the glove," as she puts it, and be clear about what it expects from builders now and into the future, industry finds it

easier to tackle green projects that might seem riskier or more complicated than familiar but inefficient styles of construction.

Goodland believes that aggressively pursuing higher building standards was a "gutsy move" for Vancouver, "And kudos to them," she says. "It's been very helpful to industry. They can dust off their real green projects now."

Reward the greenest

Norm Shearing, vice president of development for Parklane Homes, says that policies, rules and regulations needs to complemented by rewarding those who choose to do good.

"Probably most developers would say this, but I think the most effective way for getting this green building movement really under way -- I mean, it is underway now, but to really pick up the pace, and get people adopting it -- is incentives," he says.

Parklane is currently developing the River District, a 130-acre former industrial site in southeast Vancouver on the banks of the Fraser River. Shearing describes it as a "comprehensively-designed community" and sees it as a model for suburban development in the future, an alternative to the cookie-cutter suburban neighbourhoods that are ubiquitous in the Greater Vancouver area.

"It's seen as very much a walkable community," says Shearing. "What it provides essentially, is residential, retail space, office space, parks, full size community centre, two schools, four daycares, and the community is connected by a series of pedestrian pathways."

The size of the development allowed Parklane to develop a neighbourhood energy utility that will use hot water heating systems instead of highly inefficient electric baseboards and, says Shearing, rely on a renewable source of energy, possible sewer heat. All of the large buildings are being built to LEED platinum or gold standard, and the smaller wood frame buildings are going for Built Green (see a primer on these rating systems).

Shearing says Vancouver's goal of achieving carbon neutrality by 2020 envisions a "paradigm shift" from where we are now. Early adopters of the new paradigm, he thinks, should get a hand up.

"Tax [and] density incentives are really the two biggest tools the city has," says Shearing. "And a speedier approval process would certainly help."

Incentives, he thinks should also be extended to homeowners who 'green' their houses. On-bill financing for energy efficient retrofits is an idea that's taking off in the U.S. with positive results. Vancouver has recently introduced its own pilot program. Such programs, says Shearing, are key to shifting the residential market.

Be better than 'less bad'

When asked what can be done to advance green building in British Columbia, and around the world, Guido Wimmers throws this question right back: "Are you talking about making green building more mainstream, or actually more green?"

Wimmers is the principal of Building Evolution, a Vancouver-based design firm that specializes in PassivHaus buildings. The PassivHaus standard dictates that a building use no conventional heating or cooling systems at all, but rather is designed to regulate temperature with excellent insulation, air-tightness and orientation to the sun's rays.

Wimmers is among those in the industry who say that many of the current generation of green buildings, including those certified by LEED or other standards, are simply "less bad" than older construction -- and that that's not good enough.

From his perspective, and compared to Europe, Vancouver still has a long way to go, despite its green reputation.

"With architects or mechanical engineers who have studied a lot, you find this attitude like, 'I know it all,'" he says. "Especially in Vancouver, where they got promoted as the 'greenest city', it's probably more difficult for them to accept that there is much more out there to learn."

Wimmers's answer to both questions -- how to make green building more mainstream and also raise the

standards of what's considered green -- is education.

"Education of the public, of everybody," he says. "It should begin in schools."

Trade schools are beginning to recognize that green building requires a new skill set as well as a new mindset. Okanagan College recently opened the Centre for Excellence in Sustainable Building Technologies at its Penticton campus. The centre is a kind of living laboratory that offers programs in sustainable construction, geo-thermal energy capture, and metering and monitoring of green buildings. The centre's building itself provides a model of green anatomy: wherever possible its mechanical and electric systems are exposed, so students can learn from the building itself.

The centre was built to meet the stringent standards of the Living Building Challenge (the CIRS building at UBC is another example of a potential Living Building, although neither were certified by the time reporting for the series was completed.)

Jason McLennan is the founder of the Living Building Institute and the man behind the Living Building Challenge. Its standard represents the next generation of green buildings: structures that produce as much energy and water as they consume, outlaw toxic materials, and are sourced as close to the site as possible.

"Our organization operates from a position that there's global urgency, and merely being 10 per cent less bad or 30 per cent less bad, is not a successful long term strategy for humanity, frankly," says McLennon.

While we've seen more green building in the higher education and institutional sectors, we are further behind in commercial buildings and especially the production housing sectors, says McLennon. He gives an example of a typical suburban house, with a two-car garage and what he calls a "bonus room" built above the garage -– "the house a lot of us grew up in."

"If you took a two car garage and a bonus room above it -- the cost of that piece of the house is the same, approximately, [as] energy independence with renewable energy," he says. "We question, what's the payback on solar panels, an asset that actually makes you money? But we don't question what the payback is on a two-car garage that covers an asset [your car] that depreciates so rapidly."

For things to change, we need a complete paradigm shift, a re-thinking of what we value, McLennon says.

"We're seeing now projects that will never have an energy bill and water bill, they will never release carbon into the atmosphere, so it's a completely different paradigm. What we're showing is that sustainable is possible now, it's not this far-flung utopian idea. We can move much further and much faster and when we do there are social benefits and health benefits and we provide a much more exciting vision of the future."

Excerpts from the ensuing discussion in The Tyee's comment section:

Making Green the Norm
posted by "mikeoregon" on September 21, 2011

One obstacle to green building is our cultural acceptance of "cost effectiveness" as a primary standard for evaluating energy investment. It's a crude and wrongheaded concept, but it's what we use today. We need to shift towards a standard based on determining what it will it take for any building, new or existing, to achieve energy and comfort performance that meets our collective goals for efficiency, health and greenhouse gas emissions reductions.

How long before home lighting circuits are all 1.5 volts?
posted by "Fish-counter" on September 21, 2011

LED lights are the way to go, and they can be powered by very low voltages. It would reduce construction costs and fire hazard at a stroke.

I just heard a presentation on a green wall from a high school student who wants to build one at her school. Too bad she isn't on City council or in the planning department yet.

I do wish people like Mopled would go away. They are only convincing to themselves. Their data sucks like an electrolux.

Sustainable Architecture and Design
posted by "milkandhoney" on September 21, 2011

I think it is excellent to see that the province is starting to fund green projects like the Okanagan Centre for Excellence. Makes me feel like somebody has finally got it right as education is the birthplace of progress. I have had a chance to work with the architects (CEI Architecture) behind the Centre for Excellence on a number of occasions and the excitement around green building on projects like these is really noticeable in the quality of work. I hope to see both UBC and Okanagan College meet the requirements of the Living Building Challenge and set the bar for other building projects in BC going forward.

paradigm shift
posted by "lessdriven" on September 21, 2011

If we are actually looking for a paradigm shift in "building green from the ground up", why is it that the focus is always on various technical improvements, as useful as they may be, but which don't come close to energy saving benefits of developing settlement patterns, that allow us freedom from the automobile.

It doesn't matter if you live in a PassivHaus. If most of your regular trips to and from that house require the use of an automobile, you are probably using up more energy than someone living in a denser area in a less energy efficient building, where work, shopping and other activities are a short walk or bikeride away. See (http://www.youtube.com/watch?v=qjp5hH4raxA).

If the City of Vancouver wanted to change one bylaw that would save a lot of energy, it would be to remove the requirement that every living unit whether it be apartment, townhouse or detached house come equipped with at least one off-street parking space.

Fish-counter
posted by "snert" on September 21, 2011

Quote:
It would reduce construction costs and fire hazard at a stroke.
I don't think so. The theory sounds good but practically it's just not worth it. It creates more complications because you're going to essentially have to wire a house twice.

As long as an existing/new house is wired to code there is next to no chance of fire.