Eco-Design for Behavior Change

By Cheryl Gladu

Sustainability is people

The notion that technological innovations will save the day as it relates to environmental problems such as climate change and "the Great Acceleration" seems simplistic to me, to say the least, and dangerous when we consider the tendencies of human behavior. Design for environmental and social sustainability should never simply be about applying new technologies onto our existing models of living. Rather we also have to consider both behavioral and reflective approaches to design. At the end of the day, we should be looking for opportunities to shift the way that we live together on the planet towards a life that is simpler, yet more meaningful.

sustainable. This is a call for a deeper kind of transformation than our society's focus on electric cars and solar panels would have you believe. Designers and builders of communities have to consider not only the technological fixes but the ways that design can promote a change in attitudes towards resource consumption and facilitate intentional behavioral shifts towards more sensible living.

On green building

When considering what makes a building "green," builders and designers are generally interested in elements such as site selection, material use, indoor air quality, energy efficiency, and/or on-site energy production. The positive thing about this is that these considerations are made only once, and then occupants can focus on maintaining or upgrading the building(s) as needed. While appealing, this approach puts most of the learning around sustainable living in the hands of experts and consultants rather than in the hearts and minds of the eventual occupants of these spaces, and this is a real problem.

As part of a team, I led an integrated design process to develop the first Net Zero Energy triplex in Canada. In this case, a triplex means a three-story structure where each floor is a separate apartment. This model of housing is a very common presence in the older neighborhoods of Montreal and contributes to the dense yet livable character of the city.

As part of a national competition run by the Canadian Mortgage and Housing Corporation (CMHC) on net zero energy housing, we received a lot of support from various organizations and companies to build this innovative, albeit very expensive demonstration project. Net zero energy buildings are those that over the course of a year average no energy drawn from the electrical grid. That is, on very productive days (e.g., a sunny summer day) the building will contribute energy *to* the grid, using it like a giant storage battery, and on less productive days (e.g., a cloudy day in the early spring), it will likely draw energy *from* the grid. Net zero buildings are designed so that at the end of the year the building will have contributed at least as much *to* the grid as it took *from* it. Our particular building demanded a design that pulled out all the technical stops: excellent insulation and air circulation, solar photovoltaic and thermal panels, as well as geothermal energy production, etc.

One of the major benefits of participating in a pilot project such as the CMHC EQuilibrium pilot project, as it was called, was the monitoring of the building. Several teams of researchers wanted to learn from this project; some worked on the design with us, and some were from other organizations. A few years later I learned that the results of our project were somewhat disappointing, despite the high degree of confidence we had in its design, and the great skill of its builder. First, the systems required more maintenance to function optimally and this maintenance wasn't executed properly by the owner-occupants of the building. Second, the three units had *very* different rates of energy usage. I have since learned that as far back as the 1970s researchers noted that energy-intensive households are capable of

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I do support any innovation that can increase our enjoyment or appreciation of life while also decreasing our impact on the planet. I've worked on a number of very advanced buildings in pursuit of such solutions. However, over time I've become less interested in technologies that don't actively encourage us to rethink our patterns of living and working on the planet, as this is the real root of our current situation.

Back in 1992, participants in the Rio Earth Summit concluded that it would take a complete "transformation of our attitudes and behavior" to allow us a future that was both prosperous and

consuming upwards of three times as much energy as lower energy households. While this might average out with many more households, it's all too clear with only a few to look at. One of my colleagues suggested that it was almost as if the energy systems gave some of the occupants a kind of freedom to consume more than they would normally. This finding is also not new.

In 1865, economist William Stanley Jevons noticed, paradoxically, that the more energy-efficient machines became, the more coal, iron, and other resources were used in production. That is, as there was a decrease in the per-unit cost of production, this allowed for an overall increase in production from a given investment. One needn't look too far to see the "Jevons Paradox" at work today; many of our cars consume less gasoline per mile driven, but we drive further distances. Our homes are more efficient, but they are much larger and shared between fewer people. We make clothing more quickly and with fewer off-cuts and then throw them away after a season or two. This poses a challenge to designers and policymakers with an eye on efficiency, as efficiency alone will not necessarily lead to a reduction in total consumption of any given resource. The end-users have to change their

attitude with regards to the consumption of resources in order for this to happen.

That is, including eco-building into community design may help decrease our collective environmental footprints, but only if we have already taken the steps to incorporate social designs and processes to facilitate more fundamental behavioral change. To drive the point home, when we participated in the net zero energy housing pilot program years ago, only one project aimed to renovate an existing structure and most of the homes were large, free-standing, single-family homes requiring solar arrays similar in scale to the one our team had employed for *three* households. Few projects were located close to public transit or encouraged sharing between neighbors. The irony of putting a large, super "green" building at a great distance from the things you need day-to-day seems to be lost on many.

These findings might suggest to us that we should make use of a more behavioral approach to design when it comes to community development, and consider the liberal use of "nudges" towards more sustainable behaviors. However, it is a particular challenge to do so in shared spaces, where people may be at different stages of adopting sustainable practices. Some people need gentle nudges to encourage them to behave in a way that fits with how they already see themselves (i.e., environmentally-minded). Other people need more information to help them understand why certain behaviors are better for them and the environment.

For example, there is an unpopular expression in building design: "smart buildings make dumb people." That is to say, when designers and developers seek to incorporate controls for human behavior into a space used by different kinds of people, they make certain assumptions about what should be controlled and why. Not all of the eventual occupants always share these assumptions. A familiar example is sensor-based lighting, which is often quite convenient. This kind of control can come much to the chagrin of the office worker who, while quietly typing away at their desk, now needs to incorporate wild gesticulation into their daily routine to keep the light on.

The designer assumes, of course, that the person sitting behind that desk cannot or will not learn to turn the light off when leaving the room, so the building does it for them. For the initiated, this helps them to maintain an existing practice of saving energy. On the other hand, the building now trains the uninitiated to not concern themselves with this action, in any environment.

This is where the regular interaction between people within a community can help instill new attitudes and behaviors in a way that technological or behavioral designs cannot. If you are new to composting, but know that your neighbor uses this compost to feed the tomatoes you enjoy together, your adoption of this kind of segmentation of waste may come easier. If your elderly neighbor and friend are able to enjoy a certain vitality on a lifelong vegan diet, you might opt for that form of eating more often, perhaps at common meals.

Shaping sustainable norms

The above is one of the many reasons I became interested in intentional communities and cohousing in particular. The process of co-creating and/or co-managing a community provides many opportunities for people at various stages of change to learn from others about the benefits of living lighter on the planet, without it necessarily being a pedantic experience. Communal living also affords the capacity to better share seldom-used spaces, such as guest and dining rooms, as well as under-utilized tools, books, and the various things that make life fun and creative.

When talking with members of Canadian cohousing communities, I could see that while many of these people were living simpler, greener lives than a lot of dyed-in-the-wool environmentalists, that wasn't the main point for many. The value of such communities came from knowing one's neighbor, feeling engaged and able to start interesting projects with the help of those around you. When I asked them about environmental living, many would talk with me about compost or recycling (the low-hanging fruit of environmental actions). Meanwhile, they were living in a walkable community, growing some of their own food, and sharing cars and other equipment; this was all delightfully taken as a given.

Perhaps most importantly, they were living with, on average, 800 sq. ft. less personal space than they had been previously. The impact of smaller personal spaces is, naturally, compounded over time; less space to heat or cool, to finish and decorate, to clean and maintain. It is difficult for one to make such a switch on their own given the wider social context, but to share the experience with others they are relating to, while also having a greater sense of ownership over common

property, makes such changes in living not only possible, but desirable.

The intentionality of such places is a potent design element—one that can do more to change attitudes and behavior than technological interventions alone. In fact, research is staring to show us that within the urban context, cohousing communities tend to perform better on environmental measures than the less interdependent occupants of certified green buildings. All this to say, this is green design; it's just very low tech and set up to work towards human interaction rather that object-human interaction. It is arguably not

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as sexy as a massive array of solar panels, but more accessible to many for sure.

Developers interested in green building, like myself, need to recognize that conventional residential development comes ready-made with a social design that does not easily facilitate true, collaborative green living. We have to think about this in the process of any development project and take steps to remedy the problem. To make residential buildings truly sustainable, and more likely to be desirable places to live in the long term, we should consider a parallel process of community development as an integral part of housing development.

Those living in a community, or who are part of a forming community, also benefit by understanding that interaction isn't just about social sustainability: it pours over into environmental sustainability in a way that really affects attitudes and behavior. Knowledge of this might make it easier for the "deep green" dreamers among us to accept less technically advanced green building designs, in favor of flexible designs that can adapt to changes in understanding over time. In this way, without an eye on the perfect green building, you can go ahead and build truly good homes together. ❧

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