Rijksdienst voor Ondernemend Nederland

Towards Resource Recovery in a Circular Economy

Report on Workshop | 21st of April, 2017 | Josephine Nijstad

The Holland Innovation Network co-organized the workshop "Towards Resource Recovery in a Circular Economy", with Witteveen+Bos and Delft University of Technology, supported by PUB, Singapore's National Water Agency. Various Singaporean and Dutch participants, from companies, government and universities, were present in the ACE Ideation Centre in Singapore for an interesting morning. The purpose of the workshop was to get to know each other, share challenges and new technological developments in the field of circular economy, leading to collaboration and policy exchange between Singapore and The Netherlands in the future.

Singapore and The Netherlands are natural partners, as there are many similarities. Both countries have limited natural resources, but instead of seeing this as a constraint, it is taken up as a challenge for innovation. Investments in smart infrastructure, excellent logistics and new methods to increase productivity and liveability are already present and essential elements of a circular economy. Thereby, The Netherlands Organisation for Applied Scientific Research (TNO), made an initial estimation on the benefits of a circular economy. They stated that each year, an extra turnover of € 7.3 billion can be generated by investing in circular businesses, accounting for 54,000 jobs in the Netherlands. In addition, the Rabobank has estimated that a circular economy can lead to extra growth in GDP up to 8.4 billion euros - in the most circular economic scenario. This shows that sustainable development and economic interest go hand-in-hand.

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-TNO-

H.E. Jacques Werner
(Ambassador of the Netherlands)

Mr. Ng Joo Hee(PUB) and
Mr. André Struker (Waternet)

The morning kicked-off with inspiring talks from Mr. Ng Joo Hee, *Chief Executive* of PUB, and H.E. Jacques Werner, *the Ambassador of the Netherlands*. Mr. Ng Joo Hee proudly presented the dynamic and modern approach towards the water supply in Singapore, with as cherry on the pie, *NEWater,* which is fully recycled water (and tastes well!). The ambassador explained the ambition of

The Netherlands to be fully circular by 2050, and stressed the need for collaboration. Instead of reinventing the wheel, we should co-develop technologies, establish business cases and work together on policies and future proof strategies.

Ms. Susan van Boxtel, moderating the workshop (Holland Innovation Network)

Dr. Arjen van Nieuwenhuijzen, *Chief Technology* at Witteveen+Bos, started with the first presentation of the day; *Added Value of Resource Recovery in the context of Circular Economy.* The focus of Dr. van Nieuwenhuijzen's introduction was on the fact that future resource recovery concepts have to provide added value for sustainable development. Therefore, in a transition from a linear to circular economy, *"waste should no longer be seen as waste, but as a used flow, containing valuable compounds for new processes."*

"Waste should no longer be seen as waste, but as a used flow, containing valuable compounds for new processes."

-Dr. Arjen van Nieuwenhuijzen-

The presentation of Prof. Mark van Loosdrecht, Delft University of Technology, elaborated further on this in his presentation *Waste to Resource.* Using wastewater as a source, Prof. Van Loosdrecht introduced the audience to phosphate and alginate recovery. He explained how resource recovery is not only done from a 'sustainable' point of view, but can actually save costs (phosphate) or can fill a gap in the market (alginate). Prof. Van Loosdrecht emphasized that quality and quantity of materials should increase in order to generate a business case.

Prof. Mark van Loosdrecht (Delft University of Technology)

From wastewater to building industry,
Dr Yang En-Hua, *Cluster Leader* at the Nanyang Environment and Water Research Institute, highlighted recent advances on the use of recycled material for the development of green construction materials. His department developed a new type of cement, made from rejection brine from the desalination plant, which is as strong as normal cement, but more flexible and therefore increasing its

performance. This shows that circular materials do not need to copy virgin materials, but have their own advantages.

Participants from companies, governments and universities are getting to know on another

Ms. Herry Cho (ING Bank) and
H.E. Jacques Werner
(Ambassador of the Netherlands)

After the coffee break, where a lot of networking was done, Mr. André Struker, *Strategic advisor* at Amsterdam's water company Waternet, introduced us to some smart business cases. He showed how by cross sector collaborations and out-of-the-box thinking, the Dutch blood bank could save money and eradicate noise pollution from the cooling equipment to the neighbourhood. This could be done by replacing the old air conditioning for cooling blood, for a cooling system using the temperature of drinking water. Another innovative technology they are working on is producing protein out of wastewater, which could potentially supply 36% of the protein demand of Amsterdam.

Singapore deals with an increasing stream of electronic waste. Waste streams are challenges, but also offer opportunities! Mr. Yew Wen Shan presented a method to recover gold from electronic waste, by using microbes instead of harmful chemicals. The results are promising, though, not completely matching market demand. New technologies bring new opportunities; such as the molecular biological tool CRISPR-Cas, which can modify characteristics of bacteria to expedite circularity.

Last, but not least, entrepreneur and pioneer in the circular economy, Mr. Allan Lim, shared with us the story about the companies he founded (Alpha Biofuels and Comcrop). The principle behind Alpha Biofuels is relatively easy, using waste streams (e.g. waste cooking oils, animal fat) to generate energy on location. During the implementation, however, it became evident that there is more to a business than just the right technology. To improve implementation, one should have regular communication with theusers of the final product and if necessary, go back to the design table. Secondly, for every application there is a right location and scale. To find the

Mr. Allan Lim
(Alpha Biofuels and Comcrop)

optimum, one should experiment with different settings. Thereby, excellent logistics are key to every process!

After these six presentations, Jessica Cheam, well known eco-journalist, stepped up to moderate the discussion. She steered into an open discussion, starting by asking company representatives what challenges they face and what they need to overcome these challenges. The role of the government was touched upon. The Dutch national circular economy program and ambitions for 2050 made quite an impression with the Singapore audience, and Jessica challenged the government of Singapore to follow. Although circular economy is not yet a term as established as in The Netherlands, awareness and the need for new business models is increasing. People agreed that communication is key in this transition, ranging from communication between different governments and departments, '*it is essential to seek coalition with different levels in policy*', to communication between designers, users and industry. Furthermore, supply chains and the corresponding value chains were discussed. For proper implementation, one should take a holistic view on a products or service chain. Thereby, suggested was that value in itself needs to be re-evaluated. Should one look at monetary value only? What about social impact and our *intrinsic* responsibility towards society? Many examples given during the workshop showed that there *is* a business case for circular economy.

"It is essential to seek coalition with different levels in policy"

-Participant during discussion-

Ms. Jessica Cheam, moderating the discussion (eco-journalist)

Mr. Eugene Tay, during the discussion (ZeroWaste SG, Circular Economy SG, Green Future Solutions)

The topics above are just a few of the many discussed, but this workshop made clear the interest and willingness to learn from each other and to cooperate towards new developments within this field. To quote the Ambassador; "*Circular economy is here to stay".*

"Circular economy is here to stay"

-H.E. Jacques Werner-

We would like to thank all the speakers and participants of the workshop for your valuable contribution.

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More information?
Please contact the Holland Innovation Network at the Embassy of the Kingdom of the Netherlands via sin-ia@minbuza.nl, or visit the website, www.ianetwerk.nl.

***'A circular economy in the Netherlands by 2050'*, the report by the government of the Netherlands.**
https://www.government.nl/binaries/government/documents/policy-notes/2016/09/14/a-circular-economy-in-the-netherlands-by-2050/17037+Circulaire+Economie_EN.PDF