Just Don't Call It LEEDS
An Introduction to LEED for Glazing Contractors *(May 4, 2010 GCABC Breakfast Session)*

At the recent Building Envelope Science & Technology (BEST2) Conference in Portland there was no denying that Architecture 2030, Net Zero, Sustainable Design, and LEED are all alive and kicking. As well as constantly evolving. This was further reinforced during a recent Glazing Contractors Association of BC presentation entitled An Introduction to LEED for Glazing Contractors provided by LEED Expert Michael Driedger BA Dip T Arch, LEED AP of Vancouver's renowned green architectural firm, Busby Perkins+Will.

Driedger, who has been involved in construction throughout his whole life, was turned off the industry sometime ago because he felt it was wasteful and that there was no way we could survive as a species building the way we have been for the next 10,000 years; unless we start to do things a different way.

"Although the topic of climate change and greenhouse gases is still out for debate by some, LEED continues to evolve as the climate causes economic turmoil. As man-made activity increases so does the frequency, severity and cost of natural disasters," says Driedger.

Driedger continues, "In Canada, our greenhouse gas profile has been building up with our economy over the years however other countries' economies have been growing and their greenhouse gases have been going down. There is no real argument that we can't grow the economy and lower our GHG footprint at the same time like they have in Sweden. Cities are where most of this carbon increase is taking place. They are the impetus for change. Most people think that cars are the leading cause of GHG, however 50-70% of GHG are from residential, commercial and industrial buildings. The idea of LEED is to use resources more efficiently."

Cities, especially denser cities where people drive less, share heat and common areas, have lower carbon footprints than areas with urban sprawl. Generally, Europe is on the lower end of the carbon footprint. According to Driedger, in 1990, the City of Vancouver had a carbon footprint of 7 tonnes per person, today it's around 4.5 tonnes per person. Metro (Greater) Vancouver is a respectable 6 tonnes per person which is largely due to a very clean electrical source. The reason Vancouver has such a low carbon footprint is because of our clean fuel source through BC Hydro, the densification of the city over time, and an increase in building performance. Portland, on the other hand, is one of the greenest cities in North America but its higher carbon footprint is mainly attributed to its higher use of fossil fuel based electrical sources.

With all the recent attention that environmental consciousness has received, there has been a real problem with "green wash". Green wash is essentially companies claiming their products are greener than they really are. "LEED allows a quantifiable measurement of how green a building really is," Driedger says. "It is like putting a label on the buildings we build similar to the labels on the food we eat. We need to know our building's consumption and resource content so we know how they will perform and how they will affect us."

Canada's Green Building Council (CaGBC) was founded in 2003 and currently has more than 3000 members. The CaGBC signed a licensing agreement with the US Green Building Council, who owns the rights to LEED, which is why it looks similar to the US version. Canada is ready

to adopt Version 2 while the US has recently released Version 3 because as Driedger puts it, “We’ve been holding back and waiting for them to get some of the bugs out.”

The original version was developed in reaction to owner occupied office park buildings. As the rating system has increased in popularity it has made things challenging as buildings are trending toward mixed uses (e.g. retail, office and residential) . The LEED NC challenge can often be to apply LEED to a building type the system wasn’t designed to rank (such as a hospital). The new version of LEED is simpler and can be broken down into 3 categories: new construction, commercial interiors and homes.

LEED projects need to be recertified every five years. “The idea is that you wouldn’t drive your car for five years without maintaining it and you wouldn’t want to do that with a building,” says Driedger. Recertification makes sure the building is performing as designed and is up to current LEED requirements for existing buildings which are more about maintenance and operational strategies than anything else.

“People generally think that the day a building first opens is the best it will ever perform,” explains Driedger. “In fact, we need to rethink how buildings perform, and recognize that the first day a building opens is the worse it will ever perform. It takes time to learn how to tune a building and make the most of it so that it performs better every year.”

LEED’s popularity isn’t isolated to the Pacific Northwest or even North America. Busby Perkins+Will is working on roughly $15 billion (25 million sqft) worth of LEED projects in the Middle East. The developers and government in that area are trying to attract Fortune 500 corporate leaders to their projects. “Their primary motivation is to attract tenants who are looking for greener buildings,” says Driedger. “In mature real estate markets such as New York, developers are also using LEED as a marketing tool to one-up the competition.” For these and many other reasons, LEED is expanding rapidly all over the world.

After asking for a show of hands on who had worked on a LEED project, it was clear that a majority of the well attended breakfast meeting had worked on a LEED project in the recent past. This was a big change from a few years ago. Which means that a lot of people in the room have a history of working with LEED and know the reference book is bigger (and just as interesting) as any Building Code so Driedger attempted to keep the details as light, informative and as short as possible by focusing on recent changes and items directly related to the glazing industry.

LEED started as a 70 point system and the new rating system is 110 credits with most of the credit weighting allocated to energy, although there is still a significant amount devoted to sustainable sites in order to encourage developers to build in cities next to transit and existing parking.

Audits in Canada are conducted by three third-party review panels such as Driedger’s and his colleagues in Vancouver, who provide the reviews for the Canada Green Building Council.

As mentioned above, LEED has moved most of their credits to energy and the energy credit is very reliant on glazing including high performance glass, warm edge technology, shading devices, BIPV and glazing systems. It is based on a model of a ‘typical’ building which is

commonly 30% glazed. Anything that doesn't perform as well as the model has to be made up for with improvements in other building areas. Driedger explains "This can be quite difficult but not impossible because anytime you go over 30% glazing you are already in an energy deficit and have to work your way out of the hole with more efficient glazing and mechanical systems." As expected, a high performing envelope will offer a good number of credits and advantages in the long run.

"Active systems such as air supplied by ducts or PV are much more expensive to build and maintain and don't have as much impact as passive systems such as planning the right building in the right area, which includes the way the building is oriented for heating and cooling. Allowing for the use of daylight as well as allowing for access to natural air to circulate and properly ventilate throughout the building with the ability to lock that air in as well as lock it out depending on the time of year are also valuable passive design strategies. Operable windows that allow natural ventilation are essential for good air quality."

"In the Middle East (a cooling dominated area), we design the least amount of south facing glazing in order to avoid massive amounts of solar heat gain. In Canada, we are trying to do the opposite (a heating dominated area). We are trying to allow that heat in during some times of year in order to keep it in the building during our heating periods," says Driedger.

A building's occupant behavior has the largest effect on building operating costs. In one particular case, occupants of a building were unaware of how to properly operate the building's features. Driedger explains, "For the first two years the building operated worse than designed. The architect and engineer went in for a retro-commission and now it's working the way it is supposed to and every single year since then for the last five years it is performing better and better."

A portion of LEED is about diverting materials from landfills. Whether it is about reusing construction materials from a previously demolished project or post-consumer/post-industrial materials, there is a lot of paperwork to do with LEED and most of it is for materials credits. Ten percent of gross materials by cost need to have recycled content for a credit in LEED. LEED weighs recycled content differently if it is post-consumer or post-industrial; post-consumer is generally weighted higher. Twenty percent gross recycled content generally earns two credits. As a general rule, aluminum curtainwall and storefronts are examples of post-industrial recycled content. Apparently glass has 20-25% recycled content however unsurprisingly there was debate during the meeting whether recycled content in glass was post-consumer or post-industrial. My personal vote is post-industrial content. Recycled content in wood is almost always post-industrial in the Pacific Northwest.

Regional material credits are available for products located with a radius of 500 miles of the project site. Ten percent earns 1 credit, twenty percent earns 2 credits. Allowing for greater distance if transported via rail has been eliminated from the Canadian system, for now. It might come back in the future. The regional materials credit is measured as the last point of manufacture within a 500 mile radius. Since the last point of manufacture is the glazing contractor's shop, that is technically the point where it is manufactured under the LEED system. In contrast, the Living Building Challenge measures the cumulative distance back to the original point(s) of the product.

With regards to recycled content and regional materials, Driedger offers some advice, “Always think big ticket items. Don’t worry about nuts and bolts, worry about the big ticket stuff like concrete structure and curtain wall.”

Regarding any adhesives, sealants, paints and coatings that are applied on-site, all contractors need to know what the VOC content is in the material they are using. This information is usually available on the Material Safety Data Sheets (MSDS) and is measured against the South Coast Air Management standard which specifies what the VOC content must be between x and x grams per liter. Driedger states “Anything over and you lose the one credit available in this area. This is why the General Contractor becomes a bit of a policeman. If any one product goes over, you lose the credit and it is an easy credit to get because these products are readily available in most markets. If the product does not exist in the local market, there is a caveat in Canada that states if the product is not available in the market and/or it cannot be attained due to shipping or border regulations, you can apply to have an exception for a product with a higher VOC content so long as the overall VOC content on the project is decreased in another area.” Spray cans are also mostly excluded because it is too difficult to measure the volatile organic content in an aerosol can.

People always ask why views and occupant comfort important in LEED when they are only worth two credits. Energy is worth 30 credits so daylight is not a huge part of the LEED credits, however the good news for glass companies (daylight & glass = glazing) is that it is two credits building developers and owners always want to get. “They always want their workers to be happy and productive,” says Driedger. “Building operations are typically only 5% of cost while salaries that business’ pay out are massive. Daylight and access to surrounding views increases productivity substantially and decreases the amount of time people are away from work. Employers are usually more interested in that particular measure than the energy bill. There is also a misconception in the design field that you can’t glaze more than 30% or 40% and still get energy credits.”

Modeling, measuring and designing for daylight is a challenging field with opportunities for forward minded companies to hang their hats.

Retailers such as Best Buy and HSBC are among the growing list of corporations that have already shown a preference for LEED certified buildings. The City of Vancouver is currently mandating that all new re-zonings in the city pursue certification at a minimum of LEED Gold. This has prompted some developers to claim that LEED projects are too complicated and expensive to merit such a policy change. As Driedger says, “You can build a green building for a lot of money or you can build a code compliant building for a lot of money too. With the right strategies, materials and team work during construction / design, LEED certification won’t break the bank on your project.”

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