

GREEN BUILDING + ARCHITECTURE

FALL 2018



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CELEBRATING SEVEN SUCCESSFUL YEARS



WHEN THE FUTURE IS NOW

With Howland Green Homes, buildings produce more energy than they consume

For Dave de Sylva and Howland Green Homes, the future is now. What that means, really, is being aware of ongoing world-wide energy consumption, its global impact, and then doing something to combat the “addiction” to carbon-based choices.

To that end, Howland Green practises a Beyond Net Zero (BNZ) program, whereby its global carbon footprints can be reduced to beyond zero – essentially a negative reading – positive to our environment. Its mission: to build positive energy developments, which are zero carbon energy homes, building and communities that are so efficient that they produce more energy than they consume on a global basis.

“We can reduce our consumption greatly and it’s relatively easy to accomplish,” says de Sylva, P. Eng., President of Howland Green Homes. “We need to use much less energy, in general, and start using ‘today’s’ energy, such as wind and solar, rather than carbon-based energy.

“At Howland Green, for example, we can reduce operational energy usage by about 82 per cent, compared to normally-built buildings; and that’s just through the use of simple building choices.”

The benefit of BNZ, explains de Sylva, is that the concept raises the bar when it comes to homes and buildings that have a cleaner ecological footprint. Not only do those buildings save owners thousands of dollars, by producing more energy than they consume, but they also reduce the carbon footprint and make the world’s atmosphere measurably better.

As founder of Howland Green Homes, de Sylva has been instrumental in building some of the most efficient and advanced net zero projects in the GTA.

Those include Green Life Delridge communities in Markham and Milton.

Now Howland Green is poised to raise the bar by introducing the first net positive energy residential condominium building in Canada, in Milton, Ontario, with Bronte West

Condominiums.

Bronte West will produce more energy on site and remotely than it uses on an operational basis, creating a zero carbon footprint, says de Sylva.

According to a company statement, Bronte West will be the embodiment of construction innovation and the very definition of net positive. Powered by sun and geothermal energy, Bronte West will serve as the perfect combination of ecology, economy and technological advancement.

Complementing that project will be the Howland Green Business Centre in Markham, which will feature an impressive collection of net positive energy condo office spaces, says de Sylva.

“Because of our planet’s addiction to carbon-based energy, we suffer warmer sea temperatures, we pollute our skies with carbon-based gases,” he says. “So we are seeing shifts in weather patterns that create more deserts, or floods, or other rapid unpredictability in events and frequency.”

To combat those negative situations, de Sylva says Howland Green will do its part.

“It’s important to understand the global problem of climate change and the absolute need, in everything we do, even beyond the building process.”

He points out that sustainability is the term used to define the ability to endure. And at the rate the world is building today, it’s imperative to change how that process is done. If we don’t change, that points to an outcome of ‘non-survival.’

So while Howland Green understands that concentrating on energy reduction itself is one goal, the switch to a capture of ‘today’s’ energy sources of wind and sun is seemingly paramount.

“The impact of fossil fuel addiction has been proven, with negative atmospheric consequences in both carbon-filled air and particulate matter,” de Sylva says.

“The goal of going beyond net zero to BNZ implies that the impact of our developments measures a reduction in overall global carbon footprinting.

“While some of our projects achieve this on the physical site itself, others – through the Howland Green Footprint Program – will see reductions in nearby locations or, perhaps, in foreign locales.

We are faced with a global issue and, luckily, what we actually do is more important than

where we do it. We all share the same atmosphere, so everything makes a difference.”

Some of the features found in Howland Green buildings include:

- Enhanced insulated concrete form construction;
- R80 roof insulation;
- State of the art geothermal heating and cooling throughout;
- Full coverage solar power arrays;
- Load-sharing capabilities within structures;
- Electric potential energy storage;
- Pneumatic energy storage;
- Rainwater capture for toilet usage;
- Groundwater capture for irrigation;
- All ramps to underground parking entirely closed from the elements;
- High-efficiency dual level LED lighting systems;
- Low E Argon thermal pane insulated windows and sliding doors with fiberglass frames;
- Decant recapture of inversion and transformation systems;
- And high-efficiency geothermal hot water delivery with additional thermal tank wrapping.

To illustrate his point about the need to rely on ‘today’s’ energy, de Sylva uses an example where he looks at the big picture.

“The start with, we need to understand that the earth receives about 174 petawatts

of energy per year, which converts to about 174,000,000 gigawatts,” he says.

“Globally, we use 1½ per cent of 1% of that total, but only 12% of that amount is from wind and solar. The rest, or majority, comes from decayed animals and plants that release carbon into the atmosphere.

So it’s pretty obvious that we need to use ‘today’s’ energy and stop the pollution. Solar or wind, it does not matter.

“We need to look at whatever we do as a global issue. Whether we capture more solar energy than we use – as is the case with Howland Green Business Centre – or we generate excess energy off-site in wind farms or other rooftops, the effect on the global footprint is negative.

“In effect, we create a benefit to the global atmosphere as a result of our building. This can also be accomplished by reducing other footprints around us, such as retrofitting existing buildings with modern lighting, geothermal systems or new insulation.

By measuring the results, we can measure how we have reduced the global footprint as a result of our building effort ... the Beyond Net Zero effect.

“And we should never underestimate how important BNZ is to our future and how we can reach our much-needed goals.”

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BUILD SMARTER, BUILD STRONGER



HOWLAND GREEN BUILDING SYSTEMS

Howland Green is different. As a Net Positive builder, it stands alone in Canada. The objective of building system is to produce more “carbon free” energy through wind and solar than building uses annually on an operational basis. This is accomplished primarily by driving down the demand for energy while capturing and producing more than is needed.

Defining Beyond Net Zero
What is the significance of Beyond Net

Zero? First, we should look at the global problem of climate change and the need for sustainability in everything we do. Then, we can apply that to the Howland Green building process.

One definition of sustainability is “the ability to endure.” The world-wide track record when it comes to sustainability in the construction industry has not been stellar over the years, and if we don’t drastically change the way we build, then we are all headed towards

a disastrous end.

Energy concerns form a major part of Howland Green. With a Beyond Net Zero mentality, Howland Green aims to build positive energy developments that produce more energy than they consume. As part of its concentration on energy reduction, in general, Howland Green focuses on capturing additional energy from wind and sun. This minimizes the impact of fossil fuel use, which has proven to be highly negative, with dire consequences in both carbon-filled air, as well as the rampant pollution of particulate matter. Howland Green deals with these various “carbon footprint” problems by providing a goal of Beyond Net Zero in our developments.

The Howland Green Footprint Program not only aims to lower overall footprinting at our developments, but can also help in both nearby and far-off locations. Hence the Beyond Net Zero classification. This is a global issue – what we do to alleviate the problem is more important than where we actually do it – because we all share the same air, whether it’s at home or abroad. So with our Beyond Net Zero program, we are providing a local solution, but the overall effect is global in scope.

The system of energy reduction is a function of the building design.

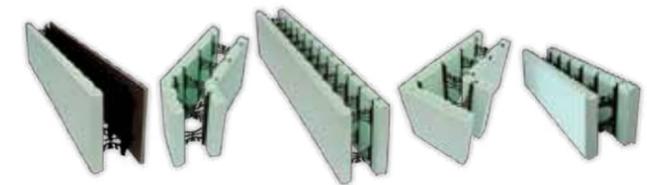
They have evolved from experience and experimentation with documented results. The items below are in place to accomplish the goal of “Beyond Net Zero” building in every Howland Green project.

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A summary of the primary components is as follows:

a) The Box A major feature of HGBS is the upgraded Insulated Concrete Form, ICF which creates the space. We are fortunate to have custom made ICF exclusively for Howland Green which increases the walls from 2 5/8" of EPS on each side to over 4". When combined into a complete wall sandwich, it forms a wall with an estimated R42 value approximately 3 times that of any other building built under OBC guidelines.

b) The roof Generally a very large area and exposed portion to thermal transfer, HGBS will maintain an R value of at least R80 with the use of high density ISO. Once again, this is 4 times that which the OBC requires.

c) The Windows High quality triple glazed fiberglass, krypton filled that are photo sensitized to reflect solar gain in the summer and adjust to the need in winter for absorption. Again about 4 times the standard.

d) Garage Openings Once again covered entirely, thereby eliminating at least 80-100,000 KWHs of energy for ice/snow melt.

e) Lighting The most current LED options and restrictions within the documentation that precludes the use of anything other than that.

f) Split Level Lighting Motion sensed lighting for hallways, and garage parking keeping only the minimum active until motion is individually detected.

g) Smart Basements Much overlooked, the entire basement is constructed using enhanced ICF construction. This completely eliminates the need for any auxiliary energy as very safe temperatures are maintained through forces of natural equilibrium of the earth around, despite the outside climate all year long. In addition to this, a "super bright" white paint is applied to everything in the basement (not the floor) resulting in an 80% reduction in lighting requirements as the light simply refracts throughout.

h) Hot Water Storage Through the simple effort of double wrapping hot water tanks, the "standby energy" required to have hot water available is reduced by 65%, resulting in overall reduction of energy for water consumption. This is based on real time studies by Howland Green.

i) Decant Recapture Another new and proven idea whereby "spent energy" of hydro transformation and photo voltaic inversion is captured from the air and fed into the domestic hot water supply, thereby changing a problem of excessive heat into a positive reduction in energy for hot water.

j) Geothermal A complete state of the art geothermal system for heating and cooling. By endorsing energy conservation at the beginning, the efficiencies of geothermal are multiplied, thereby taking the customary highest energy consumptive use and relegating it to one of the lowest. Employment of highly conductive filled grout to header systems, Variable Frequency Drives, and individual in suite units, the entire building and all the units are continuously in communica-

tion with each other automatically opening and closing solenoid valves and flow ports with results of a demand of approximately 1.3kwh/sf/year...about 10% of the normal building. Backup pumps and load sharing are simply part of the normal system.

k) ERV's Standard use for efficient delivery of required fresh air.

l) Photo Voltaic The primary energy source. Large production capability tied into the grid and fed through Load Displacement, administered by a sub-metering network to individual needs. On some projects (Howland Green Business Centre), energy beyond the annual needs is simply offered to the grid at no cost, effectively reducing someone else's footprint.

m) Electric Potential Storage NiCad and Li options to carve away energy from the solar production and stored as electrical potential to be used independent of the grid for constant common lighting.

n) Pneumatic Storage A new venture whereby more energy from solar production and kinetic harvesters compresses air into standby tanks which then feed pneumatic motors for garage doors and exhaust fans. This, once again, is a step towards site self-sufficiency.

o) Energy Monitoring Simply put, the collection of useful data about the nature of energy use within the building to observe the actual performance so lessons can be learned.

p) Low Flow Everything Toilets and showers

q) Appliances All high efficiency

r) No Grass/Sprinklers Although an overall benefit to carbon sequestration, grass and the use of synthetic fertilizers negates any benefit whatsoever with the creation of N2O gases. No grass means all vegetation sequestering on its own with only a fraction of work and NO WATER CONSUMPTION.

s) Sustainable Management Provided by Howland Green to the building to ensure the proper care and review of the systems employed.

t) Clean Water Harvesting All roof water is collected and stored in large cisterns, filtered and then used for toilets.

u) Grey Water Harvesting Surface water is collected from parking areas in large cisterns and then recycled for shrubs and plants and car washing after proper filtration.

v) Post Waste Recycling Standard in all buildings.

w) EV Charging Standard inside and out.

x) Bicycle parking Standard inside and out.

y) Not Having Green Roofs

The concept of having a green type roof is predicated on the belief of utilizing what may otherwise be "just a vacant area" for a use which may be beneficial to the environment. While principled in it's objective, the idea is not well thought out.

The increased weight of soil, laden with moisture, adds to the overall cost of the structure. In a Howland Green building, the increase in weight of the quadrupling of foam insulation coupled with the weight of a PV array has only a marginal affect with no additional cost to the structure itself.

The maintenance of a "green roof" can be substantial, and if it involves watering and pruning, then the cost could outweigh the benefit. Additionally, if the plant material is encouraged with synthetic fertilizers, which is sometimes the case, then there is clearly an

overall harm to the environment through the release of nitrous oxide (N2O) emissions. The idea of roof top carbon sequestration needs to be quantified to properly determine it's efficacy.

The typical analysis uses a mature tree comparison and while this is not really possible on a roof, it can be used for this study. Carbon uptake criteria assume consistent growth with basal vegetation area per tree of 37 sm per tree. Assuming a carbon sink of 22.67 kg per tree per year, and 1 kwh of solar energy equal to .43kg of carbon, then the average mature roof canopy for one tree would equal 52.72 kwh per year of green energy production. On the same study area, the equivalent production from photo voltaics would yield 7,391 kwh per year. The question would be whether or not to plant vegetation on a roof for a carbon equivalency of 52.72 kwh/year or a solar array of 7391 kwh/year. The answer is clear.

z) Howland Green Footprint Program

A new concept where carbon footprints are either partially or entirely offset through the efforts of the subject site under development. This could involve simple efforts such as changing light bulbs in a store or school to

installing free solar arrays or swapping archaic HVAC systems to geothermal, all in an effort to reduce the common atmospheric footprint. Considering the fact that we are only beginning the effort, the choices of how and, more importantly where, we apply our efforts are virtually limitless.

As noble as this program is, the caveat of measurability is of utmost importance. There are several processes out there that claim value but really are only a stunt to portend effort. Schemes where you are rewarded with points and a sticker on your door, but have no real effect. They endorse procedure over content and the buildings that are rewarded with a colored emblem for their front door entry have little or no reduction in operational energies. But how would we know? Not only is there a lack of post construction data, but their mandate at the beginning is more political and notional than real.

The need to measure after is only surpassed by the requirement to set goals at the beginning which themselves can be documented. We live in a world where science, through the use of metering has been constantly and accurately sounding the bells. We must, in what we do, learn to listen.

Proud to be part of Howland Green Business Centre project



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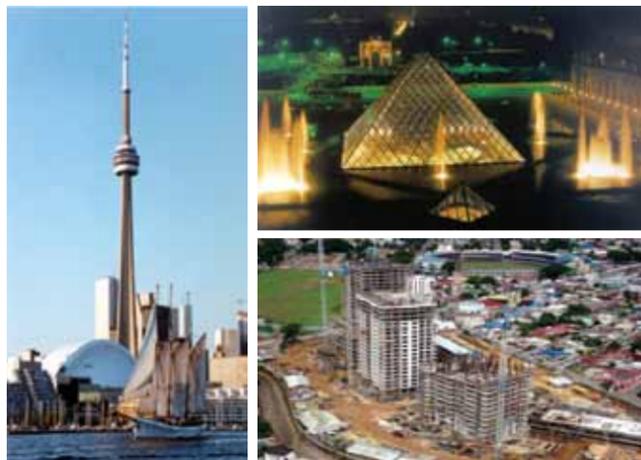
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Planting and Building for a Net Positive Future

Howland Green's building philosophy is centred on going beyond Net Zero and into Net Positive territory. The company's founder, Dave de Sylva, has been in the business of building homes and communities for over two decades; he is responsible for some of the most advanced and energy efficient buildings in the Greater Toronto Area, including the region's first Net-Zero condominium development.

Through innovations in insulation, improved conservation technology, and advanced energy sharing practices, Howland Green creates developments with low operating energies and even lower operating costs.

Howland Green is now taking their commitment to eco-friendly building above and beyond through its partnership with Forests Ontario. *The Howland Green Tree Fund* will plant 100,000 trees across the province on behalf of upcoming commercial and residential developments.

The commitment is an extension of Howland Green's decision to move from Net Zero to a Net Positive approach to building. In addition to developments that incorporate innovations to produce more energy than they consume, this initiative also adds to our natural ecosystems and Forests Ontario is proud to partner with Howland Green to make that goal a reality.

Forests Ontario, a registered charity committed to greater forest cover across Ontario, plants nearly three million trees every year on public and private lands. To date, the organization has planted more than 25 million trees. These trees strengthen carbon sequestration capacity and offer a wide range of benefits to the surrounding community including healthier soils, clean air and water, recreational space and wildlife habitat. The impact of this initiative therefore goes beyond offsetting emissions from Howland Green by strengthening ecosystem services, which in turn benefits all Ontarians.

Working alongside conservation authorities and forestry organizations, Forests Ontario takes a science-based approach to planting trees. Our partners determine the appropriate species to use based on pre-planting site assessments. Forests Ontario's partners also support the management of planting sites through follow-up assessments and tending. Like Howland Green, Forests Ontario employs an above and beyond philosophy when it comes to tree planting. Our goal isn't just to put trees in the ground, but to support their long-term growth into productive forests.

Forests Ontario is proud to work alongside Howland Green; their actions demonstrate a firm commitment to enhancing the health of natural ecosystems while also mitigating their impact on the environment.

According to de Sylva, "This program reflects our passion for bringing real engagement of known technology to deal with ever increasing global climate issues. The Tree Fund will reflect and be a function of the very building program for

each project by sponsoring mass plantings for each project."

Healthy and abundant forests are essential to addressing the climate change challenge, a fact acknowledged by world leaders. Forests Ontario hopes that our partnership with Howland Green serves as an example of how businesses and the environmental sector can come together and take action now to support a greener and healthier future.

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Forests Ontario works with businesses of all sizes and sectors to restore forests across Canada.

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