During the 2016-2017 academic year I was fortunate enough to be awarded the International Experience Award. In April 2017, I used this opportunity to explore the world of green roofs, and green roof policy, across Europe. I visited eight countries: the Netherlands, Belgium, Luxembourg, Finland, Estonia, Latvia, Denmark, and Iceland. Throughout my travels I visited various green roof and green technology projects, discussing policy and technology with planners, professionals, and locals as I went. However, despite traveling to Europe to try and determine which green roof policies would work best in Canada, my field research quickly steered me in a different direction.

Long the leaders in environmentalism, many European nations have been using various planning tools and policies to promote the adoption of more "Green-friendly" methods of development. Cities such as Amsterdam have set lofty targets of covering 30 percent of the City's public housing (almost half of all housing stock in Amsterdam) with green roofs. Equally ambitious, since 2010 Copenhagen has mandated all new buildings have green roofs if their pitch is less than 30 degrees. Coupled with gratuitous subsidies and rebates, the development of green roofs has taken off in most of the countries I visited.
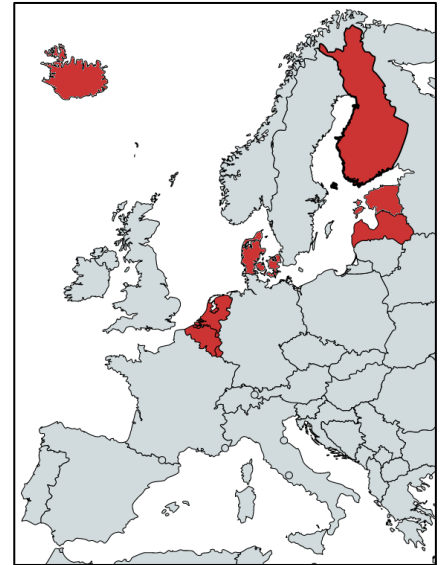
Bruxelles Environnement's new building in the Docklands neighbourhood is the second-largest passive energy building in Europe, and the largest in Belgium.

While the whole-hearted adoption of such environmentally friendly policies is to be lauded, once I was on the ground, it became clear to me that placing such a priority on green technology can adversely effect the *social* environment. Speaking with the manager of Amsterdam's green roof subsidy program, I quickly learned that the vast majority of private-sector builds with green roofs were high-end hotels, displacing what limited privately-held housing stock exists in central Amsterdam. Similarly, while exploring the Bruxelles Environnement (Brussels Ministry of Environment) building, I discovered that this record-setting environmentally friendly headquarters was actually planned to be the heart of a redeveloped mixed-use community...where currently the lowest income residents of Brussels were living.

Although Brussels was ostensibly using this redevelopment of the lowest-value, post-industrial lands in the city to showcase their commitment to green technology, the reality is actually a vector for gentrification, rapidly forcing Brussels' most vulnerable populations away. The docklands and surrounding "North Brussels" neighbourhoods have historically been some of the poorest, and feature some of the highest concentrations of immigrants in Europe. Thus, by further marginalizing these groups, Brussels' commitment to green development may unwittingly yield very negative social side effects.

A billboard advertising future developments to occur surrounding Bruxelles Environnement's landmark building. The ad is in Flemish, French, and English due to the site's relative proximity to the international financial district.

This pattern of green roofs and green technology being reserved only for the wealthy was continued during my trip to Luxembourg. This country is one of the richest per capita in the world, and is a global banking hub. The headquarters of the European Central Bank (ECB) is also located here, and was built with an astoundingly large and well-engineered green roof. In fact, it even won the 2004 Green Roof of the Year award. However, as I found out from the security guards who escorted me away from the building, the roof is not to be admired by

The European Central Bank won Green Roof of the Year in 2004.

the general public—it is solely for the enjoyment of the bureaucrats working for the ECB. While not quite as shocking as the planned gentrification in Brussels, or the removal of private housing stock for hotels in Amsterdam, it nonetheless struck me that a public financial institution would spend so much money on a project only to bar the public from even observing it.

As I continued my way across the continent, these incidents that I had initially presumed to be isolated slowly evolved into a running theme. In Finland, Estonia, and Iceland, green roofs were a foible of the rich; a more practical environmental investment was solar panels due to the long hours of sunlight in the summer, and specifically for the Icelanders, geothermal energy. Meanwhile, in Latvia, weak regulation of the building code has led to green roof projects that have killed citizens when they fail.

My collective experiences throughout this journey have led me to realize that although generally well-intentioned, green policy and technology such as green roofs must be carefully considered before implementation. Even in policy that from the outset can seem harmless, the end result on the ground is often negative. The Copenhagen policy I mentioned earlier, which mandates green roofs on all new builds, was seen as a brave and progressive move at the time. However, it has since come under scrutiny for exacerbating the problem of affordable housing in the city. While this by no means is a condemnation of environmentalism or the necessity to build more sustainable and responsible cities, my eyes were opened to the social impacts that such initiatives were having all across Europe.

Reflecting on what I experienced and how it can be applied to a Canadian context, I see a lot that we can learn. Firstly, there are contexts where policies such as Copenhagen's can potentially work without negatively impacting residential costs. For example, if green roofs were mandated on all high-rise commercial development, these costs would be borne by the corporations seeking to use these spaces, rather than by residents. Secondly, the Bruxelles Environnement building was not in and of itself evil. Governments should lead by example in adopting and implementing green technologies—they just need do so in a manner that does

not disenfranchise the most vulnerable. And my final take-home from this trip is that it seems the Europeans are ahead of us yet again. While North America is finally waking up to green roofs and beginning to adopt them, many countries are already abandoning them in favour of more practical, affordable, and effective green technologies. While a green roof may be "sexy" and "sleek," solar panels in Finland, geothermal in Iceland, or wind turbines in Denmark are sometimes just the more social, environmental, and economical way to go.