

CITY OF NORTH VANCOUVER

Reducing greenhouse gas emissions to increase climate resiliency

By Sophie Guilbault

Source: City of North Vancouver

THE SCIENCE

The construction industry has evolved significantly over the last few decades as new technologies and new design approaches have emerged to reduce both the energy consumption of buildings and their reliance on heating and cooling systems. Several of these innovations have been developed to ensure thermal comfort within the building envelope while relying on very little energy needs. For instance, passive cooling technologies have been developed and implemented in many buildings, allowing for better control of heat gain and heat dissipation to improve indoor thermal comfort with low- to no-energy consumption.

THE TRIGGER

As the City of North Vancouver was grappling with the problem of reducing greenhouse gas (GHG) emissions and energy use, it examined its main sources of emissions and prioritized interventions accordingly. Unlike most urban areas, the City of North Vancouver does not attribute most of its emissions to transportation. Indeed, the city has approximately equal levels of emissions produced by the building and transportation sectors because of transit-oriented planning efforts made in the early development of the city. As such, planners in the City of North Vancouver decided to place a focus on the building sector to achieve the city's emissions and energy use reduction goals.

THE APPROACH

The City of North Vancouver developed the Energy Efficient Buildings Working Group, to reflect on how best to tackle energy use in buildings and corresponding GHG emissions. The group, composed of developers, technical experts on green buildings, utilities representatives, architects, engineers, representatives from City Council's advisory bodies, and staff from various departments at the municipal level, brainstormed where to begin. Their discussion was influenced by their own analysis of the situation but also by research borrowed from other municipalities, including the City of Vancouver. Working group discussions resulted in the creation of energy efficiency by-laws promoting higher energy performance in all new construction and major retrofits. On January 1, 2011, the City of North Vancouver became the second municipality in British Columbia (after the City of Vancouver, which has the benefit of its own Building Code) to implement a city-wide initiative to reduce energy consumption and GHG emissions in buildings of all uses, classes and sizes. This was done by incentivizing industry take-up of building energy standards superior to those of the British Columbia Building Code.

The city implemented new zoning requirements obliging all new buildings exceeding a low base density threshold to achieve greater energy performance. In other words, the city allows for buildings to reach their maximum zoning density only if developers and builders can prove they have met higher energy performance targets. As achieving higher density is extremely appealing to developers, 97% of all builders have decided to construct buildings that meet maximum zoning density and consequently have integrated higher energy performance designs and technologies within their

ENERGY CONSUMPTION COMPARISON FOR RESIDENTIAL BUILDINGS IN kWh/m² PER YEAR

(ALL NUMBERS SHOWN ARE APPROXIMATE VALUES)

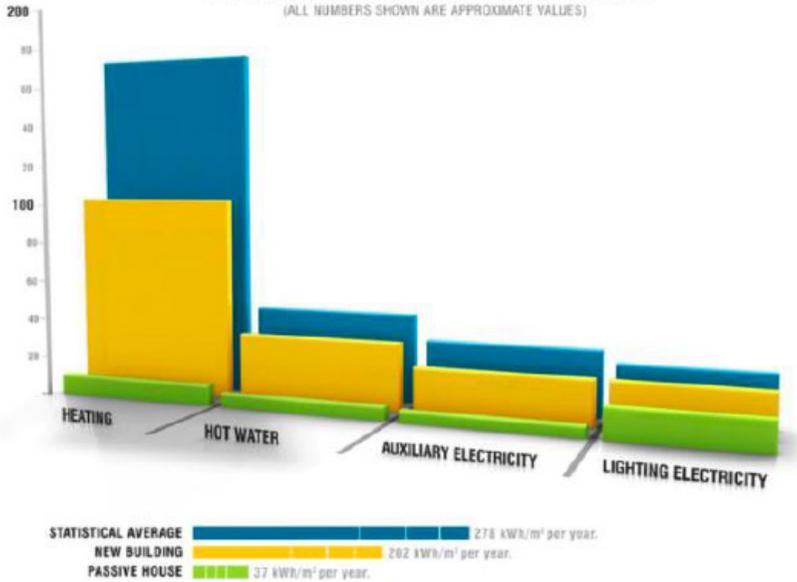


Figure 23: The diagram above represents the benefits passive buildings present in terms of lower energy consumption.

(Source: City of North Vancouver)

buildings. To this end, the city established a system of verification and compliance, requiring early and detailed energy modeling, integrated design teams, and provision of a letter of verification from all accredited professionals confirming that buildings were constructed as designed. Prior to construction, the city also requires that developers provide an energy performance bond equal to 1% of construction costs, an amount that is given back to the developers if the required energy targets are met or exceeded. When developers do not reach their pre-defined energy targets, the city invests the forfeited bonds into the city's Carbon Fund, which supports initiatives such as the city's Living City Street Tree Planting Program and the building energy retrofit program.

The City of North Vancouver is also requiring the construction of either certified Passive House buildings or LEED-Gold certified buildings with Platinum-level energy conservation targets in the redevelopment of Moodyville, a large infill neighbourhood within the city. This neighbourhood represents 1.1 million square feet of buildable area. Doubling and in some cases tripling the density of buildable area while raising energy performance requirements has ensured the redevelopment of Moodyville for new ground-oriented family-friendly housing. It also achieves energy resilience and adaptability. City planners are currently estimating that well over half of the homes of the new Moodyville neighbourhood will be certified under the Passive House Standard. These passive homes are intended to be thermally comfortable indoors year-round during both hot and cold days with minimal heating and cooling energy

use or costs, while virtually all new construction will be built to achieve higher energy performance than what is required by the provincial building code.

THE OUTCOME

Through its strong push toward passive and highly energy-efficient buildings, the City of North Vancouver is aiming to significantly reduce the energy consumption of buildings in the city. “A lot of our efforts have been around refocusing the behaviour of buildings. We highly incentivize Passive House construction and are getting all of the builders exposed to this way of designing and building new construction in order to increase climate resiliency in our city”, said Emilie Adin, Deputy Director of Community Development for the City of North Vancouver. The construction of certified Passive Houses aligns with climate resiliency goals, as these properties can be self-sufficient under a wide variety of temperatures.

A WORD FROM THE CITY OF NORTH VANCOUVER

When asked what advice she would give to municipalities that would like to follow the lead of the City of North Vancouver in their energy efficiency initiatives, Ms. Adin recommended to always look for win-win situations and examine what can be leveraged within your organizational structure. “One of the things we did for the zoning by-law was to look for outdated provisions used to promote density, and swapped these out with energy efficiency provisions. For instance, we traded out an old requirement tying greater density to exponentially higher parking, in order to get industry buy-in for new energy requirements and to remove provisions that were at odds with the city’s other climate action goals,” said Ms. Adin. This specific situation represented a “win-win” as it helped the city achieve its climate action goals and removed the parking requirements that developers were made to provide for higher density buildings. According to Ms. Adin, it is extremely important to avoid overregulation by looking at what requirements can be removed even as you are adding more. Finally, she mentioned the importance of getting the right people involved from the beginning and keeping everyone on side by understanding each stakeholder’s interests and priorities.