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June 23, 2015

From Brussels to British Columbia

An analysis of the proliferation of Passive House in Brussels

by Karen Tam Wu | Program Director, Buildings and Urban Solutions | Pembina Institute | karentw@pembina.org | 778.846.5647

Project summary

B.C. has acknowledged through various initiatives that the built environment is an important area in which to reduce energy use and greenhouse gas emissions. These initiatives include the recently announced Climate Leadership Plan, commitments to "lead the way to net-zero" as a member of the Pacific Coast Collaborative, and setting targets in the Energy Efficient Building Strategy. In order for a net-zero target for buildings to contribute meaningfully toward achieving B.C.'s climate targets, an aggressive and ambitious pathway must be set — and B.C. has yet to define its path. The example of the Brussels–Capital Region in Belgium may provide some inspiration for how B.C. can set a bold trajectory and successfully realize ultra-high efficiency for buildings as part of the climate solution.

Between 2007 and 2012, Brussels–Capital Region went from zero to 358 Passive House buildings. A total of nearly 3000 Passive House buildings are estimated to be on-line by 2015. The Brussels experience is an international "overnight" success story of one jurisdiction successfully taking a great leap into energy efficient buildings.

Factors contributing to the success of the Brussels experience included:

- **Government led first** by developing several public sector buildings to meet Passive House standards. This demonstrated viability of the standards in Brussels and kickstarted the Passive House building industry in the area.
- **Financial incentives** were put in place to support the program in the form of subsidies to promote Passive House building and energy efficient renovations, and a green social loan to enable low-income families to access zero interest loans for energy efficient renovations.
- A **network of professional advisors** was established early in the process. The advisors provided technical, financial, and management advice on best practices at no cost to developers. The focus was on disseminating information to key stakeholders to facilitate their familiarity with Passive House standards for future projects.
- Within two years, local material and component manufacturers were able to meet Passive House standards and compete directly with imports. Manufacturers were able to respond to the **market signals** provided by the certainty that BatEx would be funded at least until 2014.
- **Knowledge dissemination** was enhanced by a quarterly magazine targeting key stakeholders (developers, contractors, public authorities, etc.) providing clear and concise information on Passive House standards. This was coupled with national and regional events promoting the standard.
- Partnership between key stakeholders in industry, academia, and public sector led to the development of **training programs** to upgrade skills of the local workforce.

Project history

The Belgian context

Ten years ago, Brussels was nowhere on the world stage as a leader in sustainable buildings. Passive House was nowhere on the radar. Industry, architects, and end consumers were highly skeptical of energy

efficient housing, seeing it as a luxury. In the early 2000s, building insulation in the Brussels–Capital Region was one of the worst in Europe, with energy loss through walls measuring 250 MJ/m^2.

A three-phase pilot program (BatEx, Batiments Exemplaires or Exemplary Buildings) from 2007-2009 demonstrated that Passive House standards were affordable and did not raise renovation and construction costs to unacceptable levels. In 2009, the regional government passed the Passive House Law, requiring all new public construction to follow Passive House standards by 2010, and all new construction to follow those standards by 2015. This law committed to an energy standard that would make Brussels the largest city in Europe to adopt the one of the most stringent energy standard for buildings.

The shift to adopt aggressive policies on energy efficiency is particularly noteworthy within the context of Belgium's limited potential for renewable energy generation. Belgium lacks large hydro resources and land for biomass plantations, and its coastline is small, limiting wind resources.

At the time that new policies and legislation were adopted, authorities were wrestling with various attitudes and issues of capacity and resources:

- Energy consumers were still not convinced of the significance of energy efficiency.
- Consumers who did wish to invest in energy efficiency did not always have the technical information required for demand-side management.
- Professionals who were called on were not fully competent to meet energy efficiency demand.
- Even if investment were viable, it still was not enough of a priority in resource allocation.
- Technical solutions that made use of renewable energy sources were still not well-known, and remained relegated to obscurity due to poor economic viability.

Leading by example

The Exemplary Building (BatEx) program was created with three objectives:

1. Reach an initial critical mass of energy efficient buildings
2. Stimulate the supply for eco-construction (that is, to push the building sector towards producing more energy-efficient buildings
3. Increase the market demand

The BatEx program is an open call for proposals, in which buildings that meet an exemplary energy and environmental performance standard are eligible to receive a subsidy of 100 euros per m^2.

Between 2007 and 2009, three calls for proposals resulted in 117 winning projects, representing more than 18.5 million euros disbursed in subsidies. Projects resulted in new construction and renovation to Passive House standards of 265,000 m^2 in buildings, including hundreds of homes, offices, schools and child care centres, and even a funeral home. The total value of the BatEx program is 45 million euros from May 2007 to December 2014.

All new construction and renovation under BatEx must:

- Be informed by Passive House standards and reduce emissions as close to zero as possible
- Prioritize the use of eco-friendly construction materials, and consider natural cycles (e.g. rainwater) and biodiversity
- Demonstrate a high architectural quality, good visibility, and a satisfactory level of integration into existing stock
- Use simple and reproducible technology (in technical and financial terms) with reasonable payback timelines, rather than using high-tech solutions

The initial projects demonstrated that new construction and renovation to the Passive House standard was accessible without significant cost increases. With that confirmation, the Brussels government committed

to lead by example, passing an order mandating the Passive House standard on all new public buildings in the region as of 2010. In 2011, the Passive House law was passed, requiring the standard for all new construction as of 2015.

Private energy providers return 0.04 per cent of their annual revenue (1.5 billion euros per year) to the Brussels–Capital Region government. This annual refund, totalling 60 million euros[1], is used to provide the subsidies and incentives to run the BatEx program and supporting initiatives described below.

Supporting initiatives

In addition to the move towards Passive House standards for new construction, the region's Energy Management Action Plan Program (P.L.A.G.E.) targeted upgrades in public buildings such as schools, hospitals and social housing projects, where 20–40 per cent improvements in energy efficiency could be made without major investment. The plan allowed for increasing occupant awareness for energy efficiency while reducing energy consumption.

An extensive energy subsidy program was established to ensure that financial incentives were not solely restricted to exemplary buildings. The program was designed to further develop the supply chain and availability of sustainable products and services, thereby reducing the cost as take up and demand increased. A suite of subsidies were made available for insulation, green roofing, glazed windows, and other materials, mechanical components and appliances for individual homes, collective housing, and tertiary sector buildings. Subsidies are also available for energy audits and feasibility studies.

A Green Social Loan was established to encourage low-income families to access zero interest loans, valued at 500 to 20,000 euros, to be used for insulation and effective heating. This helps the energy efficient building program as a whole reach as wide an audience as possible.

Public outreach and engagement

The market did not initially embrace the idea of going passive in 2015; professionals thought the policy was moving too fast. Real estate companies were concerned about airtightness tests — although all buildings submitted and successfully passed the tests. Despite a rocky start and a few obstacles along the way, the new legislation was eventually well received by the key stakeholders in the Brussels–Capital Region.

Promotion of the move toward the Passive House standard in the Brussels–Capital Region was done through highly visible outreach and advertising. The magazine Be.Passive, which is released quarterly, targeted key stakeholders (developers, contractors, public authorities, etc.) by providing clear and concise information on Passive House standards and highlighting projects. Fun public events, Passive House Fairs and symposia were organized. Creative outreach and advertising using tactics like flashmobs and an "Are you normal?" ad campaign was launched to de-mystify Passive House and make it understandable for all residents.

People who live in Passive Houses became ambassadors of the Passive House standard. Most of them low-income residents, they debunk the myth that passive buildings are a luxury only reserved for the rich.

[1] Items supported by the 60 million euros budget include:
6 million euros – BatEx
8 million euros – 115 internal staff
19.5 million euros – supporting tools (e.g. experts, research)
20 million euros - energy subsidies

Jobs and innovation

Initially the local supply chain faced stiff competition from imported Passive House-compliant components. Within a few years, however, local businesses including a number of SMEs were able to develop certified products and compete effectively in the market. Key to innovation was certainty that a market for higher quality products exists, as provided by the BatEx program, which was expected at the outset to be funded until 2014. (The Passive House Law established a definitive demand).

In 2012, BatEx accounted for more than 16 per cent of construction annually, generating 319 million euros in business and creating an additional 1250 jobs.

The B.C. context

Globally, the building sector contributes up to 30 per cent of greenhouse gas emissions and consumes up to 40 per cent of all energy. In B.C., the building sector accounts for 22 per cent of energy use and 12 per cent of greenhouse gas emissions. The provincial government has acknowledged that energy efficiency and building construction will have to play a major role in climate policy, and has made various commitments towards improving energy efficiency in buildings. Along with its Pacific Coast Collaborative partners, B.C. has committed to "lead the way to 'net-zero' buildings." The 2008 Energy Efficient Building Strategy established targets for buildings, but the strategy did not explicitly lay out how the B.C. Building Code (BCBC) would be subsequently amended to achieve these targets, and there has been no official reporting on progress to meet them. The 2013-14 updates to the BCBC introduced new energy efficiency requirements for large and complex buildings over 600 m^2 (Part 3 buildings) and small buildings and houses, three stories or less (Part 9 buildings). These requirements are a step in the right direction, but still lack the level of ambition indicated by the commitment to "lead the way to 'net-zero.'"

The Brussels experience demonstrates that with firm government commitment, financing for subsidies and training/support for industry professionals, it is possible to go from being a laggard on energy efficient buildings to a world leader. The Brussels–Capital Region government is now building and renovating to ultra-high energy efficiency standards at affordable costs, driving down greenhouse gas emissions by 18 per cent per capita, and stimulating innovation and creating jobs at a regional scale.

With a proven track record of creating employment, implementing an ultra-efficient energy standard for buildings, like Passive House, would provide B.C. an opportunity to both tackle the climate challenge and create employment and innovation opportunities.

Sources

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are you normal?

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In your passivehouse, the most extraordinary is YOU

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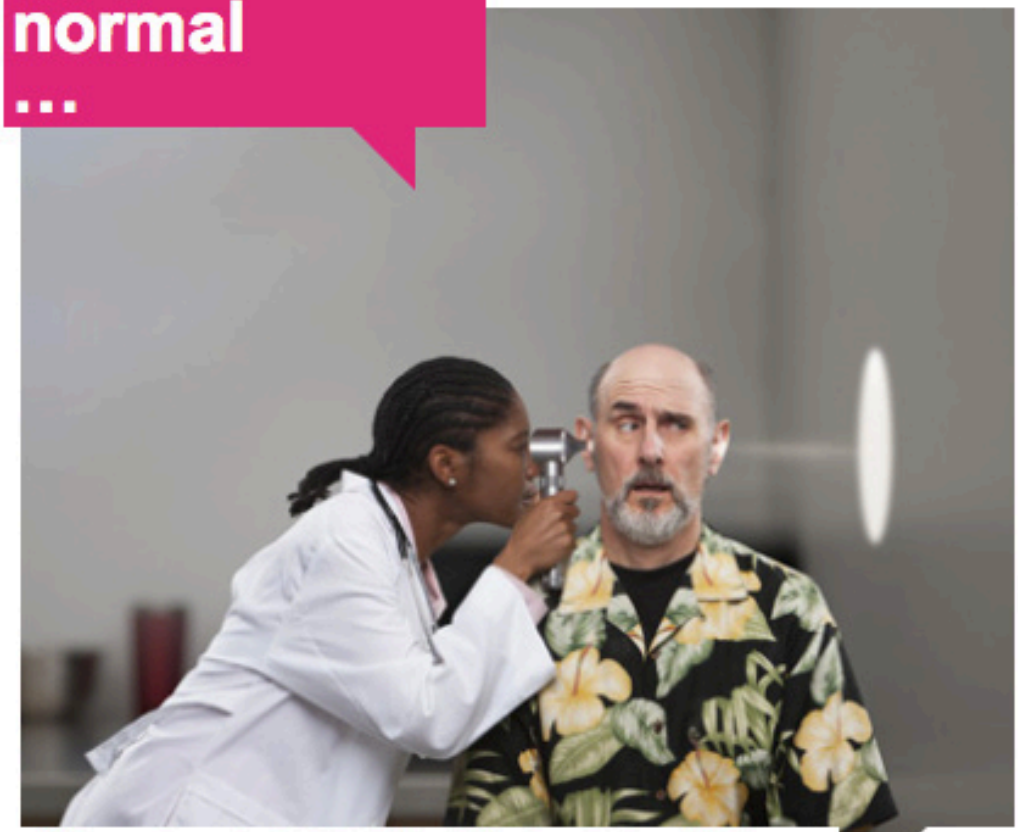

In your passivehouse, the
most extraordinary is YOU