Kingdom of the Netherlands
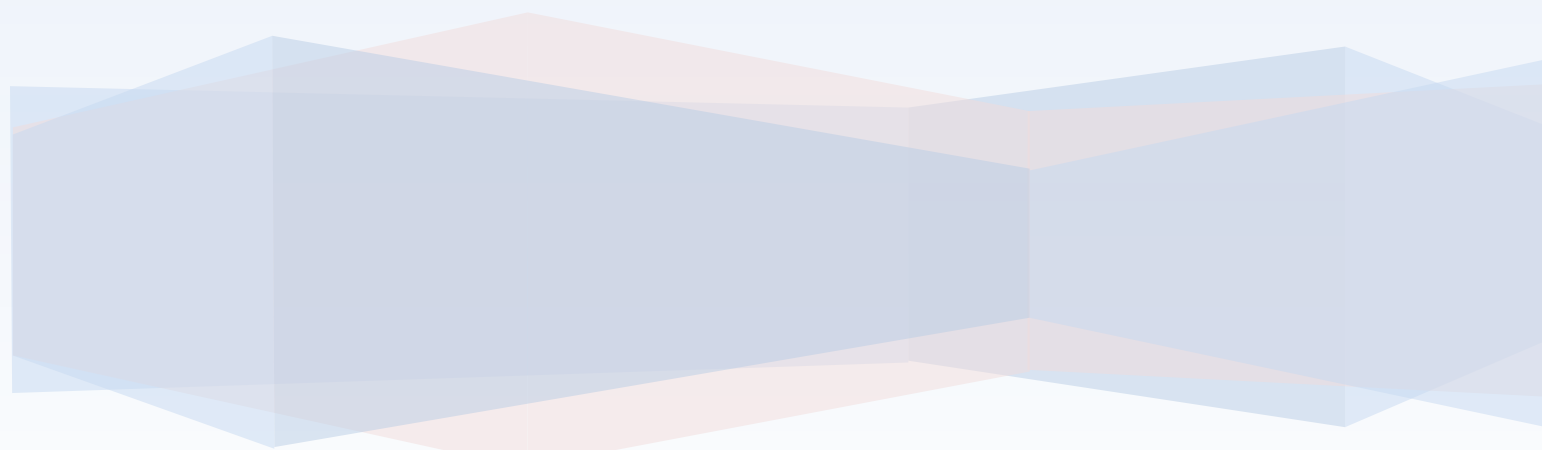
THE WORLD BANK

SMART CITIES
KNOWLEDGE SILO BREAKER

Final Report:
Netherlands Smart Cities Study Tour

Smart Cities KSB and Royal Netherlands Embassy
May 8-12, 2017

Section 1: Background and Aim

Study Tour Aim

A collaborative venture of the Smart Cities Knowledge Silo Breaker at the World Bank and the Embassy of the Netherlands, the aim of the study tour was:

a) to offer client city officials of the World Bank the unique opportunity to learn from practical examples and interactions with Dutch pioneers in sustainable, technology-led innovations,

b) to encourage intellectual exchange and ultimately adoption of similar longer-term approaches among client cities.

Goals

- Identifying cities' needs and challenges in implementing smart urban infrastructure under the facilitation of Dutch experts

- Showcasing success stories of Dutch Smart City projects and sharing efforts undertaken to address critical challenges and issues during project implementation

- Exchange of expertise and inspiration with Dutch experts in various fields, particularly in transport, energy, circular economies and citizen engagement

- Having an interactive week, while continuously revisiting how lessons learned can be applied in the client cities

Themes

The main themes that emerged were multi-stakeholder collaboration (between the public and private sectors, citizens and academia), planning for sustainable, longer-term goals rather than just immediate profit, and the shifting roles of government in encouraging/facilitating system-wide thinking.

Section 2: Projects Visited

Day 1: Smart City Overview and Introduction to Themes

The Study Tour started with an introduction by the study tour organizers: Stephanie Broeder, Private Sector Officer, and Jan Peelen, Policy Advisor, from the Embassy of Netherlands, Qiyang Xu and Nanya Sudhir, Community Managers and Program Coordinators from the Smart Cities KSB at the World Bank, and Bram Reijndeers Chairman of the Global Smart Cities Community & Coalition (GSC3).

National and city representatives from Albania, Bangladesh, Belgrade, Bosnia and Herzegovina, Croatia, Kosovo, Morocco, presented their smart city projects, goals and term strategies under the support of the World Bank. Key areas of concern identified were:

- ***Defining smart cities at a city level:*** Dhaka, Macedonia, Sarajevo, Southeast Europe

- ***Creating service efficiency through technology:***

    o Overall planning and implementation: Macedonia, Dhaka, Vlora, Southeast Europe

    o Energy: Morocco, Southeast Europe

    o Transport: Gjakova, Skopje

- ***Citizen and stakeholder engagement:*** Vlora, Dhaka, Sarajevo, Belgrade, Rijeka

The Amsterdam Smart Cities platform was introduced by Maaike Oosieck, Head of Communication & Engagement. The innovative platform connects, accelerates and strengthens the links between 11 PPP partners and a community of over 3000 members with the aim of creating a future-proof and live able city. Its smart city goals include reducing traffic congestion by 2020 and installing 850,000 solar panels in Amsterdam. In the words of Ms. Oosieck, "a smart city is not about technology, but about the innovation process and how cities bring citizens together to overcome obstacles".

Hans Teuben, Director, Public Sector Strategy & Innovation, Deloitte, spoke about the power of disruptive technology and social innovation in achieving smart city objectives. He talked about the importance of keeping citizens at the center of smart cities, and of bringing together innovators to use technology and data intelligently rather than expensively to help solve problems. He emphasized that sustainable urban growth and innovation can be achieved on small budgets by delivering training and fostering creativity. Mr Teuben also presented Deloitte's smart city actor map that helps define the roles of citizens and city government as well as a Smart City Capability Framework that supports building a smart city in seven capability dimensions.

The group also toured the Edge – recognized by the Bloomberg as one of the greenest, most intelligent buildings in the world. The building is equipped with

over 28,000 sensors to ensure resource efficiency in its electricity, water, lighting and temperature systems, and its layout encourages flexible work, physical and mental wellbeing (through gyms, counseling, daycare centers and high levels of natural light in the building), and specially designed spaces for face-to-face collaboration between teams.

The day ended with field visits to ArenA Amsterdam and De Ceuvel. The Amsterdam Innovation ArenA is a world-famous football stadium that also hosts 90-100 entertainment events annually, with a capacity of up to 68,000 visitors each time. Sander van Stiphout, Director of the ArenA demonstrated how the City of Amsterdam has partnered with ArenA Amsterdam to make it an icon of sustainability. The two work together on mobility and sustainability solutions, using the city as a lab to test out ways to improve post-event traffic flows, exploring social media as a crowd monitoring and response tool, and offering financial incentives for energy sustainability. The ArenA generates its own solar energy to fuel events, and is set to become carbon neutral in five years.

De Ceuvel is an award-winning architectural project that repurposes a 1.2-acre derelict shipyard into a sustainable workplace through circular economy technologies. The site uses filters and compost bins to process bio-waste from the businesses onsite, an urban garden with aquaponic agriculture that uses phytoremediative grasses to clean the previously polluted land, and heat pumps, solar panels, and biogas to generate energy onsite. Eva Gladek, Founder and CEO of Metabolic Labs that developed the design for the site, explained how circular solutions can use technology and social planning to derive more output while using fewer resources, especially in crowded urban areas where infrastructure and resources are becoming increasingly scarce.

Day 2: Circular Economy

To gain in-depth knowledge on how smart solutions can contribute towards the circular economy in different contexts, the group visited four featured project sites around Amsterdam – Waternet, Valley Beta, Park2020 and a Neighborhood Battery System.

Waternet
Waternet treats 50% of Amsterdam's water, taking a future-oriented water cycle approach to ensure that water systems are safe, sufficient, clean, and climate-proof. The treatment facility is designed to recover as much energy from the wastewater treatment process as possible, and generates more energy than it needs for its operations. The heat energy generated from wastewater is shared with local energy board to supply the city. Waternet also mines resources such as phosphates and cellulose from wastewater, and promotes sustainability initiatives such as green and blue roofs, preserving green spaces, and water/energy saving sanitation at civic-level.

Valley Beta
Participants were walked through the concept of a circular economy by the team at Valley Beta. They looked at the shifting role of the private sector as innovators with the end goal of sustainability rather than profit motive and of the government as enablers changing how rules/regulations/laws are defined to make room for possibilities rather than just reduce risks. They also saw examples of sustainability schemes across the world and of Dutch products being repackaged and refocused with the circular economy in mind.[1] They then participated in a workshop on how to refocus priorities and enable sectoral change as government to address their cities' problems.

Presenters:
- Annerieke Douma, Director Program and Business Development from the Circle Economy

- Tijstke IJpma, Policy Advisor Circular Economy, Ministry of Infrastructure and the Environment

- Rob Oomen, Project Management Officer at Valley Creators

Game:
- Jurn de Winter, Lead Circle Cities Programme

- Joke Dufourmont, Junior Project Manager Circle Cities Programme

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[1] Examples of schemes include 'hoy no circula' in Mexico, tax breaks for bicycle repair in Sweden, the city hall in Venlo built on cradle-to-cradle principles. Examples of products include the Fairphone and Gerrard Street headphones, both made from completely replaceable parts, and longer term durability Philips lightbulbs also with individually replaceable parts, with the idea of light being offered as a service rather than a product.

Park2020

Andre Buikema, Park Manager from the Delta Development Group presented Park 2020 in Rijssen, the world's first business park that is completely designed according to the cradle-to-cradle principles. Park2020 is built on land owned by the City of Amsterdam incentivized for sustainable development through tax breaks. Park2020 works for people, planet and profit by encouraging established businesses to build offices and ateliers with entirely repurposable, replaceable and recyclable construction materials and furnishings. In doing so, it also inspires a sustainability-focused business strategy.

Neighborhood Battery

The second day closed with Alliander Energy Specialist Rob van Olst presenting the Neighborhood Battery System in Rijsenhout, a town in the Western Netherlands near Amsterdam. The community-level energy storage system houses a collection of solar-powered batteries from households in the neighborhood to enable stabilization of electricity distribution for 35 households, particularly during peak hours.

Day 3: Smart Mobility and Matchmaking Session

Reliable road and public transport infrastructure are the foundation for sustainable development of cities, but their management is notoriously difficult. On their first day in The Hague, the Study Tour group was received by Netherlands Enterprise Agency for a deep dive on Smart Mobility. Julie Van Hetersen, of the Amsterdam Metropolitan Authority and Hans Kramer from the Agency of Public Works presented Amsterdam Practical Trial, a traffic management app in Amsterdam that leverages technology to provide drivers access to alternate travel routes and ease congestion. The city also embraces autonomous vehicles, the Internet of Things, and using open data, social media tracking and big data analysis to improve traffic efficiency. This has resulted in better roadside integrated networks, easier traffic management, and better cooperation between public authorities and the private sector.

On the private sector side, Barry Tremeer, Director of Product Management at the satellite navigation company TomTom, spoke about the importance of striking a balance between largely publicly managed roadside traffic management and largely privately provided dashboard messaging systems (e.g. GPS, satellite navigation systems and mapping apps). He proposed a complementary system that provides consistent messaging and measurement on roadside and dashboard interfaces to influence drivers and improve safety, parking accessibility, and commuting time.

On the public sector side, Marcel van der Steen, Manager, Innovation and Business Development of the Netherlands Central Bureau of Statistics (CBS), combines CBS data from different sources, e.g. survey, administration and sensor data, with city level data and a map of local needs to develop evidence-informed, financially sound, and actionable policy advisory. These are devolved through Urban Data Centers in Eindhoven, Heerlen, Groningen and The Hague.

Day 3 ended with a matchmaking session between city officials and Dutch private sector companies to identify common goals and build synergistic relationships towards achieving them.

Day 4: Smart Energy and Using Cities as Labs

Alliander
Cities play a crucial role in Smart energy transition through potential energy reduction and decentralizing energy production. William van Neikerk, Managing Director, Liandon, which supplies 40% of the Netherlands' electricity. He discussed the enormous potential of facilitating increasingly smart and resilient cities by changing infrastructure, shifting to renewable energy sources, using neighborhood level microgrid operating systems, and increasing energy efficiency at household level. Liandon uses simulation models to map potential risks, better prepare hazard responses, and visualize what can happen in other, unconnected systems (e.g. water and gas). The key, Mr Niekerk emphasized, is sharing knowledge and insights by being transparent to all stakeholders, and being prepared to adapt operating models to respond to new technologies.

Eindhoven: Strijp-S, Automotive Campus, Stratumseind
The group traveled to Eindhoven, site of former Philips headquarters, to learn about smart, multi-use brownfield redevelopment in Strijp-S, urban experiments in smart mobility at the Automotive Campus, and the use of smart lighting for crowd control in Stratumseind.

Strijp-S
Strijp-S is the redeveloped site of the former Philips headquarters that has been converted into a creative, mixed-use, tech-enabled district. Strijp-S is well-connected to public transport, equipped with smart sensors to bring about resource-efficiency, and features residential, creative, business environments, multi-use public spaces.

Automotive Campus
Using hybrid and electric buses, the Automotive Campus is working with the City of Eindhoven to roll out zero-emissions public transport by 2025. It has partnered with the city to experiment with automated traffic light controls, self-driving cars, platooning (where trucks following each other so the second one can drive longer and more efficiently) and the mitigation of shockwave traffic jams (where cars stop successively in a harmonica-like wave on major roads to bring traffic to standstill).

Daniel de Klein, Campus Site Manager from the Automotive Campus emphasized that their success rests on the quadruple helix model, which uses the strong partnerships between government, industry, society and academia to enable the

Dutch automotive industry to switch to offering mobility as a service rather than as a series of new products. Collaboration within the industry also refocuses the profit-driven approach by giving companies collective ownership and incentive to advance collaboratively.

The Automotive Campus, which has used the highways around Eindhoven to conduct traffic experiments, uses the city as a living lab with citizens as willing participants in experimentation.

Stratumseind

Stratumseind, a 300-meter long pub street that uses streetlights equipped with sensors for behavior influence, crowd management, and reduction in violence and crime also uses the city as a living lab. In both cases, lessons from this experimentation go on to inform city-level policy implementation and response.

Day 5: PPPs and Action Plans

On the last day, participants discussed key takeaways from projects and action plans to deal with the challenges they had identified on the first day of the Study Tour. (Detailed in the next section)

They then participated in a simulation game to develop a better understanding of how to pursue projects using Public Private Partnerships (PPPs). Throughout the week, the group saw many examples of forward-looking initiatives achieved in collaboration with – and often led by – the private sector in the Netherlands. Almost all recent highway projects in Netherlands are realized through a DBFM (Design, Build, Finance & Maintain) contracts, giving private parties the opportunity to innovate and develop efficient maintenance.

This session with Jan van Schoonhoven, Senior Advisor on Innovative Financing and Water at the Ministry of Infrastructure and the Environment, aimed to expose participants to the PPP model of working through role play. The PPP simulation game – solving problems for a highway project under PPP model, was a case study developed based on real-life situations. Participants brought in different perspectives as the roles assigned to them, gaining deep understanding of the key to developing and implementing solutions – close collaboration between city authorities, the private sector and other stakeholders.

Section 3: Lessons Learnt and Steps Forward

Key Takeaways

1. Think long-term, build smart from the start – it is easier and increasingly cheaper to invest in smart, energy-efficient traffic lights from the beginning than to replace them further down the line

2. Cooperation between the public sector and private entities, citizens, non-profits (civic organizations) and academia is crucial to ensuring sustained success of future initiatives

3. Governments should strongly consider partnering with the private sector to develop more efficient solutions, harness financial opportunities, and facilitate collaboration between/within the public and private sector.

4. Through awareness-raising campaigns by government and partners, it is important to build social consciousness in citizens over time. This, combined with flexibility and city level devolution of power and finances ultimately encourages city officials and private sector firms to take ownership to develop innovative solutions for bigger picture environmental goals

5. City-level ownership is important in achieving success. Leads to city level or private sector initiative-taking, facilitated by the government.

Next steps – from session on last day

- Continue to work on strategy with the objective Smart – while evaluating and keeping updated through staying in touch

- Partner with the private sector to develop more efficient solutions – using the Public-Private-Partnership training on the last day

- Facilitate exchange – university to university, innovation lab to living lab, municipality and Eindhoven municipality (Gjakova)

- Work within city governments and with Dutch to make a low-budget version (adopt best practices) for municipalities with less funds at their disposal

- Municipalities work on strategies to inform their citizens about the Smart City initiatives in place in their cities

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