

International Experience Award: Rotterdam and Krommenie, the Netherlands

Research Topic: Investigating the Implementation of Multifunctional infrastructure in the Netherlands

Learning Experiences:

During my visit to the Netherlands, I had the opportunity to investigate three infrastructure developments that serve to improve the user experience of each locality, while having the added benefit of aiding in the adaptation to or mitigation of climate change. These sites include:

Bentham Square, Rotterdam: is a vibrant public space that serves the functions of a basketball court, skateboard park and band stand. However, on days when rain is substantial, this multi-grade public amenity becomes a catchment that allows water to permeate below grade, while saving millions of euros each year in insurance claims from flood damage.

Museumpark, Rotterdam: While serving to mitigate much of the on-street parking need and improve the sightlines of the green space that contains several historic sites, museums, and the medical centre of Erasmus University, this parking garage also contains the largest floodwater retention facility in the Netherlands, with enough capacity to hold 4 Olympic sized swimming pools worth of water.

SolaRoad, Krommenie: The solar bicycle path in Krommenie is a prime example of innovative repurposing of an established technology. The single lane bicycle path is a prototype that measures only 70 meters, but generates enough electricity to power three Dutch homes year round. This prototype has been established in order to develop a product that could one day resurface vast networks of roads. The design includes solar panels

encased in a layer of textured tempered glass that is both strong and transparent.

I conducted site visits at each of these locations as well as interviewed Noud Paes, partner at Paul de Ruiter Architects, the firm that designed the Museumpark parkade, as well as the Sten de Wit, Director of TNO's SolaRoad R&D.



Figure 1. SolaRoad Prototype

Location: Krommenie, The Netherlands

Image: Matt Murray, 2016

Developed by the Dutch consortium of TNO, Province of Noord-Holland, Ooms Civiel, Dynniq

Context:

From August 31 to September 8, 2016 I travelled through the Netherlands researching these three renewable energy projects. The precedent that led me to seek out these projects was the costly reality that climate change is now having. Two separate flooding events occurred in Canada in the summer of 2013. Toronto's flood was the largest flood in Ontario's history, while the flooding event in Calgary was the most expensive natural disaster in Canadian history. Clearly, our cities are increasingly more vulnerable to climate change and need innovative and cost-effective solutions to mitigate and adapt to threats such as this. Moreover, as much of the Netherlands is situated below sea level, and since climate change will make sea levels rise globally, it is an ideal place to research the mitigation and adaptation of climate change.



Figure 2. Artist's rendering of the Benthem Square
Location: Rotterdam, The Netherlands
Image: <http://worldlandscapearchitect.com>

Research Topic:

The Netherlands is host to many innovative infrastructure developments that adapt to or mitigate climate change. The focus of my trip was to discover what it is about the Netherlands, that allows them to develop cutting edge infrastructure projects. I had suspected that there would be notable differences in their legal frameworks, or an especially flexible building code that allows for more innovation or substantial government incentives or subsidies for the private sector to innovate. I was also interested in finding out what challenges and successes were found along the path to implementing sustainable, multifunction infrastructure developments.

Research Findings:

While composing interviews, I discovered that ambitious choices made by the Dutch government were a central cause of these successes. Though private industry can and does make some innovative developments, ambitious government policy was most referenced as the catalyst for these sorts of projects. For example, before employees at Paul de Ruiter Architects were tasked with designing the parkade for Museumpark, the large floodwater cisterns had already been designed by engineers at the City of Rotterdam.

TNO, the Netherlands Organisation for Applied Scientific Research is a semi-public entity that is the lead partner in research and development of SolaRoad. The organisation receives partial funding from the Dutch government in order to support their research. However, it relies on private investment to make their ideas a reality. In this way, the group is motivated to create truly marketable innovation, such as the SolaRoad. Furthermore, my contact from TNO explained to me that – in the infrastructure market – the Dutch government rewards proposed projects with up to five stars for

designs that effectively reduce greenhouse gas emissions. This rating is something that companies are very interested in receiving, because during the bidding process, each star that is rewarded is recognized as being valued at a certain dollar amount less, therefore making the project more competitive. This rating helps companies and investors feel more comfortable with working on and investing in research and development, and it also makes projects such as TNO's SolaRoad more attractive to their business partners: Ooms Civiel, The Province of North Holland and Dynniq.

Reflection:

As an academic focussing on the concepts of adaptation and mitigation of climate change through urban and regional planning, I find it encouraging to know that progressive policy implementation has been demonstrated as an effective method of establishing infrastructure projects that aid in climate change mitigation and adaptation. Before I embarked on my trip, or met with any professionals in the field, I had suspected that there would be a complex answer to explain how these infrastructure projects became reality. I had suspected that flexibility in parts of the Dutch equivalent of the Ontario Building Code, Planning Act, or Municipal Act would explain why the Netherlands seems to have more progressive approaches to infrastructure. However, my interviews revealed that, although items such as these may play a role in increasing innovation, mandated government policy is seen as a key instrument in bringing these innovations to market. Entities such as TNO, as well as government mandates to encourage and incentivize companies to develop sustainable projects help to make the Netherlands a fertile place for this variety of innovation.

Though the scope of my research did not include a close examination of infrastructure development in

Canada, it is encouraging to know that there are new organizations that serve similar purposes to TNO, such as the Canadian Urban Transit Research and Innovation Consortium (CUTRIC). Also, current policy exists that pushes for more progressive infrastructure development, such as Ontario's Five Year Climate Change Action Plan.

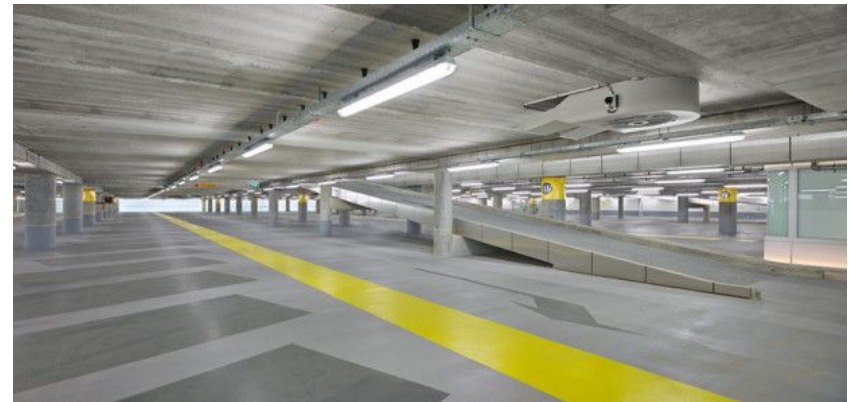


Figure 3. Underground Parking at Museumpark

Location: Rotterdam, The Netherlands

Image: www.igg.nl

For questions relating to this document, please contact
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